PUBLS. INST. GEOPHYS. POL. ACAD. SC., B-42 (410), 2009

Editorial Note

Starting with data for 2006, the Institute of Geophysics has been gradually limiting the print-form publication of data from its stations and observatories. Most of the material is available on the Institute's webpage.

Along this line, instead of publishing two seismological bulletins every year, we decided to publish just one. Hence, the present ***Seismological Bulletin 2006 – Local Earthquakes Recorded by Polish Seismological Stations*** is the only seismological bulletin published with the data for the year 2006. Since that year, the former bulletins entitled: ***Seismological Bulletin – Polish Broadband Seismic Stations SUW, KWP, WAR, GKP, KSP, OJC, RAC, NIE*** cease to appear. A short note with description of data processing, current information regarding the stations and details how to get the data is each time added to the bulletin with local earthquakes

PUBLS. INST. GEOPHYS. POL. ACAD. SC., B-42 (410), 2009

Local Earthquakes Recorded by Polish Seismic Stations 2006

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1. General Information

The majority of seismic events recorded in Poland are caused by mining activity in the Upper Silesian Coal Basin and Lubin Copper Basin. Induced seismicity is observed less frequently in the Rybnik Coal District and Bełchatów Open-Pit Mining area.

A tectonic event of magnitude M = 3.2 occurred on June 25, 2006, in Western Carpathians, about 12 km south of a series of local earthquakes recorded since November 30, 2004, until December, 2005, in the south margin of the intramontane Orawa-Nowy Targ Basin (Guterch 2006, 2008).

Eigth seismic stations were in operation in 2006 at the Institute of Geophysics, Polish Academy of Sciences: Górka Klasztorna (GKP), Kalwaria Pacławska (KWP), Książ (KSP), Niedzica (NIE), Ojców (OJC), Racibórz (RAC), Suwałki (SUW) and Warszawa (WAR). Station parameters are given in Table 1. The location of seismic stations operated by the Institute of Geophysics and by research centers associated with coal mining (Katowice, Bełchatów) and copper mining (Lubin) is presented in Fig. 1.

The bulletin contains a list of local earthquakes which occurred in 2006 in Poland. The full description of each earthquake contains: epicentral location (φ, λ), time of origin (H), local magnitude (M). The location of events listed in this bulletin is given in Fig. 2. For comparison, location of the same events done by NEIC is presented in Fig. 3.

Magnitudes of all earthquakes are based on spectral method. This method allows conversion of the recorded ground particle velocities into ground particle displacements. The modified FFT method has been applied, for which a multitaper method (Thomson 1982, Park *et al*. 1987) has been used instead of a single taper window. The multitaper method allows for a better and more reliable evaluation of spectrum. The scal-

Table 1

Seismic stations – site information and equipment

Station	Location	Date of opening	Current equipment		Foundation
			Seismometers	DAS	
GKP – Górka Klasztorna	53.2697 N 17.2367 E 115 m	Jun 2004	STS-2 (VBB)	MK-6	Post-glacial sediments
KSP – Książ	50.8428 N 16.2931 E 353 m	Jan 1971	STS-2 (VBB) BB-13 (BB) GS-13 (SP) SM-3 (SP)	MK-6 MK-2 MK-2 analogue	Consolidated sandstone, Lower Carbo-niferous
KWP – Kalwaria Pacławska	49.6314 N 22.7075 E 448 m	Jun 1999	STS-2 (VBB)	Quanterra	Carpathian Flysh
NIE – Niedzica	49.4189 N 20.3131 E 649 m	May 1960	SM-3 (SP)	MK-5	Limestone
OJC – Ojców	50.2196 N 19.7984 E 391 m	Sep 1991	STS-2 (VBB) GS-13 (SP) SM-3 (SP)	MK-6 MK-2 analogue	Limestone
RAC – Racibórz	50.0833 N 18.1942 E 209 m	Jan 1948*	KIRNOS (LP) SM-3 (SP)	MK-5 MK-5	Alluvial sands and clay
SUW – Suwałki	54.0125 N 23.1808 E 152 m	Nov 1995	STS-2 (VBB)	Quanterra	Post-glacial sediments
WAR – Warszawa	52.2417 N 21.0236 E 110 m	Jan 1939	STS-2 (VBB)	MK-6	Alluvial sands and clay

Seismometers: SP – short-period, LP – long-period, BB – broadband, VBB – very broadband
Data aquisition system (DAS): Quanterra Q380 – in cooperation with GEOFON network; MK-2, MK-5, and MK-6 described by Wiszniowski (2003)

* Date of reactivation after the World War II

ing of the calculated spectra has been done using Parseval's theorem for every applied window separately (Niewiadomski 1997). The low frequency spectral level has been used to calculate seismic moment and magnitude (Brune 1970). In order to accelerate magnitude calculation a simple neural network is applied. The network takes filtered and averaged amplitudes of P-wave velocity records as the input data. The training was done on the basis of known examples of several hundred seismograms, where network's weight corrections were calculated by spectral method (Niewiadomski 2000). The performance of the applied neural networks for magnitude calculation is the same as that of multitaper method. The seismic source radiation pattern is not homogeneous, and it is why the magnitudes calculated by different seismic stations are not the same. Average values of magnitudes are presented in the bulletin.

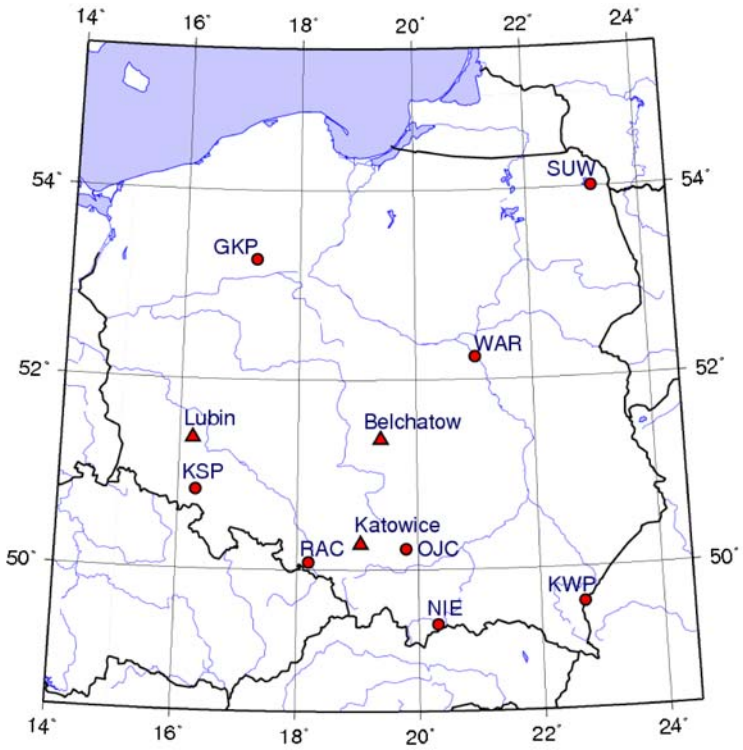

Fig. 1. Seismic stations operated by the Institute of Geophysics, Polish Academy of Sciences (●), and local seismic networks operated by mines (▲).

2. Interpretation of P and S Waves

In the light of results provided by seismic refraction and wide angle reflection experiment CELEBRATION 2000 (Guterch *et al*. 2003), interpretation of seismic waves recorded in Poland at regional distances, between about 180 and 600 km, were revised by Guterch (2007). Generally, at regional distances of more than about 180 km, direct Pg wave does not occur in first arrivals and follows the Pn wave. First arrivals of Pn waves are weak and have been recorded in Poland only for earthquakes with magnitude M > 2.7. According to record sections along profile CEL05 (Grad *et. al*., 2006), the longest seismic profile in Central Europe, extending from the East European Craton across the Trans European Suture Zone, Carpathians, to the Panonian Basin, Pn is usually followed by much stronger reflected wave from the Moho PmP, or twice reflected wave from the Moho PmPPmP. These waves are interpreted as Pg in routine seismic bulletins according to the Jefreys–Bullen or Herrin travel times, available for distances up to about 800 km. Pg waves at these distances, according to record sections of profile CEL05, are too weak to be recorded and are overlaid by much dynamically stronger PmP and PmPPmP waves. At distances of about more than 450-460 km, P wave, i.e., the lithospheric wave, should be recorded in first arrivals. The same concerns, in general, the S waves. The Sn wave is followed according to CEL05 data by much

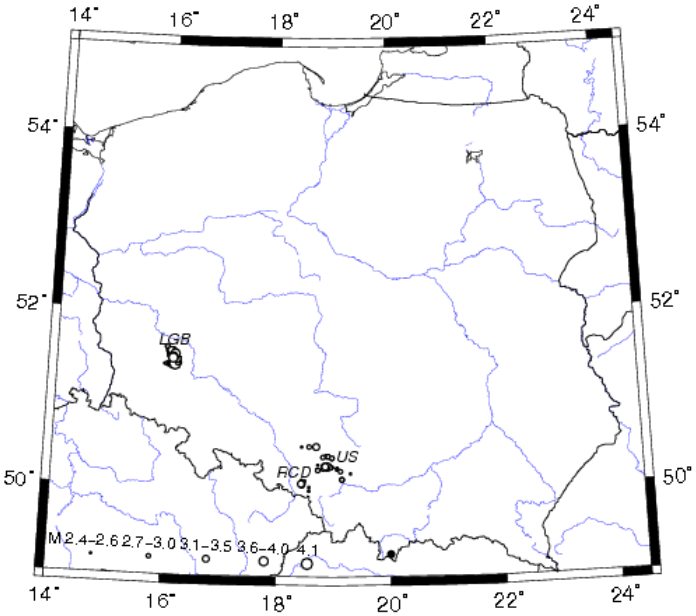

Fig. 2. Epicentres of earthquakes recorded in 2006 by Polish seismic network. ○ – mining induced seismic events in: the Upper Silesia Coal Basin (US), Rybnik Coal District (RCD), and Lubin-Głogów Copper Basin (LGB). ● – tectonic earthquakes recorded in the Tatras, Western Carpathians.

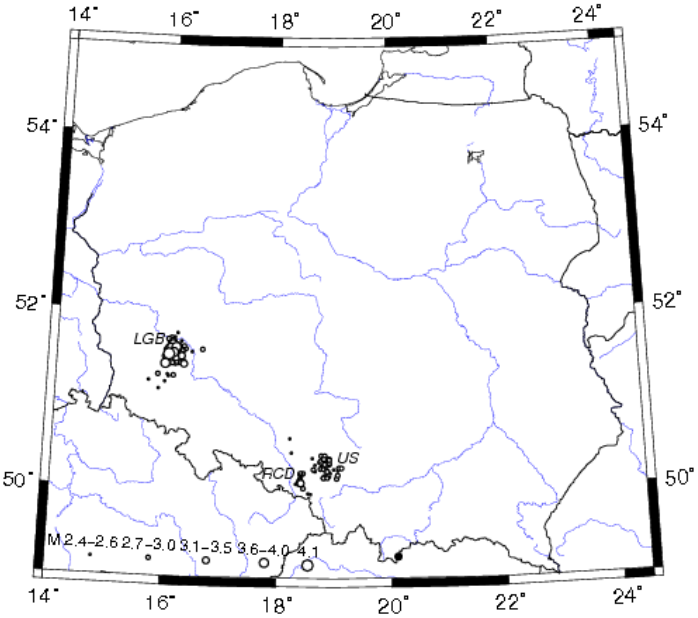

Fig. 3. Epicentres of earthquakes recorded in 2006 by NEIC. ○ – mining induced seismic events in: the Upper Silesia Coal Basin (US), Rybnik Coal District (RCD), and Lubin-Głogów Copper Basin (LGB). ● – tectonic earthquakes recorded in the Tatras, Western Carpathians.

stronger wave SmS reflected from the Moho, interpreted in routine seismic bulletins according to Jefreys–Bullen and Herrin travel times as Sg. Wave Sg is too weak to be recorded according to CEL05 travel sections. At distances of more than 450-460 km, the S wave, i.e., the lithospheric wave, should be recorded in first S arrivals.

It seems that in the area under study, at regional distances of more than about 180 km, the onsets interpreted as Pg and Sg phases are probably arrivals of waves PmP, or PmPPmP and SmS, i.e., reflected from the Moho.

The interpretation of phases given in the bulletin is made according to Jeffreys–Bullen and Herrin travel times. Only for an earthquake in the Tatras, Western Carpathians, suggested interpretation of waves PmP/PmPPmP and SmS instead of Pg and Sg is done.

3. Induced Seismicity

Out of several thousand of seimic events induced by mining in Poland each year, only those with magnitude M > 2.1 for the Lubin-Głogów Copper Basin and with M > 1.8 for the Upper Silesia Coal Basin and Rybnik Coal District are listed in this bulletin. Quakes induced by the open-pit mining in the Bełchatów area, were in 2006 of M < 2.0, and are not given in the bulletin.

3.1 Upper Silesia and Rybnik Coal District

Epicentral location of Upper Silesian and Rybnik Coal District earthquakes was made by the Central Mining Institute in Katowice. Only if such data were missing, the coordinates were estimated at the Institute of Geophysics. The epicenters determined at the Central Mining Institute are labelled (GIG). The other two source parameters, the time of origin and magnitude, are determined at the Institute of Geophysics. The origin times are based on the Pg and Sg arrivals recorded at stations OJC, NIE, KSP, and RAC. Seismic events with magnitude M > 1.8 recorded in the Upper Silesia and Rybnik Coal District in 2006 are presented in Fig. 4.

3.2 Lubin-Głogów Copper Basin

Epicentral locations of tremors from the Lubin-Głogów Copper Basin were made by the Copper Mining-Metallurgical Company in Lubin on the basis of the local seismic networks at Lubin, Polkowice, Rudna and Sieroszowice mines. The average accuracy of epicenter location is about 50 m and occasionally even 20 m. Most of seismic events in the Lubin-Głogów Copper Basin occur at depths between 500 and 1000 m. The other two source parameters, the time of origin and magnitude, are determined at the Institute of Geophysics. The origin times are estimated from the arrival times of the Pg waves recorded by KSP assuming Pg velocity of 6.1 km/s. Seismic events with magnitude M > 2.1 recorded in the Lubin-Głogów Copper Basin in 2006 are presented in Fig. 5. All these events occurred within the area of the Lubin-Głogów copper mines. Dispersion of epicentres follows NW-SE direction, the area of earthquakes occurrences is about 25 km long (see Figs. 2 and 5). NEIC epicentres of events in the Lubin-Głogów Copper Basin are NE-SW widely dispersed and delineate an artificial seismic line, about 100 km long,in SW Poland(see Fig. 3).

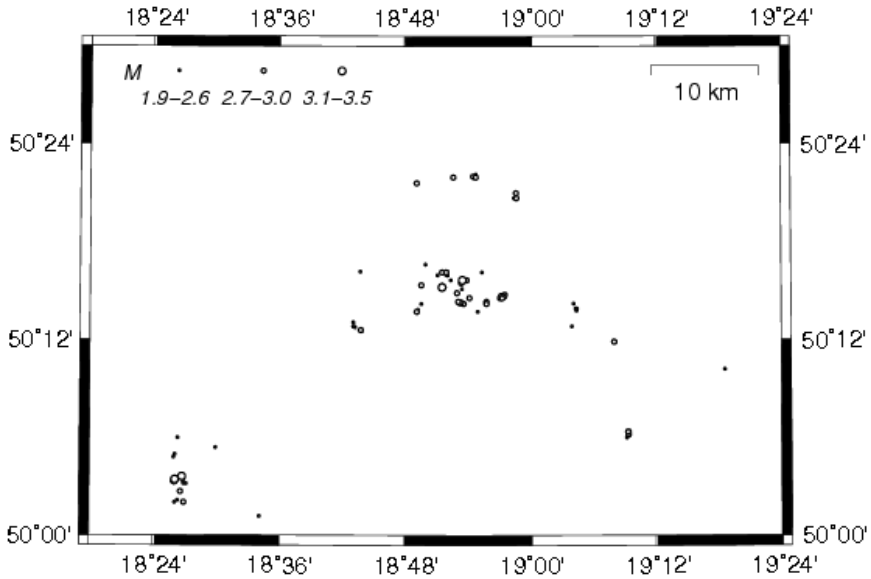

Fig. 4. Mining induced earthquakes recorded in the Upper Silesia and Rybnik Coal District in 2006. Epicentral location of earthquakes made by mining networks of the Central Mining Institute in Katowice.

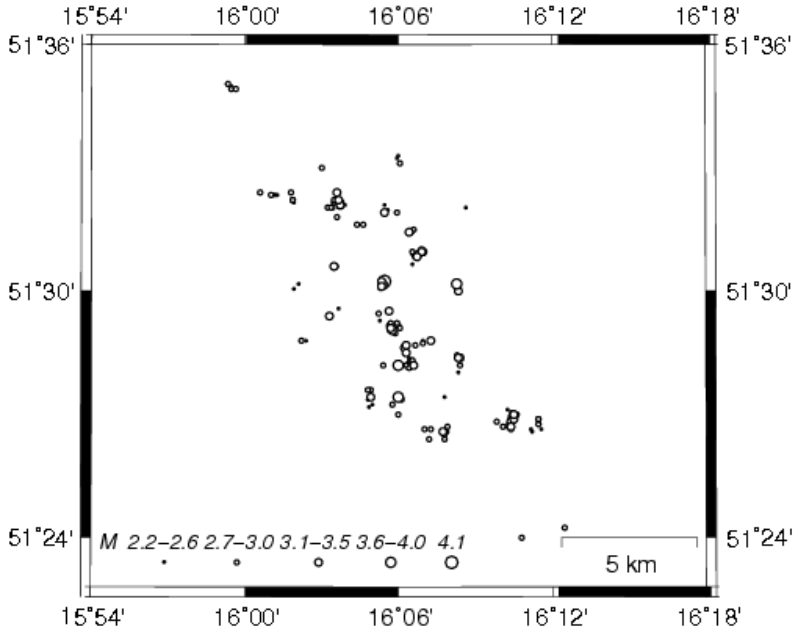

Fig. 5. Mining induced earthquakes recorded in the Lubin-Głogów Copper Basin in 2006. Epicentral location of earthquakes made by mining networks of the Copper Mining-Metallurgical Company in Lubin.

A general interpretation of Lubin-Głogów earthquakes recorded by NIE and RAC is given i.e., phases P and S, and occasionally phases Pn and Sn for stronger events of M > 2.7.

4. Local Tectonic Earthquakes

A tectonic event was recorded on June 25, 2006 of magnitude M = 3.2 in Western Carpathians, in Poland. The quake occurred in the area of Tatras, about 12 km south of a series of local earthquakes recorded since November 30, 2004 until December, 2005 in the south margin of the intramontane Orawa-Nowy Targ Basin (Guterch 2006, 2008). An epicenter of the event was made after records of the nearest stations in the Czech Republic, Poland and Slovakia, by Dębski *et al*. (1997) method, assuming the mean Moho depth h = 35 km. No foreshocks or aftershocks were detected.

The bulletin was made by Danuta Cerlica for induced earthquakes in Upper Silesia Coal Basin and by Ewa Tomaszewska in the Lubin-Głogów Copper Basin.

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JAN 3

GIG: φ = 50.266°N, λ = 18.864°E
H = 04:06:14.4, M = 2.4

OJC Δ = 67km
Pg eZ 04 06 26.5
Sg eE 06 34.7

NIE Δ = 140km
Pg eZ 04 06 38.5
Sg eN 06 55.1

KSP Δ = 193km
Pg eZ 04 06 46.6
Sg eN 07 09.4

JAN 3

GIG: φ = 50.267°N, λ = 18.882°E
H = 10:39:37.3, M = 2.3

OJC Δ = 65km
Pg eZ 10 39 48.1
Sg eE 39 57.5

NIE Δ = 140km
Pg eZ 10 40 01.1
Sg eE 40 19.2

KSP Δ = 194km
Pg eZ 10 40 09.2
Sg eN 40 32.8

JAN 4

φ = 50.27°N, λ = 19.06°E
H = 03:12:21.2, M = 2.1

OJC Δ = 53km
Pg eZ 03 12 30.5
Sg eN 12 37.5

NIE Δ = 131km
Pg eZ 03 12 43.6
Sg eE 12 59.9

KSP Δ = 206km
Pg eZ 03 12 55.6
Sg eE 13 20.5

JAN 4

GIG: φ = 50.261°N, λ = 18.896°E
H = 05:30:40.4, M = 2.5

OJC Δ = 65km
Pg iZ 05 30 51.8 D
Sg eE 31 00.4

NIE Δ = 138km
Pg eZ 05 31 03.8
Sg eE 31 20.7

KSP Δ = 195km
Pg eZ 05 31 13.2
Sg eN 31 35.8

JAN 4

GIG: φ = 50.057°N, λ = 18.434°E
H = 15:16:54.0, M = 2.4

RAC Δ = 17km
Pg eZ 15 16 57.9
Sg eNE 17 01.0

OJC Δ = 99km
Pg eZ 15 17 11.1
Sg eN 17 23.3

NIE Δ = 153km
Pg eZ 15 17 20.6
Sg eN 17 39.6

JAN 4

φ = 50.27°N, λ = 18.87°E
H = 17:55:03.4, M = 2.1

OJC Δ = 66km
Pg eZ 17 55 15.2
Sg eN 55 23.5

NIE Δ = 141km
Pg eZ 17 55 27.6
Sg eE 55 45.0

KSP Δ = 193km
Pg eZ 17 55 35.6
Sg eZ 55 59.3

JAN 5

φ = 50.29°N, λ = 18.88°E
H = 08:33:46.4, M = 2.2

OJC Δ = 66km
Pg eZ 08 33 58.2
Sg eE 34 06.3

NIE Δ = 142km
Pg eZ 08 34 11.1
Sg eN 34 28.1

KSP Δ = 193km
Pg eZ 08 34 18.9
Sg eN 34 41.6

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JAN 5

GIG: φ = 50.266°N, λ = 18.882°E
H = 20:09:20.7, M = 2.1

OJC	Δ = 66km		
	Pg eZ	20 09	32.8
	Sg eE	09	40.6
NIE	Δ = 140km		
	Pg eZ	20 09	44.6
	Sg eN	10	02.2
KSP	Δ = 194km		
	Pg eZ	20 09	52.9
	Sg eN	10	16.5

JAN 6

GIG: φ = 50.215°N, λ = 19.067°E
H = 02:52:21.5, M = 2.4

OJC	Δ = 52km		
	Pg eZ	02 52	30.6
	Sg eN	52	37.5
NIE	Δ = 127km		
	Pg eZ	02 52	44.0
	Sg eN	52	59.7
KSP	Δ = 208km		
	Pn eZ	02 52	53.6
	Pg eZ	52	55.8
	Sg eN	53	20.8

JAN 6

GIG: φ = 50.266°N, λ = 18.864°E
H = 03:23:25.7, M = 2.2

OJC	Δ = 67km		
	Pg eZ	03 23	37.5
	Sg eN	23	46.1
NIE	Δ = 140km		
	Pg eZ	03 23	49.7
	Sg eE	24	07.1
KSP	Δ = 193km		
	Pg eZ	03 23	58.0
	Sg eN	24	21.2

JAN 6

GIG: φ = 50.266°N, λ = 18.887°E
H = 03:23:25.9, M = 2.1

OJC	Δ = 65km		
	Pg eZ	17 18	40.0
	Sg eN	18	47.9
NIE	Δ = 139km		
	Pg eZ	17 18	52.5
	Sg eN	19	09.4
KSP	Δ = 194km		
	Pg eE	17 19	00.1
	Sg eN	19	22.8

JAN 7

GIG: φ = 50.273°N, λ = 18.829°E
H = 17:29:03.3, M = 2.1

OJC	Δ = 69km		
	Pg eZ	17 29	15.4
	Sg eE	29	24.6
NIE	Δ = 143km		
	Pg eZ	17 29	28.0
	Sg eE	29	45.6
KSP	Δ = 190km		
	Pg eZ	17 29	35.4
	Sg eN	29	57.4

JAN 9

GIG: φ = 50.266°N, λ = 18.864°E
H = 16:11:39.1, M = 2.3

OJC	Δ = 67km		
	Pg eZ	16 11	50.7
	Sg eN	11	59.3
NIE	Δ = 141km		
	Pg eZ	16 12	03.2
	Sg eE	12	21.1
KSP	Δ = 193km		
	Pg eZ	16 12	11.3
	Sg eN	12	34.2

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JAN 9

GIG: φ = 50.066°N, λ = 18.458°E
H = 22:54:02.0, M = 2.1

RAC Δ = 19km
Pg eZ 22 54 06.0
Sg eNE 54 09.4

OJC Δ = 97km
Pg eZ 22 54 18.6
Sg eN 54 31.6

NIE Δ = 152km
Pg eZ 22 54 28.2
Sg eN 54 46.8

JAN 10

GIG: φ = 50.254°N, λ = 18.860°E
H = 06:34:53.1, M = 2.3

OJC Δ = 67km
Pg eZ 06 35 05.0
Sg eE 35 13.3

NIE Δ = 140km
Pg eZ 06 35 17.0
Sg eE 35 34.9

KSP Δ = 193km
Pg eZ 06 35 25.4
Sg eN 35 47.9

JAN 10

GIG: φ = 50.255°N, λ = 18.860°E
H = 14:57:40.1, M = 2.8

RAC Δ = 52km
Pg eZ 14 57 49.7
Sg eNE 57 56.7

OJC Δ = 67km
Pg eZ 14 57 52.0
Sg eE 58 00.3

NIE Δ = 140km
Pg eZ 14 58 03.9
Sg eE 58 21.2

KSP Δ = 193km
Pg iZ 14 58 12.3
Sg eE 58 34.7

JAN 10

GIG: φ = 50.266°N, λ = 18.866°E
H = 16:32:00.3, M = 2.3

OJC Δ = 67km
Pg eZ 16 32 12.5
Sg eN 32 20.3

NIE Δ = 140km
Pg eZ 16 32 24.4
Sg eN 32 41.2

KSP Δ = 193km
Pg eZ 16 32 32.4
Sg eE 32 55.2

JAN 10

φ = 50.26°N, λ = 18.88°E
H = 18:05:41.5, M = 2.3

OJC Δ = 66km
Pg eZ 18 05 53.0
Sg eE 06 01.5

NIE Δ = 140km
Pg eZ 18 06 05.5
Sg eE 06 22.7

KSP Δ = 194km
Pg eZ 18 06 13.5
Sg eE 06 37.0

JAN 10

GIG: φ = 50.216°N, λ = 19.066°E
H = 20:02:36.0, M = 2.3

OJC Δ = 52km
Pg eZ 20 02 44.8
Sg eN 02 51.7

NIE Δ = 126km
Pg eZ 20 02 57.9
Sg eN 03 13.8

KSP Δ = 209km
Pg eZ 20 03 10.9
Sg eZ 03 35.0

JAN 11

φ = 50.28°N, λ = 18.93°E
H = 22:26:56.8, M = 2

OJC Δ = 62km
Pg eZ 22 27 07.9
Sg eN 27 15.7

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NIE Δ = 138km
Pg eZ 22 27 20.4
Sg eE 27 37.8

KSP Δ = 197km
Pg eE 22 27 29.5
Sg eE 27 53.0

JAN 12
GIG: φ = 50.277°N, λ = 18.834°E
H = 11:38:54.2, M = 2.5

OJC Δ = 69km
Pg eZ 11 39 06.2
Sg eN 39 15.5

NIE Δ = 143km
Pg eZ 11 39 18.7
Sg eE 39 36.7

KSP Δ = 190km
Pg eZ 11 39 25.9
Sg eN 39 48.4

JAN 12
φ = 50.31°N, λ = 18.92°E
H = 13:54:36.3, M = 2.3

OJC Δ = 64km
Pg eZ 13 54 47.0
Sg eE 54 55.9

NIE Δ = 141km
Pg eZ 13 55 00.3
Sg eE 55 17.9

KSP Δ = 195km
Pg eZ 13 55 08.0
Sg eN 55 31.5

JAN 13
GIG: φ = 50.215°N, λ = 19.067°E
H = 12:21:03.5, M = 2.3

OJC Δ = 52km
Pg eZ 12 21 12.4
Sg eN 21 19.6

NIE Δ = 126km
Pg eZ 12 21 26.0
Sg eN 21 41.5

KSP Δ = 208km
Pg eE 12 21 37.7
Sg eN 22 02.5

JAN 13
φ = 50.27°N, λ = 18.87°E
H = 17:08:08.9, M = 2.2

OJC Δ = 67km
Pg eZ 17 08 20.5
Sg eE 08 29.2

NIE Δ = 140km
Pg eZ 17 08 33.1
Sg eN 08 50.0

KSP Δ = 193km
Pg eZ 17 08 41.1
Sg eN 09 04.3

JAN 16
GIG: φ = 50.239°N, λ = 18.933°E
H = 09:45:12.9, M = 2.3

OJC Δ = 62km
Pg eZ 09 45 23.5
Sg eE 45 31.4

NIE Δ = 135km
Pg eZ 09 45 36.4
Sg eE 45 53.1

KSP Δ = 198km
Pg eZ 09 45 45.6
Sg eN 46 09.9

JAN 16
GIG: φ = 50.366°N, λ = 18.878°E
H = 22:40:40.8, M = 2.7

RAC Δ = 58km
Pg eZ 22 40 51.4
Sg eNE 40 59.1

OJC Δ = 68km
Pg eZ 22 40 52.7
Sg eN 41 01.5

NIE Δ = 147km
Pg eZ 22 41 06.3
Sg eE 41 24.2

KSP Δ = 190km
Pg eZ 22 41 12.4
Sg eN 41 34.6

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JAN 17

φ = 50.08°N, λ = 18.46°E
H = 00:23:17.7, M = 2.1

RAC Δ = 19km
Pg iZ 00 23 21.9 C
Sg eNE 23 25.3

OJC Δ = 97km
Pg eZ 00 23 34.2
Sg eN 23 47.2

NIE Δ = 152km
Pg eZ 00 23 44.0
Sg eN 24 02.6

JAN 17

φ = 50.29°N, λ = 18.89°E
H = 04:48:32.5, M = 2.1

OJC Δ = 65km
Pg eZ 04 48 44.1
Sg eE 48 52.0

NIE Δ = 140km
Pg eZ 04 48 56.6
Sg eE 49 13.8

KSP Δ = 194km
Pg eZ 04 49 04.6
Sg eN 49 28.0

JAN 17

φ = 50.25°N, λ = 18.88°E
H = 05:01:15.1, M = 2.1

OJC Δ = 66km
Pg eZ 05 01 27.5
Sg eE 01 35.3

NIE Δ = 139km
Pg eZ 05 01 39.3
Sg eN 01 55.5

KSP Δ = 194km
Pg eZ 05 01 47.4
Sg eN 02 10.4

JAN 17

GIG: φ = 50.215°N, λ = 19.067°E
H = 13:20:14.5, M = 2.2

OJC Δ = 52km
Pg eZ 13 20 23.6
Sg eN 20 30.4

NIE Δ = 126km
Pg eZ 13 20 36.5
Sg eN 20 52.2

KSP Δ = 208km
Pg eE 13 20 48.9
Sg eN 21 13.8

JAN 18

GIG: φ = 50.267°N, λ = 18.864°E
H = 08:26:03.5, M = 2.3

OJC Δ = 67km
Pg eZ 08 26 15.1
Sg eE 26 23.6

NIE Δ = 140km
Pg eZ 08 26 27.5
Sg eE 26 45.0

KSP Δ = 193km
Pg eZ 08 26 35.5
Sg eZ 26 59.0

JAN 18

GIG: φ = 50.267°N, λ = 18.865°E
H = 08:34:33.6, M = 2.3

OJC Δ = 67km
Pg eZ 08 34 45.3
Sg eE 34 53.7

NIE Δ = 140km
Pg eZ 08 34 57.6
Sg eE 35 14.9

KSP Δ = 193km
Pg eZ 08 35 05.7
Sg eN 35 28.9

JAN 18

GIG: φ = 50.254°N, λ = 18.860°E
H = 21:52:00.5, M = 2.2

OJC Δ = 67km
Pg eZ 21 52 12.5
Sg eE 52 20.5

NIE Δ = 140km
Pg eZ 21 52 24.5
Sg eE 52 42.9

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KSP Δ = 193km
Pg eZ 21 52 32.6
Sg eN 52 55.8

JAN 18
GIG: φ = 50.266°N, λ = 18.865°E
H = 22:57:42.6, M = 2.4

RAC Δ = 52km
Pg eZ 22 57 52.2
Sg eNE 57 59.4

OJC Δ = 67km
Pg eZ 22 57 54.2
Sg eE 58 02.9

NIE Δ = 141km
Pg eZ 22 58 06.7
Sg eZ 58 24.3

KSP Δ = 193km
Pg eZ 22 58 14.8
Sg eN 58 37.5

JAN 19
GIG: φ = 50.087°N, λ = 18.436°E
H = 02:11:49.3, M = 2.3

RAC Δ = 17km
Pg iZ 02 11 53.4 C
Sg eNE 11 56.1

OJC Δ = 98km
Pg eZ 02 12 06.2
Sg eN 12 18.4

KSP Δ = 173km
Pg eZ 02 12 17.6
Sg eE 12 38.4

JAN 19
GIG: φ = 50.244°N, λ = 18.963°E
H = 07:34:53.7, M = 2.2

OJC Δ = 60km
Pg eZ 07 35 03.8
Sg eE 35 11.7

NIE Δ = 134km
Pg eZ 07 35 17.0
Sg eE 35 34.5

KSP Δ = 200km
Pg eZ 07 35 26.7
Sg eE 35 51.5

JAN 19
GIG: φ = 50.214°N, λ = 19.067°E
H = 11:31:51.1, M = 2.5

OJC Δ = 52km
Pg eZ 11 32 00.1
Sg eN 32 06.8

NIE Δ = 126km
Pg eZ 11 32 13.1
Sg eN 32 29.1

KSP Δ = 209km
Pg eZ 11 32 25.5
Sg eE 32 50.4

JAN 19
φ = 50.26°N, λ = 18.85°E
H = 23:46:15.2, M = 2.1

OJC Δ = 68km
Pg eZ 23 46 27.3
Sg eE 46 35.4

NIE Δ = 141km
Pg eZ 23 46 39.4
Sg eE 46 56.7

KSP Δ = 192km
Pg eZ 23 46 47.3
Sg eN 47 10.1

JAN 20
GIG: φ = 50.066°N, λ = 18.458°E
H = 06:57:40.1, M = 2.1

RAC Δ = 19km
Pg eZ 06 57 44.1
Sg eNE 57 47.3

OJC Δ = 97km
Pg eZ 06 57 56.6
Sg eN 58 08.9

NIE Δ = 152km
Pg eZ 06 58 06.3
Sg eE 58 25.1

JAN 20
GIG: φ = 50.216°N, λ = 19.067°E
H = 18:34:14.3, M = 2.2

OJC Δ = 52km
Pg eZ 18 34 23.7
Sg eN 34 30.7

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```
NIE  Δ = 126km
     Pg eZ        18 34 36.5
     Sg eN           34 52.2

KSP  Δ = 208km
     Pg eZ        18 34 47.5
     Sg eN           35 13.3
```

JAN 20

φ = 50.27°N, λ = 18.88°E
H = 23:01:09.7, M = 2.1

```
OJC  Δ = 66km
     Pg eZ        23 01 21.2
     Sg eE           01 29.8

NIE  Δ = 140km
     Pg eZ        23 01 33.4
     Sg eE           01 51.9

KSP  Δ = 194km
     Pg eZ        23 01 41.7
     Sg eN           02 04.9
```

JAN 20

GIG: φ = 50.267°N, λ = 18.866°E
H = 23:04:20.7, M = 2.5

```
RAC  Δ = 52km
     Pg eZ        23 04 30.3
     Sg eNE          04 37.2

OJC  Δ = 67km
     Pg eZ        23 04 32.4
     Sg eN           04 40.9

NIE  Δ = 140km
     Pg eZ        23 04 44.6
     Sg eE           05 02.9

KSP  Δ = 193km
     Pn eZ        23 04 51.6
     Pg iZ           04 53.0
     Sg eE           05 15.8
```

JAN 22

GIG: φ = 49.979°N, λ = 18.573°E
H = 03:32:14.8, M = 2.5

```
RAC  Δ = 30km
     Pg eZ        03 32 21.3
     Sg eNE          32 26.0

OJC  Δ = 92km
     Pg eZ        03 32 30.9
     Sg eN           32 59.2

NIE  Δ = 140km
     Pg eZ        03 32 39.5

KSP  Δ = 188km
     Pg eZ        03 32 46.6
     Sg eE           33 09.8
```

JAN 22

GIG: φ = 50.215°N, λ = 19.069°E
H = 13:03:21.2, M = 2.1

```
OJC  Δ = 52km
     Pg eZ        13 03 30.0
     Sg eN           03 36.9

NIE  Δ = 126km
     Pg eZ        13 03 43.9
     Sg eN           03 59.8

KSP  Δ = 208km
     Pg eZ        13 03 54.7
     Sg eN           04 20.2
```

JAN 23

GIG: φ = 50.244°N, λ = 18.963°E
H = 03:26:43.1, M = 2.5

```
OJC  Δ = 60km
     Pg eZ        03 26 53.7
     Sg eE           27 01.4

RAC  Δ = 57km
     Pg eZ        03 26 53.8
     Sg eNE          27 01.7

NIE  Δ = 134km
     Pg eZ        03 27 06.0
     Sg eE           27 22.3

KSP  Δ = 200km
     Pn eZ        03 27 14.9
     Pg eZ           27 16.5
     Sg eN           27 39.8
```

JAN 23

GIG: φ = 50.266°N, λ = 18.869°E
H = 23:00:28.0, M = 2.5

```
RAC  Δ = 52km
     Pg eZ        23 00 37.6
     Sg eNE          00 44.4
```

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OJC Δ = 66km
Pg eZ 23 00 39.5
Sg eE 00 48.0

NIE Δ = 140km
Pg eZ 23 00 51.8
Sg eN 01 09.4

KSP Δ = 193km
Pg eZ 23 01 00.2
Sg eN 01 22.9

JAN 24

GIG: φ = 50.055°N, λ = 18.434°E
H = 03:29:23.6, M = 1.9

RAC Δ = 18km
Pg eZ 03 29 27.5
Sg eNE 29 30.7

OJC Δ = 99km
Pg eZ 03 29 40.8
Sg eN 29 53.4

NIE Δ = 153km
Pg eZ 03 29 49.9
Sg eE 30 08.4

JAN 24

GIG: φ = 50.216°N, λ = 19.066°E
H = 17:19:18.3, M = 2.3

OJC Δ = 52km
Pg eZ 17 19 26.8
Sg eN 19 33.5

NIE Δ = 126km
Pg eZ 17 19 39.9
Sg eE 19 55.9

KSP Δ = 209km
Pg eZ 17 19 53.3
Sg eN 20 17.0

JAN 24

GIG: φ = 50.229°N, λ = 18.820°E
H = 18:00:55.2, M = 2.7

OJC Δ = 69km
Pg eZ 18 01 07.3
Sg eN 01 16.1

NIE Δ = 140km
Pg eZ 18 01 19.1
Sg eN 01 37.2

KSP Δ = 192km
Pg eZ 18 01 27.2
Sg eE 01 50.2

JAN 25

GIG: φ = 50.266°N, λ = 18.882°E
H = 13:04:29.4, M = 2.2

OJC Δ = 66km
Pg eN 13 04 41.1
Sg eE 04 49.0

NIE Δ = 140km
Pg eZ 13 04 53.5
Sg eN 05 11.0

KSP Δ = 194km
Pg eZ 13 05 01.8
Sg eN 05 24.8

JAN 25

GIG: φ = 50.254°N, λ = 18.860°E
H = 17:59:28.8, M = 2.4

OJC Δ = 67km
Pg eZ 17 59 40.3
Sg eN 59 49.1

NIE Δ = 140km
Pg eZ 17 59 52.8
Sg eE 18 00 10.7

KSP Δ = 193km
Pg eZ 18 00 01.0
Sg eN 00 23.6

JAN 25

φ = 50.29°N, λ = 18.88°E
H = 20:34:25.7, M = 2.1

OJC Δ = 66km
Pg eZ 20 34 37.6
Sg eE 34 45.5

NIE Δ = 141km
Pg eZ 20 34 50.2
Sg eN 35 07.1

KSP Δ = 193km
Pg eZ 20 34 58.1
Sg eE 35 21.0

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JAN 25

GIG: φ = 50.055°N, λ = 18.432°E
H = 21:39:10.9, M = 2.3

RAC Δ = 17km
Pg iZ 21 39 14.6 D
Sg iNE 39 17.8

OJC Δ = 99km
Pg eZ 21 39 27.9
Sg eN 39 40.9

NIE Δ = 153km
Pg eZ 21 39 37.3
Sg eE 39 55.7

KSP Δ = 175km
Pg eZ 21 39 40.4
Sg eE 40 00.9

JAN 26

GIG: φ = 50.206°N, λ = 19.073°E
H = 11:13:37.7, M = 2.1

OJC Δ = 52km
Pg eZ 11 13 47.4
Sg eE 13 53.7

NIE Δ = 125km
Pg eZ 11 13 59.7
Sg eN 14 14.3

KSP Δ = 209km
Pg eZ 11 14 11.8
Sg eN 14 36.6

JAN 26

GIG: φ = 50.236°N, λ = 18.929°E
H = 13:57:24.9, M = 2.1

OJC Δ = 62km
Pg eZ 13 57 35.8
Sg eE 57 43.7

NIE Δ = 135km
Pg eZ 13 57 48.7
Sg eN 58 04.9

KSP Δ = 198km
Pg eE 13 57 58.0
Sg eN 58 21.6

JAN 26

GIG: φ = 50.274°N, λ = 18.828°E
H = 18:03:14.7, M = 2.4

OJC Δ = 69km
Pg eZ 18 03 26.8 D
Sg iE 03 35.6

NIE Δ = 143km
Pg eZ 18 03 39.3
Sg eE 03 57.2

KSP Δ = 190km
Pg eZ 18 03 46.4
Sg eN 04 09.0

JAN 26

φ = 50.27°N, λ = 18.87°E
H = 21:43:46.9, M = 2.0

OJC Δ = 66km
Pg eZ 21 43 58.9
Sg eE 44 06.9

NIE Δ = 141km
Pg eZ 21 44 11.4
Sg eN 44 28.1

KSP Δ = 193km
Pg eZ 21 44 19.1
Sg eZ 44 42.5

JAN 26

GIG: φ = 50.216°N, λ = 19.064°E
H = 21:56:26.3, M = 2.1

OJC Δ = 52km
Pg eZ 21 56 35.3
Sg eN 56 42.0

NIE Δ = 126km
Pg eZ 21 56 48.3
Sg eE 57 04.3

KSP Δ = 208km
Pg eZ 21 57 01.6
Sg eN 57 25.5

JAN 27

φ = 50.26°N, λ = 18.86°E
H = 07:09:12.7, M = 2.0

OJC Δ = 67km
Pg eZ 07 09 24.7
Sg eE 09 32.7

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NIE Δ = 140km
Pg eZ 07 09 36.7
Sg eE 09 54.1

KSP Δ = 193km
Pg eZ 07 09 44.4
Sg eE 10 08.0

JAN 27

φ = 50.28°N, λ = 18.93°E
H = 19:20:21.9, M = 2.1

OJC Δ = 62km
Pg eZ 19 20 32.8
Sg eE 20 40.9

NIE Δ = 138km
Pg eZ 19 20 45.6
Sg eE 21 02.7

KSP Δ = 197km
Pg eZ 19 20 54.5
Sg eZ 21 18.0

JAN 28

φ = 50.09°N, λ = 18.44°E
H = 10:55:54.2, M = 2.1

RAC Δ = 18km
Pg eZ 10 55 58.0
Sg eNE 56 01.6

OJC Δ = 98km
Pg eZ 10 56 10.8
Sg eN 56 23.7

NIE Δ = 154km
Pg eZ 10 56 20.6
Sg eN 56 40.3

JAN 28

GIG: φ = 50.217°N, λ = 19.067°E
H = 12:03:07.8, M = 2.3

OJC Δ = 52km
Pg eZ 12 03 16.6
Sg eN 03 23.3

NIE Δ = 126km
Pg eZ 12 03 29.7
Sg eE 03 45.7

KSP Δ = 209km
Pg eZ 12 03 42.7
Sg eN 04 06.8

JAN 29

φ = 50.28°N, λ = 18.86°E
H = 06:21:09.1, M = 2.0

OJC Δ = 68km
Pg eZ 06 21 20.5
Sg eN 21 30.0

NIE Δ = 141km
Pg eZ 06 21 33.8
Sg eE 21 51.2

KSP Δ = 192km
Pg eZ 06 21 41.1
Sg eN 22 04.1

JAN 30

φ = 50.26°N, λ = 18.82°E
H = 08:11:18.5, M = 2.4

OJC Δ = 70km
Pg eZ 08 11 30.6
Sg eE 11 40.1

NIE Δ = 143km
Pg eZ 08 11 43.2
Sg eN 12 01.5

KSP Δ = 190km
Pg eE 08 11 50.4
Sg eN 12 12.5

JAN 30

φ = 50.25°N, λ = 19.07°E
H = 21:48:25.9, M = 2.2

OJC Δ = 52km
Pg eZ 21 48 35.3
Sg eN 48 42.2

NIE Δ = 128km
Pg eZ 21 48 48.3
Sg eN 49 04.3

KSP Δ = 207km
Pg eZ 21 49 00.5
Sg eN 49 24.5

JAN 31

φ = 49.94°N, λ = 18.53°E
H = 00:43:13.6, M = 2.4

RAC Δ = 29km
Pg eZ 00 43 20.4
Sg eNE 43 24.8

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OJC Δ = 96km
Pg eZ 00 43 30.0
Sg eN 43 42.6

NIE Δ = 141km
Pg eZ 00 43 37.1
Sg eN 43 56.4

KSP Δ = 188km
Pg eZ 00 43 44.7
Sg eZ 44 08.4

JAN 31

GIG: φ = 50.30°N, λ = 18.87°E
H = 14:27:49.3, M = 2.2

OJC Δ = 67km
Pg eZ 14 28 01.0
Sg eE 28 09.6

NIE Δ = 142km
Pg eZ 14 28 13.7
Sg eE 28 31.5

KSP Δ = 192km
Pg eZ 14 28 21.3
Sg eN 28 44.2

FEB 1

GIG: φ = 50.268°N, λ = 18.924°E
H = 11:27:41.8, M = 2.4

OJC Δ = 63km
Pg eZ 11 27 52.7
Sg eE 28 00.3

NIE Δ = 138km
Pg eZ 11 28 06.1
Sg eE 28 23.3

KSP Δ = 197km
Pg eZ 11 28 14.6
Sn eN 28 36.2

FEB 1

φ = 50.25°N, λ = 18.83°E
H = 14:49:32.2, M = 2.0

OJC Δ = 69km
Pg eZ 14 49 44.6
Sg eE 49 52.6

NIE Δ = 141km
Pg eZ 14 49 56.7
Sg eE 50 13.6

KSP Δ = 192km
Pg eZ 14 50 03.8
Sg eE 50 27.2

FEB 1

GIG: φ = 50.255°N, λ = 18.860°E
H = 15:23:39.5, M = 2.7

RAC Δ = 50km
Pg eZ 15 23 48.6
(Sg) eNE 23 54.3

OJC Δ = 67km
Pg eZ 15 23 51.4
Sg eN 23 59.8

NIE Δ = 140km
Pg eZ 15 24 03.7
Sg eN 24 21.1

KSP Δ = 193km
Pg eZ 15 24 11.9
Sg eN 24 34.1

FEB 1

GIG: φ = 50.217°N, λ = 19.067°E
H = 19:15:31.4, M = 2.2

OJC Δ = 52km
Pg eZ 19 15 40.3
Sg eN 15 47.1

NIE Δ = 127km
Pg eZ 19 15 53.9
Sg eE 16 09.4

KSP Δ = 208km
Pg eN 19 16 05.4
Sg eN 16 30.4

FEB 2

φ = 50.23°N, λ = 18.85°E
H = 01:02:35.1, M = 1.9

OJC Δ = 67km
Pg eZ 01 02 47.1
Sg eN 02 55.2

NIE Δ = 139km
Pg eZ 01 02 59.1
Sg eE 03 16.8

KSP Δ = 193km
Pg eE 01 03 07.3
Sg eE 03 30.1

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FEB 2

GIG: φ = 50.217°N, λ = 19.067°E
H = 20:11:52.5, M = 2.2

OJC Δ = 52km
Pg eZ 20 12 01.4
Sg iN 12 08.2

NIE Δ = 126km
Pg eZ 20 12 14.5
Sg eN 12 30.4

KSP Δ = 209km
Pg eZ 20 12 27.7
Sn eN 12 50.7

FEB 2

GIG: φ = 50.237°N, λ = 18.928°E
H = 22:38:29.1, M = 2.2

OJC Δ = 62km
Pg eZ 22 38 39.9
Sg eE 38 47.7

NIE Δ = 135km
Pg eZ 22 38 52.6
Sg eE 39 09.3

KSP Δ = 198km
Pg eZ 22 39 02.0
Sg eE 39 25.5

FEB 3

φ = 50.24°N, λ = 18.84°E
H = 04:15:07.3, M = 2.0

OJC Δ = 68km
Pg eZ 04 15 19.0
Sg eE 15 28.2

NIE Δ = 140km
Pg eZ 04 15 31.0
Sg eE 15 49.1

KSP Δ = 193km
Pg eE 04 15 39.3
Sg eN 16 02.8

FEB 4

φ = 50.25°N, λ = 19.09°E
H = 02:29:54.9, M = 2.2

OJC Δ = 50km
Pg eZ 02 30 04.0
Sg iN 30 10.6

NIE Δ = 127km
Pg eZ 02 30 17.0
Sg eE 30 33.0

KSP Δ = 209km
Pg eZ 02 30 30.1
Sg eN 30 53.7

FEB 5

GIG: φ = 50.045°N, λ = 18.461°E
H = 06:31:47.9, M = 2.2

RAC Δ = 20km
Pg eZ 06 31 52.1
Sg eNE 31 55.7

OJC Δ = 97km
Pg eZ 06 32 04.1
Sg eE 32 16.6

NIE Δ = 151km
Pg eZ 06 32 14.1
Sg eE 32 33.5

KSP Δ = 177km
Pn eZ 06 32 16.2
Sg eZ 32 38.4

FEB 7

GIG: φ = 50.231°N, λ = 18.842°E
H = 01:56:34.4, M = 2.0

OJC Δ = 68km
Pg iZ 01 56 46.0 D
Sg eE 56 54.9

NIE Δ = 139km
Pg eZ 01 56 58.1
Sg eE 57 15.8

KSP Δ = 193km
Pg eE 01 57 06.4
Sg eN 57 30.7

FEB 7

φ = 50.28°N, λ = 18.92°E
H = 14:15:35.9, M = 2.1

OJC Δ = 63km
Pg eZ 14 15 47.0
Sg eE 15 55.2

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NIE Δ = 138km
Pg eZ 14 15 59.7
Sg eE 16 17.0

KSP Δ = 196km
Pg eZ 14 16 08.8
Sg eN 16 31.9

FEB 8
GIG: φ = 50.273°N, λ = 18.829°E
H = 04:45:51.2, M = 2.2

OJC Δ = 70km
Pg eZ 04 46 03.2
(Sg) eE 46 13.6

NIE Δ = 143km
Pg eZ 04 46 15.5
Sg eE 46 33.8

KSP Δ = 190km
Pg eZ 04 46 23.0
Sg eE 46 45.8

FEB 8
GIG: φ = 50.254°N, λ = 18.858°E
H = 19:19:04.8, M = 2.0

OJC Δ = 67km
Pg eZ 19 19 17.1
Sg eE 19 25.2

NIE Δ = 140km
Pg eZ 19 19 29.4
Sg eE 19 46.2

KSP Δ = 193km
Pg eZ 19 19 36.1
Sg eN 20 00.0

FEB 8
GIG: φ = 50.217°N, λ = 19.067°E
H = 21:47:50.1, M = 2.3

OJC Δ = 52km
Pg eZ 21 47 59.6
Sg eN 48 06.3

NIE Δ = 126km
Pg eZ 21 48 11.9
Sg eN 48 27.6

KSP Δ = 209km
Pg eE 21 48 24.7
Sg eZ 48 49.5

FEB 8
φ = 50.25°N, λ = 18.85°E
H = 22:25:39.5, M = 2.0

OJC Δ = 68km
Pg eZ 22 25 51.1
Sg eE 26 00.4

NIE Δ = 140km
Pg eZ 22 26 03.2
Sg eN 26 21.3

KSP Δ = 193km
Pg eZ 22 26 11.6
Sg eE 26 34.6

FEB 9
GIG: φ = 50.217°N, λ = 19.067°E
H = 22:30:58.2, M = 2.1

OJC Δ = 52km
Pg eZ 22 31 07.0
Sg eN 31 14.2

NIE Δ = 126km
Pg eZ 22 31 20.1
Sg eN 31 36.3

KSP Δ = 209km
Pg eZ 22 31 33.7
Sg eZ 31 57.2

FEB 10
GIG: φ = 50.253°N, λ = 18.858°E
H = 00:44:31.7, M = 2.0

OJC Δ = 67km
Pg eZ 00 44 44.2
Sg eN 44 52.2

NIE Δ = 140km
Pg eZ 00 44 56.0
Sg eE 45 13.1

KSP Δ = 193km
Pg eZ 00 45 04.2
Sg eN 45 26.1

FEB 11
GIG: φ = 50.235°N, λ = 18.930°E
H = 08:18:43.9, M = 2.4

OJC Δ = 62km
Pg eZ 08 18 54.7
Sg eN 19 02.4

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NIE Δ = 135km
Pg eZ 08 19 07.8
Sg eE 19 24.0

KSP Δ = 198km
Pg eZ 08 19 16.9
Sg eN 19 40.1

FEB 11
GIG: φ = 50.264°N, λ = 18.853°E
H = 10:09:01.1, M = 2.4

OJC Δ = 67km
Pg eZ 10 09 13.3
Sg eE 09 21.3

KSP Δ = 192km
Pg eZ 10 09 33.6
Sg eN 09 55.9

FEB 11
φ = 50.34°N, λ = 18.90°E
H = 18:11:50.7, M = 2.3

OJC Δ = 66km
Pg eZ 18 12 02.3
Sg eE 12 10.3

NIE Δ = 145km
Pg eZ 18 12 16.4
Sg eE 12 33.7

KSP Δ = 192km
Pg eZ 18 12 21.8
Sg eN 12 46.6

FEB 13
GIG: φ = 50.255°N, λ = 18.862°E
H = 07:02:55.0, M = 2.4

OJC Δ = 67km
Pg eZ 07 03 06.5
Sg eE 03 15.1

NIE Δ = 140km
Pg eZ 07 03 19.1
Sg eE 03 37.0

KSP Δ = 193km
Pg eZ 07 03 27.2
Sg eE 03 50.3

FEB 14
GIG: φ = 50.271°N, λ = 18.926°E
H = 00:06:12.8, M = 2.1

OJC Δ = 62km
Pg eZ 00 06 23.6
Sg eE 06 31.6

NIE Δ = 138km
Pg eZ 00 06 36.8
Sg eE 06 54.0

KSP Δ = 197km
Pg eZ 00 06 45.1
Sg eN 07 09.8

FEB 14
GIG: φ = 50.217°N, λ = 19.068°E
H = 19:38:08.0, M = 2.3

OJC Δ = 52km
Pg eZ 19 38 16.9
Sg eN 38 23.9

NIE Δ = 126km
Pg eZ 19 38 29.2
Sg eN 38 46.0

KSP Δ = 209km
Pg eZ 19 38 43.3
Sg eE 39 07.1

FEB 15
GIG: φ = 50.245°N, λ = 18.958°E
H = 05:16:51.9, M = 2.2

OJC Δ = 60km
Pg eZ 05 17 02.3
Sg eE 17 10.2

NIE Δ = 134km
Pg eZ 05 17 15.2
Sg eE 17 32.3

KSP Δ = 200km
Pg eZ 05 17 25.1
Sg eN 17 48.2

FEB 15
GIG: φ = 50.225°N, λ = 19.104°E
H = 23:33:34.5, M = 2.4

OJC Δ = 49km
Pg iZ 23 33 43.0
Sg iN 33 49.5

NIE Δ = 125km
Pg eZ 23 33 56.7
Sg eE 34 11.8

KSP Δ = 211km
Pg eZ 23 34 09.7
Sg eE 34 34.3

FEB 16

GIG: φ = 50.254°N, λ = 18.860°E
H = 00:49:33.3, M = 2.0

OJC Δ = 67km
Pg eZ 00 49 45.2
Sg eE 49 53.2

NIE Δ = 140km
Pg eZ 00 49 57.6
Sg eN 50 15.4

KSP Δ = 193km
Pg eZ 00 50 05.1
Sg eZ 50 28.5

FEB 17

GIG: φ = 50.254°N, λ = 18.858°E
H = 00:04:15.4, M = 2.0

OJC Δ = 67km
Pg eZ 00 04 27.5
Sg eE 04 35.4

NIE Δ = 140km
Pg eZ 00 04 39.7
Sg eE 04 57.3

KSP Δ = 193km
Pg eZ 00 04 47.2
Sg eE 05 10.1

FEB 17

GIG: φ = 50.217°N, λ = 19.067°E
H = 13:47:32.4, M = 2.2

OJC Δ = 52km
Pg eZ 13 47 41.1
Sg eN 47 47.9

NIE Δ = 126km
Pg eZ 13 47 54.2
Sg eN 48 10.1

KSP Δ = 209km
Pg eZ 13 48 07.6
Sg eE 48 31.4

FEB 18

φ = 50.24°N, λ = 18.85°E
H = 05:05:14.4, M = 1.9

OJC Δ = 68km
Pg eZ 05 05 26.0
Sg eN 05 35.2

NIE Δ = 139km
Pg eZ 05 05 38.0
Sg eN 05 55.9

KSP Δ = 193km
Pg eZ 05 05 46.2
Sg eN 06 10.0

FEB 18

GIG: φ = 50.100°N, λ = 19.155°E
H = 09:33:48.0, M = 2.2

OJC Δ = 48km
Pg eZ 09 33 56.7
Sg eN 34 02.6

NIE Δ = 113km
Pg eZ 09 34 08.1

KSP Δ = 219km
Pg eZ 09 34 23.7
Sg eZ 34 49.5

FEB 19

GIG: φ = 50.273°N, λ = 18.900°E
H = 09:20:04.1, M = 2.1

OJC Δ = 65km
Pg iZ 09 20 15.1 D
(Sg) eN 20 24.9

NIE Δ = 139km
Pg eZ 09 20 27.8
Sg eN 20 45.8

KSP Δ = 194km
Pg eZ 09 20 35.9
Sg eN 20 59.7

FEB 20

GIG: φ = 50.046°N, λ = 18.456°E
H = 22:55:23.9, M = 1.9

RAC Δ = 19km
Pg eZ 22 55 28.2
Sg eNE 55 31.3

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OJC Δ = 98km
Pg eZ 22 55 40.5
Sg eN 55 53.4

NIE Δ = 151km
Pg eZ 22 55 50.3
Sg eE 56 08.4

FEB 21
GIG: φ = 50.254°N, λ = 18.860°E
H = 04:04:55.7, M = 2.3

RAC Δ = 51km
Pg eZ 04 05 05.0
Sg eNE 05 11.5

OJC Δ = 67km
Pg eZ 04 05 07.6
Sg eN 05 16.1

NIE Δ = 140km
Pg eZ 04 05 19.7
Sg eE 05 37.8

KSP Δ = 193km
Pn eE 04 05 26.2
Pg iE 05 28.1
Sg eN 05 50.8

FEB 21
GIG: φ = 50.269°N, λ = 18.867°E
H = 21:33:57.8, M = 2.0

OJC Δ = 66km
Pg eZ 21 34 09.6
Sg eN 34 17.5

NIE Δ = 141km
Pg eZ 21 34 22.1
Sg eE 34 39.7

KSP Δ = 193km
Pg eZ 21 34 30.0
Sg eN 34 52.3

FEB 21
φ = 50.10°N, λ = 19.16°E
H = 23:50:51.7, M = 2.4

OJC Δ = 47km
Pg eZ 23 51 00.1
Sg eN 51 06.6

NIE Δ = 113km
Pg eZ 23 51 10.7
Sg eE 51 26.2

KSP Δ = 219km
Pg eZ 23 51 27.9
Sg eZ 51 53.6

FEB 22
GIG: φ = 50.255°N, λ = 18.860°E
H = 16:31:37.0, M = 2.8

RAC Δ = 52km
(Pg) eZ 16 31 48.1
(Sg) eNE 31 55.3

OJC Δ = 67km
Pg eZ 16 31 48.9
Sg eN 31 57.0

NIE Δ = 140km
Pg eZ 16 32 00.9
Sg eN 32 18.3

KSP Δ = 193km
Pn eZ 16 32 07.0
Pg eZ 32 09.0
Sg eN 32 31.6

KWP Δ = 284km
Pg eZ 16 32 27.6
Sn eNE 32 55.5
Sg eNE 33 07.2

FEB 22
GIG: φ = 50.254°N, λ = 18.860°E
H = 17:02:32.1, M = 3.2

RAC Δ = 51km
Pg eZ 17 02 41.3
Sg eNE 02 48.1

OJC Δ = 67km
Pg eZ 17 02 43.8
Sg iEZ 02 52.5

NIE Δ = 140km
Pg eZ 17 02 56.2
Sg eE 03 14.2

KSP Δ = 193km
Pn eZ 17 03 02.1
Pg eZ 03 04.2
Sg eN 03 27.2

Upper Silesian Coal Basin 2006

```
   KWP  Δ = 284km
        Pn eZ        17 03 20.5
        Pg eZ           03 22.9
        Sg eNE          04 01.0

   GKP  Δ = 354km
        Pn eZ        17 03 23.7
        Pg eZ           03 37.2
        Sn eNE          04 04.5
        Sg eNE          04 22.4
```

FEB 23

GIG: φ = 50.236°N, λ = 18.931°E
H = 10:10:17.7, M = 2.2

```
   OJC  Δ = 62km
        Pg eZ        10 10 28.5
        Sg eE           10 36.5

   NIE  Δ = 135km
        Pg eZ        10 10 41.2
        Sg eE           10 58.8

   KSP  Δ = 198km
        Pg eZ        10 10 50.6
        Sg eN           11 13.7
```

FEB 23

GIG: φ = 50.059°N, λ = 18.433°E
H = 11:24:37.6, M = 2.3

```
   RAC  Δ = 17km
        Pg eZ        11 24 41.5
        Sg eNE          24 44.6

   OJC  Δ = 99km
        Pg eZ        11 24 54.7
        Sg eN           25 07.5

   NIE  Δ = 153km
        Pg eZ        11 25 04.3
        Sg eN           25 23.6

   KSP  Δ = 175km
        Pg eZ        11 25 07.2
        Sg eN           25 27.0
```

FEB 23

GIG: φ = 50.247°N, λ = 18.960°E
H = 17:05:52.4, M = 2.3

```
   OJC  Δ = 60km
        Pg eEZ       17 06 02.9
        Sg eN           06 10.9

   KSP  Δ = 200km
        Pg eZ        17 06 25.7
        Sg eN           06 49.0
```

FEB 23

GIG: φ = 50.266°N, λ = 18.853°E
H = 18:06:16.0, M = 2.2

```
   OJC  Δ = 68km
        Pg eZ        18 06 28.4
        Sg eE           06 36.4

   NIE  Δ = 141km
        Pg eZ        18 06 40.3
        Sg eE           06 58.0

   KSP  Δ = 192km
        Pg eZ        18 06 47.9
        Sg eN           07 10.6
```

FEB 24

φ = 50.09°N, λ = 18.50°E
H = 05:15:23.4, M = 2.5

```
   RAC  Δ = 22km
        Pg eZ        05 15 27.6
        Sg eNE          15 30.9

   OJC  Δ = 93km
        Pg eZ        05 15 39.2
        Sg eN           15 51.1

   NIE  Δ = 151km
        Pg eZ        05 15 49.1
        Sg eN           16 07.6

   KSP  Δ = 177km
        Pn eZ        05 15 51.7
        Pg eZ           15 53.2
        Sn eE           16 12.6
        Sg eE           16 14.4
```

FEB 24

GIG: φ = 50.266°N, λ = 18.853°E
H = 06:38:51.0, M = 2.3

```
   OJC  Δ = 68km
        Pg eZ        06 39 02.6
        Sg eE           39 11.3

   NIE  Δ = 141km
        Pg eZ        06 39 15.2
        Sg eE           39 33.2
```

KSP Δ = 192km
Pg eZ 06 39 22.9
Sg eN 39 45.9

FEB 24
GIG: φ = 50.217°N, λ = 19.067°E
H = 13:17:34.1, M = 2.2

OJC Δ = 52km
Pg eZ 13 17 43.1
Sg eN 17 49.9

NIE Δ = 126km
Pg eZ 13 17 56.5
Sg eN 18 12.3

KSP Δ = 208km
Pg eZ 13 18 08.5
Sg eN 18 33.2

FEB 27
GIG: φ = 50.081°N, λ = 19.124°E
H = 21:20:10.6, M = 2.4

OJC Δ = 50km
Pg eZ 21 20 18.9
Sg eEN 20 25.5

NIE Δ = 113km
Pg eZ 21 20 29.6
Sg eE 20 45.6

KSP Δ = 218km
Pg eZ 21 20 46.7
Sg eZ 21 12.7

FEB 27
GIG: φ = 50.350°N, λ = 18.965°E
H = 22:13:58.7, M = 2.2

OJC Δ = 61km
Pg eZ 22 14 09.5
Sg eE 14 17.6

NIE Δ = 142km
Pg eZ 22 14 23.6
Sg eN 14 41.5

KSP Δ = 196km
Pg eZ 22 14 30.7
Sg eZ 14 54.7

FEB 28
φ = 50.28°N, λ = 18.98°E
H = 03:47:12.5, M = 2.0

OJC Δ = 59km
Pg eZ 03 47 22.8
Sg eE 47 30.6

NIE Δ = 136km
Pg eZ 03 47 35.8
Sg eE 47 53.2

KSP Δ = 200km
Pg eZ 03 47 45.6
Sg eE 48 09.6

FEB 28
GIG: φ = 50.055°N, λ = 18.434°E
H = 04:27:17.8, M = 2.9

RAC Δ = 17km
Pg eZ 04 27 21.7
Sg eNE 27 24.6

OJC Δ = 99km
Pg eZ 04 27 34.7
Sg eE 27 47.1

NIE Δ = 153km
Pg eZ 04 27 43.7
Sg eE 28 02.8

KSP Δ = 175km
Pn eZ 04 27 45.9
Pg eZ 27 47.8
(Sg) eE 28 07.0

KWP Δ = 310km
Pg eZ 04 28 16.8
Sg eNE 28 55.2

FEB 28
GIG: φ = 50.217°N, λ = 19.067°E
H = 23:29:06.0, M = 2.2

OJC Δ = 52km
Pg eZ 23 29 15.2
Sg eN 29 22.0

NIE Δ = 127km
Pg eZ 23 29 28.3
Sg eNE 29 44.3

```
   KSP  Δ = 208km
        Pg eE        23 29 40.4
        Sg eZ           30 05.1
```

MAR 1

GIG: φ = 50.236°N, λ = 18.929°E
H = 17:30:47.5, M = 2.4

```
   OJC  Δ = 62km
        Pg eZ        17 30 58.6
        Sg eE           31 06.6

   NIE  Δ = 135km
        Pg eZ        17 31 11.3
        Sg eE           31 28.8

   KSP  Δ = 198km
        Pg eZ        17 31 19.4
        Sg eN           31 43.8
```

MAR 1

GIG: φ = 50.266°N, λ = 18.853°E
H = 20:57:40.4, M = 2.5

```
   RAC  Δ = 52km
        Pg eZ        20 57 50.0
        Sg eNE          57 56.8

   OJC  Δ = 68km
        Pg eZ        20 57 52.3
        Sg eE           58 00.7

   NIE  Δ = 141km
        Pg eZ        20 58 04.7
        Sg eE           58 22.8

   KSP  Δ = 192km
        Pg eZ        20 58 12.5
        Sg eN           58 35.3
```

MAR 2

GIG: φ = 50.266°N, λ = 18.882°E
H = 00:43:34.8, M = 2.4

```
   RAC  Δ = 53km
        Pg eZ        00 43 44.2
        Sg eNE          43 51.2

   OJC  Δ = 66km
        Pg eZ        00 43 46.4
        Sg eE           43 54.7

   NIE  Δ = 140km
        Pg eZ        00 43 59.0
        Sg eN           44 16.5

   KSP  Δ = 194km
        Pg eZ        00 44 07.1
        Sg eN           44 30.3
```

MAR 2

GIG: φ = 50.277°N, λ = 18.824°E
H = 14:51:20.0, M = 2.4

```
   OJC  Δ = 70km
        Pg eZ        14 51 32.4
        Sg eE           51 41.2

   NIE  Δ = 144km
        Pg eZ        14 51 44.9
        Sg eN           52 02.2

   KSP  Δ = 190km
        Pg eZ        14 51 51.9
        Sg eN           52 13.9
```

MAR 3

GIG: φ = 50.101°N, λ = 19.154°E
H = 22:34:04.4, M = 2.4

```
   OJC  Δ = 47km
        Pg eZ        22 34 12.4
        Sg eN           34 18.3

   RAC  Δ = 69km
        Pg eZ        22 34 17.4
        Sg eNE          34 27.0

   NIE  Δ = 113km
        Pg eZ        22 34 23.2
        Sg eE           34 38.6

   KSP  Δ = 219km
        Pn eZ        22 34 38.3
        Pg eZ           34 40.1
        Sn eN           35 03.9
        Sg eN           35 06.5
```

MAR 4

GIG: φ = 50.243°N, λ = 18.960°E
H = 05:30:45.6, M = 2.2

```
   OJC  Δ = 60km
        Pg eZ        05 30 56.1
        Sg iE           31 03.9

   NIE  Δ = 134km
        Pg eZ        05 31 09.0
        Sg eE           31 25.6
```

```
   KSP  Δ = 200km
        Pg eZ        05 31 19.2
        Sg eE           31 43.0
```

MAR 4

GIG: φ = 50.239°N, λ = 18.931°E
H = 15:03:02.3, M = 2.8

```
   RAC  Δ = 56km
        Pg eZ        15 03 12.4
        Sg eNE          03 20.0

   OJC  Δ = 61km
        Pg eZ        15 03 13.1
        Sg eE           03 21.1

   NIE  Δ = 135km
        Pg eZ        15 03 25.9
        Sg eE           03 43.0

   KSP  Δ = 199km
        Pn eZ        15 03 33.8
        Pg eZ           03 35.3
        Sg eN           03 58.8
```

MAR 6

GIG: φ = 50.245°N, λ = 18.958°E
H = 09:54:13.5, M = 2.1

```
   OJC  Δ = 60km
        Pg iZ        09 54 24.1 D
        Sg eE           54 31.8

   NIE  Δ = 134km
        Pg eZ        09 54 36.3
        Sg eN           54 52.5

   KSP  Δ = 200km
        Pg eZ        09 54 47.4
        Sg eN           55 09.9
```

MAR 6

GIG: φ = 50.247°N, λ = 18.961°E
H = 15:16:35.4, M = 2.4

```
   OJC  Δ = 60km
        Pg eZ        15 16 46.0
        Sg eE           16 53.4

   NIE  Δ = 133km
        Pg eZ        15 16 58.3
        Sg eN           17 14.4

   KSP  Δ = 200km
        Pg eZ        15 17 09.4
        Sg eN           17 32.9
```

MAR 7

GIG: φ = 50.058°N, λ = 18.434°E
H = 03:46:36.7, M = 2.3

```
   OJC  Δ = 99km
        Pg eZ        03 46 53.2
        Sg eE           47 05.5

   NIE  Δ = 153km
        Pg eZ        03 47 03.0
        Sg eN           47 22.3

   KSP  Δ = 175km
        Pg eE        03 47 05.7
        Sg eE           47 27.5
```

MAR 7

GIG: φ = 50.243°N, λ = 18.962°E
H = 07:43:20.5, M = 2.4

```
   OJC  Δ = 60km
        Pg iZ        07 43 31.0 D
        Sg iE           43 38.8

   NIE  Δ = 134km
        Pg eZ        07 43 43.4
        Sg eE           44 01.0

   KSP  Δ = 200km
        Pg eZ        07 43 53.8
        Sg eZ           44 18.0
```

MAR 7

GIG: φ = 50.268°N, λ = 18.923°E
H = 08:51:32.5, M = 2.3

```
   OJC  Δ = 62km
        Pg iZ        08 51 43.3 D
        Sg eN           51 51.4

   NIE  Δ = 138km
        Pg eZ        08 51 56.2
        Sg eEN          52 14.5

   KSP  Δ = 197km
        Pg eZ        08 52 05.3
        Sn eE           52 27.2
```

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MAR 7

GIG: φ = 50.084°N, λ = 19.123°E
H = 22:38:41.5, M = 2.4

OJC Δ = 50km
Pg iZ 22 38 49.8 D
Sg iN 38 56.3

NIE Δ = 113km
Pg eZ 22 39 00.4
Sg eE 39 16.0

KSP Δ = 218km
Pg eZ 22 39 17.7
Sg eN 39 44.0

MAR 8

φ = 50.09°N, λ = 18.43°E
H = 03:36:12.3, M = 1.8

RAC Δ = 17km
Pg iZ 03 36 16.0 D
Sg eNE 36 19.3

OJC Δ = 99km
Pg eZ 03 36 29.4
Sg eE 36 42.0

NIE Δ = 155km
Pg eZ 03 36 38.8
Sg eE 36 58.7

MAR 8

GIG: φ = 49.979°N, λ = 18.572°E
H = 16:26:12.2, M = 2.3

RAC Δ = 29km
Pg eZ 16 26 18.5
Sg eNE 26 23.5

OJC Δ = 92km
Pg eZ 16 26 28.0
Sg eN 26 40.4

KSP Δ = 188km
Pg eN 16 26 44.1
Sg eZ 27 06.3

MAR 8

GIG: φ = 50.217°N, λ = 19.067°E
H = 17:05:56.7, M = 2.2

OJC Δ = 52km
Pg eZ 17 06 05.3
Sg eN 06 12.0

NIE Δ = 126km
Pg eZ 17 06 19.3
Sg eN 06 35.8

KSP Δ = 208km
Pg eE 17 06 32.1
Sg eE 06 56.2

MAR 8

φ = 50.30°N, λ = 18.94°E
H = 22:55:43.6, M = 2.2

OJC Δ = 62km
Pg eZ 22 55 54.5
Sg eE 56 02.6

NIE Δ = 139km
Pg eZ 22 56 07.4
Sg eE 56 24.9

KSP Δ = 197km
Pg eZ 22 56 16.4
Sg eN 56 39.9

MAR 8

GIG: φ = 50.055°N, λ = 18.436°E
H = 23:09:11.1, M = 2.7

RAC Δ = 18km
Pg iZ 23 09 14.9 D
Sg eNE 09 18.0

OJC Δ = 99km
Pg eZ 23 09 27.6
Sg eN 09 39.9

NIE Δ = 152km
Pg eZ 23 09 36.6
Sg eN 09 56.2

KSP Δ = 176km
Pn eZ 23 09 38.9
Pg eZ 09 41.3
Sn eN 09 59.6
Sg eN 10 02.1

KWP Δ = 310km
Pg eZ 23 10 02.7
Sg NE 10 34.3

Upper Silesian Coal Basin 2006

MAR 9

GIG: φ = 50.245°N, λ = 18.958°E
H = 13:18:34.1, M = 2.2

OJC Δ = 60km
Pg eZ 13 18 44.6
Sg eE 18 52.4

NIE Δ = 134km
Pg eZ 13 18 57.5
Sg eE 19 14.1

KSP Δ = 200km
Pg eZ 13 19 07.9
Sg eN 19 30.4

MAR 10

GIG: φ = 50.244°N, λ = 18.959°E
H = 04:44:40.1, M = 2.1

OJC Δ = 60km
Pg eZ 04 44 50.4
Sg eE 44 58.3

NIE Δ = 134km
Pg eZ 04 45 03.3
Sg eE 45 20.7

KSP Δ = 200km
Pg eZ 04 45 13.7
Sg eZ 45 37.9

MAR 10

GIG: φ = 50.058°N, λ = 18.433°E
H = 06:49:43.8, M = 2.3

RAC Δ = 17km
Pg eZ 06 49 47.3
Sg eNE 49 50.8

OJC Δ = 99km
Pg eZ 06 50 00.7
Sg eN 50 13.2

NIE Δ = 153km
Pg eZ 06 50 10.5
Sg eN 50 29.2

MAR 10

GIG: φ = 50.246°N, λ = 18.959°E
H = 13:15:45.5, M = 2.4

OJC Δ = 60km
Pg eZ 13 15 55.9
Sg eE 16 03.8

NIE Δ = 134km
Pg eZ 13 16 08.3
Sg eE 16 25.4

KSP Δ = 200km
Pg eZ 13 16 18.7
(Sg) eN 16 44.5

MAR 10

GIG: φ = 50.264°N, λ = 18.851°E
H = 17:54:47.2, M = 2.2

OJC Δ = 68km
Pg eZ 17 54 59.1
Sg eE 55 07.2

NIE Δ = 141km
Pg eZ 17 55 12.1
Sg eE 55 29.7

KSP Δ = 192km
Pg eZ 17 55 19.4
Sg eN 55 42.0

MAR 10

GIG: φ = 50.101°N, λ = 19.155°E
H = 18:32:46.1, M = 2.3

OJC Δ = 48km
Pg eZ 18 32 54.3
Sg eN 33 00.0

NIE Δ = 113km
Pg eZ 18 33 06.2
Sg eE 33 20.9

KSP Δ = 219km
Pg eE 18 33 21.6
Sg eN 33 48.2

MAR 11

φ = 50.24°N, λ = 19.11°E
H = 01:00:50.9, M = 2.0

OJC Δ = 49km
Pg eZ 01 00 59.3
Sg eN 01 06.2

NIE Δ = 126km
Pg eZ 01 01 12.7
Sg eE 01 28.4

KSP Δ = 210km
Pg eE 01 01 25.6
Sg eN 01 50.7

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MAR 11

GIG: φ = 50.069°N, λ = 18.420°E
H = 03:24:28.7, M = 1.9

RAC Δ = 16km
Pg eZ 03 24 32.0
Sg eNE 24 35.7

OJC Δ = 100km
Pg eZ 03 24 45.5
Sg eE 24 58.5

NIE Δ = 154km
Pg eZ 03 24 54.8
Sg eE 25 14.9

MAR 11

GIG: φ = 50.266°N, λ = 18.851°E
H = 08:59:40.7, M = 2.4

OJC Δ = 67km
Pg eZ 08 59 52.4
Sg eE 09 00 00.9

NIE Δ = 141km
Pg eZ 09 00 04.8
Sg eN 00 23.0

KSP Δ = 192km
Pg eZ 09 00 12.8
Sg eN 00 35.5

MAR 13

GIG: φ = 50.246°N, λ = 18.960°E
H = 13:33:38.9, M = 2.2

OJC Δ = 60km
Pg eZ 13 33 49.2
Sg eE 33 57.0

NIE Δ = 134km
Pg eZ 13 34 02.1
Sg eE 34 19.0

KSP Δ = 200km
Pg eZ 13 34 11.8
Sg eZ 34 35.9

MAR 14

GIG: φ = 50.244°N, λ = 18.958°E
H = 12:15:29.7, M = 2.3

OJC Δ = 60km
Pg eZ 12 15 39.8
Sg eE 15 48.1

NIE Δ = 134km
Pg eZ 12 15 53.2
Sg eN 16 10.3

KSP Δ = 200km
Pg eZ 12 16 02.6
Sg eN 16 26.9

MAR 14

φ = 50.33°N, λ = 18.94°E
H = 18:21:24.0, M = 2.1

OJC Δ = 62km
Pg eZ 18 21 35.0
Sg eE 21 42.7

NIE Δ = 141km
Pg eZ 18 21 48.6
Sg eE 22 05.9

KSP Δ = 196km
Pg eZ 18 21 56.7
Sg eN 22 19.6

MAR 14

GIG: φ = 50.216°N, λ = 19.068°E
H = 18:55:40.5, M = 2.3

OJC Δ = 52km
Pg eZ 18 55 49.4
Sg eN 55 56.3

NIE Δ = 126km
Pg eZ 18 56 03.0
Sg eE 56 19.0

KSP Δ = 208km
Pg eZ 18 56 15.0
Sg eN 56 39.7

MAR 15

GIG: φ = 50.244°N, λ = 18.959°E
H = 01:51:51.3, M = 2.1

OJC Δ = 60km
Pg eZ 01 52 01.5
Sg eE 52 09.4

NIE Δ = 134km
Pg eZ 01 52 14.4
Sg eE 52 31.3

KSP Δ = 200km
Pg eZ 01 52 24.6
Sn eE 52 46.1

Upper Silesian Coal Basin 2006

MAR 15

φ = 50.05°N, λ = 18.41°E
H = 03:50:46.7, M = 2.0

RAC	Δ = 16km		
	Pg eZ	03	50 50.1
	Sg eNE		50 53.4
OJC	Δ = 101km		
	Pg eZ	03	51 03.6
	Sg eN		51 17.5
NIE	Δ = 154km		
	Pg eZ	03	51 13.1
	Sg eN		51 32.7

MAR 15

GIG: φ = 50.237°N, λ = 18.959°E
H = 11:40:52.8, M = 2.2

OJC	Δ = 60km		
	Pg eZ	11	41 03.0
	Sg eE		41 10.8
NIE	Δ = 134km		
	Pg eZ	11	41 16.4
	Sg eN		41 32.8
KSP	Δ = 200km		
	Pg eZ	11	41 25.9
	Sg eE		41 49.8

MAR 15

GIG: φ = 50.209°N, λ = 18.732°E
H = 12:20:50.7, M = 2.5

RAC	Δ = 40km		
	Pg eZ	12	20 57.7
	Sg eNE		21 03.6
OJC	Δ = 76km		
	Pg eZ	12	21 04.0
	Sg eN		21 13.9
NIE	Δ = 144km		
	Pg eZ	12	21 15.3
	Sg eE		21 33.5
KSP	Δ = 186km		
	Pg eZ	12	21 21.7
	Sn eE		21 42.6

MAR 15

GIG: φ = 50.247°N, λ = 18.959°E
H = 17:27:52.8, M = 2.4

OJC	Δ = 60km		
	Pg iZ	17	28 03.2 D
	Sg eE		28 11.0
NIE	Δ = 134km		
	Pg eZ	17	28 16.2
	Sg eE		28 33.2
KSP	Δ = 200km		
	Pg eZ	17	28 26.1
	Sg eN		28 49.4

MAR 15

φ = 50.30°N, λ = 18.95°E
H = 19:55:01.6, M = 2.0

OJC	Δ = 61km		
	Pg eZ	19	55 12.4
	Sg eN		55 20.3
NIE	Δ = 138km		
	Pg eZ	19	55 25.7
	Sg eE		55 43.1
KSP	Δ = 197km		
	Pg eZ	19	55 34.6
	Sg eN		55 57.8

MAR 15

GIG: φ = 50.213°N, λ = 19.129°E
H = 21:25:20.2, M = 2.1

OJC	Δ = 48km		
	Pg eZ	21	25 28.4
	Sg eN		25 34.6
NIE	Δ = 123km		
	Pg eZ	21	25 42.0
	Sg eE		25 57.9
KSP	Δ = 212km		
	Pg eE	21	25 55.3
	Sg eN		26 19.7

MAR 16

φ = 50.08°N, λ = 18.43°E
H = 02:38:56.3, M = 2.1

RAC	Δ = 17km		
	Pg iZ	02	38 59.9 D
	Sg eNE		39 03.3

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```
   OJC  Δ = 99km
        Pg eZ        02 39 13.1
        Sg eE           39 26.2

   NIE  Δ = 155km
        Pg eZ        02 39 22.7
        Sg eEN          39 42.5
```

MAR 16

GIG: φ = 50.231°N, λ = 18.822°E
H = 04:14:10.4, M = 2.5

```
   OJC  Δ = 70km
        Pg iZ        04 14 22.3 D
        Sg eN           14 31.8

   NIE  Δ = 141km
        Pg eZ        04 14 34.3
        Sg eN           14 52.8

   KSP  Δ = 191km
        Pg eZ        04 14 42.4
        Sg eE           15 04.7
```

MAR 16

GIG: φ = 50.243°N, λ = 18.960°E
H = 10:21:17.9, M = 2.4

```
   OJC  Δ = 60km
        Pg iZ        10 21 28.3 D
        Sg iE           21 36.2

   NIE  Δ = 134km
        Pg eZ        10 21 40.7
        Sg eE           21 57.7

   KSP  Δ = 200km
        Pg eZ        10 21 51.2
        Sg eN           22 15.1
```

MAR 16

GIG: φ = 50.058°N, λ = 18.435°E
H = 18:47:00.2, M = 2.3

```
   RAC  Δ = 17km
        Pg iZ        18 47 04.0 D
        Sg eNE          47 07.2

   OJC  Δ = 99km
        Pg eZ        18 47 17.3
        Sg eN           47 29.2

   NIE  Δ = 153km
        Pg eZ        18 47 26.8
        Sg eE           47 46.4
```

MAR 16

φ = 50.26°N, λ = 19.01°E
H = 23:13:30.7, M = 2.0

```
   OJC  Δ = 56km
        Pg eZ        23 13 40.4
        Sg eE           13 48.2

   NIE  Δ = 132km
        Pg eZ        23 13 53.6
        Sg eE           14 10.1

   KSP  Δ = 203km
        Pg eZ        23 14 04.7
        Sg eE           14 28.0
```

MAR 16

GIG: φ = 50.046°N, λ = 18.460°E
H = 23:23:52.3, M = 1.9

```
   RAC  Δ = 19km
        Pg eZ        23 23 56.6
        Sg eNE          23 59.9

   OJC  Δ = 98km
        Pg eZ        23 24 08.8
        Sg eN           24 22.0

   NIE  Δ = 151km
        Pg eZ        23 24 18.3
        Sg eE           24 37.9
```

MAR 17

GIG: φ = 50.244°N, λ = 18.961°E
H = 06:55:40.8, M = 2.2

```
   OJC  Δ = 60km
        Pg iZ        06 55 51.1 D
        Sg iE           55 59.0

   NIE  Δ = 134km
        Pg eZ        06 56 04.1
        Sg eE           56 21.0

   KSP  Δ = 200km
        Pg eZ        06 56 13.7
        Sg eE           56 37.8
```

MAR 17

GIG: φ = 50.036°N, λ = 18.440°E
H = 07:40:37.1, M = 2.6

```
   RAC  Δ = 18km
        Pg iZ        07 40 41.0 D
        Sg eNE          40 44.3
```

```
   OJC  Δ = 99km
        Pg eZ        07 40 54.3
        Sg eE           41 06.3

   NIE  Δ = 152km
        Pg eZ        07 41 03.2
        Sg eE           41 22.8

   KSP  Δ = 177km
        Pn eZ        07 41 05.0
        Pg eZ           41 07.3
        Sg eN           41 27.7
```

MAR 17

GIG: φ = 50.247°N, λ = 18.958°E
H = 10:35:29.0, M = 2.3

```
   OJC  Δ = 60km
        Pg iZ        10 35 39.4 D
        Sg iE           35 47.3

   NIE  Δ = 134km
        Pg eZ        10 35 52.0
        Sg eE           36 09.0

   KSP  Δ = 200km
        Pg eZ        10 36 02.0
        Sg eN           36 26.4
```

MAR 17

GIG: φ = 50.265°N, λ = 18.852°E
H = 17:33:33.8, M = 2.3

```
   OJC  Δ = 67km
        Pg eZ        17 33 45.3
        Sg eN           33 54.2

   NIE  Δ = 141km
        Pg eZ        17 33 57.9
        Sg eE           34 16.1

   KSP  Δ = 192km
        Pg eZ        17 34 05.5
        Sg eE           34 29.2
```

MAR 17

GIG: φ = 50.244°N, λ = 18.960°E
H = 18:18:49.6, M = 2.1

```
   OJC  Δ = 60km
        Pg eZ        18 18 59.8
        Sg eE           19 07.7

   NIE  Δ = 134km
        Pg eZ        18 19 13.4
        Sg eE           19 30.4

   KSP  Δ = 200km
        Pg eZ        18 19 22.5
        Sg eN           19 46.0
```

MAR 17

GIG: φ = 50.217°N, λ = 19.069°E
H = 22:52:23.5, M = 2.1

```
   OJC  Δ = 52km
        Pg eZ        22 52 32.7
        Sg eN           52 39.3

   NIE  Δ = 126km
        Pg eZ        22 52 45.6
        Sg eN           53 01.6

   KSP  Δ = 209km
        Pg eZ        22 52 57.9
        Sg eN           53 22.8
```

MAR 18

GIG: φ = 50.047°N, λ = 18.460°E
H = 00:29:15.0, M = 2.0

```
   RAC  Δ = 19km
        Pg eZ        00 29 19.2
        Sg eNE          29 22.4

   OJC  Δ = 98km
        Pg eZ        00 29 31.6
        Sg eE           29 44.0

   NIE  Δ = 151km
        Pg eZ        00 29 41.1
        Sg eN           29 59.7
```

MAR 18

GIG: φ = 50.245°N, λ = 18.959°E
H = 04:24:25.3, M = 2.1

```
   OJC  Δ = 60km
        Pg iZ        04 24 35.5 D
        Sg iE           24 43.4

   NIE  Δ = 134km
        Pg eZ        04 24 48.4
        Sg eE           25 05.0

   KSP  Δ = 200km
        Pg eE        04 24 58.4
        Sg eN           25 22.4
```

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MAR 18

GIG: φ = 50.245°N, λ = 18.959°E
H = 14:08:08.4, M = 2.2

OJC Δ = 60km
Pg eZ 14 08 18.7
Sg eE 08 26.5

NIE Δ = 134km
Pg eZ 14 08 31.8
Sg eE 08 48.3

KSP Δ = 200km
Pg eZ 14 08 41.4
Sg eE 09 05.0

MAR 19

GIG: φ = 50.034°N, λ = 18.450°E
H = 19:20:49.0, M = 3.0

RAC Δ = 19km
Pg iZ 19 20 53.1 D
Sg eNE 20 56.5

OJC Δ = 98km
Pg eZ 19 21 05.5
Sg eE 21 18.1

NIE Δ = 151km
Pg eZ 19 21 14.8
Sg eN 21 34.0

KSP Δ = 177km
Pn eZ 19 21 17.1
Pg eZ 21 19.3
Sg eN 21 40.0

KWP Δ = 309km
Pg eZ 19 21 42.8
Sg eNE 22 21.8

GKP Δ = 369km
Pn eZ 19 21 42.1
Pg eZ 21 54.7
Sn eNE 22 17.9
Sg eNE 22 29.2

MAR 19

GIG: φ = 50.210°N, λ = 18.731°E
H = 20:39:37.9, M = 2.9

RAC Δ = 41km
Pg eZ 20 39 45.5
Sg eNE 39 51.1

OJC Δ = 76km
Pg iZ 20 39 51.0 C
Sg iN 40 01.0

NIE Δ = 144km
Pg eZ 20 40 02.2
Sg eE 40 20.5

KSP Δ = 186km
Pn eZ 20 40 06.9
Pg iZ 40 08.8
Sn eN 40 29.2

MAR 20

GIG: φ = 50.239°N, λ = 18.931°E
H = 16:46:06.5, M = 2.7

RAC Δ = 56km
Pg eZ 16 46 16.7
Sg eNE 46 24.3

OJC Δ = 62km
Pg eZ 16 46 17.3
Sg eN 46 25.1

NIE Δ = 135km
Pg eZ 16 46 29.5
Sg eE 46 46.7

KSP Δ = 199km
Pg eZ 16 46 39.6
Sg eN 47 02.7

KWP Δ = 279km
Pn eZ 16 46 50.6
Pg eZ 46 55.8
Sn eNE 47 28.5

MAR 20

GIG: φ = 50.246°N, λ = 18.958°E
H = 20:29:52.2, M = 2.4

OJC Δ = 60km
Pg iZ 20 30 02.6 D
Sg iE 30 10.5

NIE Δ = 134km
Pg eZ 20 30 14.9
Sg eE 30 32.2

KSP Δ = 200km
Pg eZ 20 30 25.4
Sg eE 30 49.4

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MAR 20

GIG: φ = 50.217°N, λ = 19.067°E
H = 21:50:54.0, M = 2.1

OJC Δ = 52km
Pg eZ 21 51 02.8
Sg eN 51 09.8

NIE Δ = 126km
Pg eZ 21 51 15.7
Sg eE 51 31.9

KSP Δ = 209km
Pg eZ 21 51 29.1
Sg eN 51 53.1

MAR 21

GIG: φ = 50.217°N, λ = 19.029°E
H = 10:56:46.0, M = 2.0

OJC Δ = 55km
Pg eZ 10 56 55.2
Sg eE 57 02.8

NIE Δ = 128km
Pg eZ 10 57 08.5
Sg eE 57 25.0

KSP Δ = 206km
Pg eE 10 57 19.5
Sg eN 57 45.3

MAR 22

GIG: φ = 50.059°N, λ = 18.434°E
H = 02:55:07.0, M = 1.9

RAC Δ = 17km
Pg iZ 02 55 10.8 D
Sg eNE 55 14.0

OJC Δ = 99km
Pg eZ 02 55 24.2
Sg eE 55 36.1

NIE Δ = 153km
Pg eZ 02 55 33.6
Sg eN 55 53.4

MAR 22

GIG: φ = 50.055°N, λ = 18.434°E
H = 04:01:29.6, M = 2.4

RAC Δ = 18km
Pg eZ 04 01 33.2
Sg eNE 01 36.5

OJC Δ = 99km
Pg eZ 04 01 46.1
Sg eN 01 58.3

NIE Δ = 152km
Pg eZ 04 01 56.0
Sg eN 02 15.6

KSP Δ = 176km
Pn eZ 04 01 57.4
Pg eZ 02 00.0
Sn eN 02 18.8
Sg eN 02 20.4

MAR 22

GIG: φ = 50.058°N, λ = 18.434°E
H = 06:08:18.1, M = 2.5

RAC Δ = 18km
Pg eZ 06 08 21.8
Sg eNE 08 25.0

OJC Δ = 99km
Pg iZ 06 08 34.7 C
Sg eE 08 47.0

NIE Δ = 153km
Pg eZ 06 08 44.6
Sg eE 09 04.3

KSP Δ = 175km
Pn eZ 06 08 46.0
Pg eZ 08 48.1
Sn eN 09 06.7
Sg eE 09 08.7

MAR 22

GIG: φ = 50.245°N, λ = 18.958°E
H = 10:09:49.4, M = 2.4

OJC Δ = 60km
Pg iZ 10 09 59.9 D
Sg iE 10 07.8

NIE Δ = 134km
Pg eZ 10 10 12.2
Sg eE 10 29.4

KSP Δ = 200km
Pg eZ 10 10 22.6
Sg eE 10 46.1

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MAR 23

GIG: φ = 50.055°N, λ = 18.433°E
H = 02:26:46.7, M = 2.3

RAC Δ = 18km
Pg eZ 02 26 50.1
Sg eNE 26 53.2

OJC Δ = 99km
Pg eZ 02 27 03.0
Sg eN 27 15.4

NIE Δ = 153km
Pg eZ 02 27 12.9
Sg eN 27 32.6

KSP Δ = 175km
Pn eZ 02 27 14.5
Pg eZ 27 17.2
Sn eE 27 35.1
Sg eN 27 37.9

MAR 23

GIG: φ = 50.243°N, λ = 18.960°E
H = 05:05:48.7, M = 2.3

OJC Δ = 60km
Pg iZ 05 05 59.2 D
Sg iE 06 07.0

NIE Δ = 134km
Pg eZ 05 06 12.1
Sg eE 06 29.1

KSP Δ = 200km
Pg eZ 05 06 21.7
Sg eN 06 45.3

MAR 23

GIG: φ = 50.217°N, λ = 19.068°E
H = 07:36:23.7, M = 2.2

OJC Δ = 52km
Pg eZ 07 36 32.5
Sg eN 36 39.4

NIE Δ = 126km
Pg eZ 07 36 45.9
Sg eN 37 02.2

KSP Δ = 208km
Pg eE 07 36 57.7
Sg eN 37 22.8

MAR 23

φ = 50.33°N, λ = 18.80°E
H = 16:26:55.4, M = 2.4

OJC Δ = 72km
Pg eZ 16 27 07.9
Sg eN 27 17.4

NIE Δ = 148km
Pg eZ 16 27 20.6
Sg eN 27 39.5

KSP Δ = 186km
Pg eZ 16 27 26.1
Sg eN 27 49.3

MAR 24

GIG: φ = 50.246°N, λ = 18.960°E
H = 02:22:36.8, M = 2.2

OJC Δ = 60km
Pg eZ 02 22 47.1
Sg eE 22 55.0

NIE Δ = 134km
Pg eZ 02 23 00.0
Sg eE 23 16.9

KSP Δ = 200km
Pg eZ 02 23 09.5
Sg eE 23 33.9

MAR 24

GIG: φ = 50.058°N, λ = 18.437°E
H = 04:13:33.2, M = 2.0

RAC Δ = 17km
Pg eZ 04 13 37.0
Sg eNE 13 40.2

OJC Δ = 99km
Pg eZ 04 13 50.0
Sg eE 14 02.2

NIE Δ = 153km
Pg eZ 04 13 59.9
Sg eE 14 19.4

MAR 24

GIG: φ = 50.055°N, λ = 18.435°E
H = 04:57:32.0, M = 2.8

RAC Δ = 18km
Pg iZ 04 57 35.7 D
Sg eNE 57 38.9

OJC Δ = 99km
Pg eZ 04 57 48.4
Sg eNE 58 00.7

NIE Δ = 153km
Pg eZ 04 57 58.4
Sg eN 58 18.2

KSP Δ = 175km
Pn eZ 04 57 59.6
Pg eZ 58 02.0
Sn eN 58 21.0
Sg eN 58 22.8

MAR 24

GIG: φ = 50.244°N, λ = 18.957°E
H = 14:31:12.5, M = 2.4

OJC Δ = 60km
Pg iZ 14 31 22.6 D
Sg iE 31 30.6

NIE Δ = 134km
Pg eZ 14 31 35.6
Sg eE 31 52.6

KSP Δ = 200km
Pg eZ 14 31 45.8
Sg eE 32 09.8

MAR 24

GIG: φ = 50.046°N, λ = 18.456°E
H = 23:53:19.1, M = 1.9

RAC Δ = 19km
Pg eZ 23 53 23.2
Sg eNE 53 26.2

OJC Δ = 98km
Pg eZ 23 53 36.2
Sg eN 53 48.8

NIE Δ = 151km
Pg eZ 23 53 45.2
Sg eN 54 03.7

MAR 25

GIG: φ = 50.058°N, λ = 18.435°E
H = 09:15:57.8, M = 2.3

RAC Δ = 18km
Pg iZ 09 16 01.1 D
Sg eNE 16 04.3

OJC Δ = 99km
Pg eZ 09 16 14.4
Sg eN 16 27.1

NIE Δ = 153km
Pg eZ 09 16 23.8
Sg eE 16 43.6

KSP Δ = 176km
Pn eZ 09 16 25.8
Pg eZ 16 28.0
Sn eE 16 46.7
Sg eE 16 48.8

MAR 26

φ = 50.03°N, λ = 18.56°E
H = 18:02:58.0, M = 2.3

RAC Δ = 27km
Pg iZ 18 03 03.9 D
Sg eNE 03 08.5

OJC Δ = 91km
Pg eZ 18 03 13.5
Sg eN 03 25.2

NIE Δ = 144km
Pg eZ 18 03 22.2
Sg eE 03 41.1

KSP Δ = 184km
Pg eZ 18 03 29.2
Sg eN 03 50.5

MAR 27

GIG: φ = 50.059°N, λ = 18.437°E
H = 23:19:48.7, M = 2.5

RAC Δ = 18km
Pg iZ 23 19 52.2 D
Sg iN 19 55.3

OJC Δ = 99km
Pg eZ 23 20 05.2
Sg eN 20 18.1

NIE Δ = 153km
Pg eZ 23 20 15.3
Sg eE 20 35.0

KSP Δ = 175km
Pn eZ 23 20 16.1
Pg eZ 20 17.9
Sg eE 20 38.7

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MAR 28

φ = 50.03°N, λ = 18.52°E
H = 02:34:12.3, M = 2.1

RAC	Δ = 24km		
	Pg eZ	02	34 18.4
	Sg eNE		34 21.5
OJC	Δ = 93km		
	Pg eZ	02	34 28.1
	Sg eN		34 40.4
NIE	Δ = 146km		
	Pg eZ	02	34 36.6
	Sg eE		34 55.6

MAR 28

GIG: φ = 50.058°N, λ = 18.435°E
H = 11:38:39.7, M = 2.4

RAC	Δ = 17km		
	Pg eZ	11	38 43.5
	Sg eNE		38 46.7
OJC	Δ = 99km		
	Pg eZ	11	38 56.4
	Sg eE		39 08.6
NIE	Δ = 153km		
	Pg eZ	11	39 06.3
	Sg eN		39 25.1
KSP	Δ = 175km		
	Pg eZ	11	39 08.2
	Sg eE		39 30.2

MAR 28

GIG: φ = 50.246°N, λ = 18.961°E
H = 16:07:31.7, M = 2.3

OJC	Δ = 60km		
	Pg eZ	16	07 42.1
	Sg iE		07 49.9
NIE	Δ = 134km		
	Pg eZ	16	07 55.4
	Sg eE		08 11.6
KSP	Δ = 200km		
	Pg eZ	16	08 04.8
	Sg eE		08 28.9

MAR 28

GIG: φ = 50.266°N, λ = 18.882°E
H = 23:43:43.9, M = 2.3

OJC	Δ = 66km		
	Pg eZ	23	43 55.3
	Sg eN		44 04.1
NIE	Δ = 140km		
	Pg eZ	23	44 07.8
	Sg eE		44 26.0
KSP	Δ = 194km		
	Pg eZ	23	44 16.1
	Sg eN		44 38.8

MAR 29

GIG: φ = 50.055°N, λ = 18.437°E
H = 04:00:12.6, M = 2.6

RAC	Δ = 18km		
	Pg iZ	04	00 16.2 D
	Sg eNE		00 19.4
OJC	Δ = 99km		
	Pg eZ	04	00 29.1
	Sg eE		00 41.6
NIE	Δ = 153km		
	Pg eZ	04	00 39.0
	Sg eN		00 58.6
KSP	Δ = 175km		
	Pn eZ	04	00 40.4
	Pg eZ		00 42.6
	Sn eN		01 00.2
	Sg eN		01 03.2

MAR 29

GIG: φ = 50.244°N, λ = 18.960°E
H = 04:29:37.1, M = 2.3

OJC	Δ = 60km		
	Pg eZ	04	29 47.4
	Sg eE		29 55.3
NIE	Δ = 134km		
	Pg eZ	04	30 00.3
	Sg eE		30 17.2
KSP	Δ = 200km		
	Pg eZ	04	30 10.3
	(Sg) eE		30 33.0

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MAR 29

GIG: φ = 50.259°N, λ = 18.907°E
H = 08:03:16.1, M = 2.4

OJC Δ = 63km
Pg eZ 08 03 27.2
Sg eE 03 35.6

NIE Δ = 138km
Pg eZ 08 03 39.9
Sg eE 03 57.6

KSP Δ = 196km
Pg eZ 08 03 48.6
Sg eN 04 12.0

MAR 30

GIG: φ = 50.246°N, λ = 18.958°E
H = 11:49:08.7, M = 2.3

OJC Δ = 60km
Pg eZ 11 49 18.8
Sg eE 49 26.6

NIE Δ = 134km
Pg eZ 11 49 32.5
Sg eE 49 48.6

KSP Δ = 200km
Pg eZ 11 49 41.6
Sg eN 50 05.5

MAR 31

GIG: φ = 50.244°N, λ = 18.960°E
H = 05:09:10.3, M = 2.4

OJC Δ = 60km
Pg eZ 05 09 20.5
Sg eE 09 28.4

NIE Δ = 133km
Pg eZ 05 09 32.9
Sg eE 09 50.5

KSP Δ = 200km
Pg eZ 05 09 43.3
Sg eE 10 07.3

MAR 31

GIG: φ = 50.058°N, λ = 18.435°E
H = 10:50:31.7, M = 2.6

RAC Δ = 17km
Pg iZ 10 50 35.4 D
Sg eNE 50 38.6

OJC Δ = 99km
Pg iZ 10 50 48.4 C
Sg eN 51 00.6

NIE Δ = 153km
Pg eZ 10 50 58.2
Sg eN 51 18.0

KSP Δ = 175km
Pn eZ 10 50 59.5
Pg eZ 51 01.8
Sg eE 51 21.1

MAR 31

GIG: φ = 50.059°N, λ = 18.436°E
H = 14:36:55.7, M = 2.2

RAC Δ = 17km
Pg eZ 14 36 59.5
Sg eNE 37 02.7

OJC Δ = 99km
Pg eZ 14 37 12.4
Sg eE 37 24.9

NIE Δ = 153km
Pg eZ 14 37 22.2
Sg eN 37 41.7

MAR 31

GIG: φ = 50.246°N, λ = 18.958°E
H = 15:14:18.4, M = 2.2

OJC Δ = 60km
Pg eZ 15 14 28.7
Sg eE 14 36.5

NIE Δ = 134km
Pg eZ 15 14 42.0
Sg eE 14 58.6

KSP Δ = 200km
Pg eZ 15 14 51.5
Sg eN 15 14.8

APR 1

GIG: φ = 50.265°N, λ = 18.850°E
H = 08:26:34.0, M = 2.3

OJC Δ = 68km
Pg eZ 08 26 46.3
Sg eE 26 54.5

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```
   NIE  Δ = 141km
        Pg eZ        08 26 58.2
        Sg eE           27 16.3

   KSP  Δ = 192km
        Pg eZ        08 27 05.9
        Sg eN           27 28.8
```

APR 3

GIG: φ = 50.058°N, λ = 18.437°E
H = 10:16:54.8, M = 3.0

```
   RAC  Δ = 18km
        Pg iZ        10 16 58.3 D
        Sg eNE          17 01.4

   OJC  Δ = 99km
        Pg iZ        10 17 11.1 D
        Sg eN           17 23.5

   NIE  Δ = 153km
        Pg eZ        10 17 21.0
        Sg eN           17 40.7

   KSP  Δ = 175km
        Pn iZ        10 17 22.4
        Pg iZ           17 24.6
        Sn iN           17 43.8
```

APR 4

GIG: φ = 50.269°N, λ = 18.924°E
H = 02:34:01.2, M = 2.4

```
   OJC  Δ = 63km
        Pg eZ        02 34 12.1
        Sg eE           34 20.3

   NIE  Δ = 137km
        Pg eZ        02 34 25.1
        Sg eE           34 42.1

   KSP  Δ = 197km
        Pg eZ        02 34 33.9
        Sg eN           34 57.5
```

APR 4

GIG: φ = 50.245°N, λ = 18.961°E
H = 02:50:58.8, M = 2.2

```
   OJC  Δ = 60km
        Pg eZ        02 51 09.2
        Sg eE           51 17.1

   NIE  Δ = 134km
        Pg eZ        02 51 22.1
        Sg eE           51 39.1

   KSP  Δ = 200km
        Pg eZ        02 51 31.8
        Sg eN           51 55.2
```

APR 4

GIG: φ = 50.243°N, λ = 18.958°E
H = 12:08:15.7, M = 2.3

```
   OJC  Δ = 60km
        Pg eZ        12 08 26.3
        Sg eE           08 34.1

   KSP  Δ = 200km
        Pg eZ        12 08 49.2
        Sg eE           09 12.3
```

APR 4

GIG: φ = 50.269°N, λ = 18.860°E
H = 16:17:23.7, M = 2.8

```
   OJC  Δ = 67km
        Pg eZ        16 17 35.5
        Sg eE           17 44.0

   NIE  Δ = 141km
        Pg eZ        16 17 47.9
        Sg eN           18 05.0

   KSP  Δ = 193km
        Pn eZ        16 17 54.3
        Pg iZ           17 56.1
        Sg eN           18 18.9
```

APR 5

φ = 50.28°N, λ = 18.96°E
H = 00:27:40.7, M = 2.1

```
   OJC  Δ = 60km
        Pg eZ        00 27 51.2
        Sg eE           27 59.1

   NIE  Δ = 136km
        Pg eZ        00 28 04.2
        Sg eE           28 21.1

   KSP  Δ = 199km
        Pg eZ        00 28 14.2
        Sg eN           28 36.9
```

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APR 5

GIG: φ = 50.243°N, λ = 18.958°E
H = 06:26:49.8, M = 2.3

OJC Δ = 60km
Pg eZ 06 27 00.2
Sg eE 27 08.0

NIE Δ = 134km
Pg eZ 06 27 13.3
Sg eE 27 30.4

KSP Δ = 200km
Pg eZ 06 27 23.0
(Sg) eE 27 45.5

APR 5

φ = 50.09°N, λ = 18.46°E
H = 21:45:27.7, M = 2.0

RAC Δ = 19km
Pg eZ 21 45 31.5
Sg eNE 45 34.6

OJC Δ = 97km
Pg eZ 21 45 44.1
Sg eE 45 56.3

NIE Δ = 153km
Pg eZ 21 45 53.6
Sg eE 46 13.2

APR 6

GIG: φ = 50.244°N, λ = 18.961°E
H = 04:00:59.1, M = 2.4

OJC Δ = 60km
Pg eZ 04 01 09.5
Sg eE 01 17.5

NIE Δ = 134km
Pg eZ 04 01 22.0
Sg eE 01 39.5

KSP Δ = 200km
Pg eZ 04 01 32.2
Sg eN 01 55.2

APR 7

GIG: φ = 49.978°N, λ = 18.570°E
H = 02:40:19.9, M = 2.2

RAC Δ = 29km
Pg eZ 02 40 26.8
Sg eNE 40 30.1

OJC Δ = 92km
Pg eZ 02 40 36.3
Sg eE 40 47.8

KSP Δ = 188km
Pg eZ 02 40 51.1
Sg eE 41 12.9

APR 7

GIG: φ = 50.246°N, λ = 18.960°E
H = 10:03:39.1, M = 2.7

KSP Δ = 200km
Pg eZ 10 04 11.9
(Sg) eN 04 37.6

APR 7

GIG: φ = 50.244°N, λ = 18.956°E
H = 18:59:21.4, M = 2.3

OJC Δ = 60km
Pg eZ 18 59 31.9
Sg eE 59 39.7

KSP Δ = 200km
Pg eZ 18 59 55.2
Sg eN 19 00 18.6

APR 10

GIG: φ = 50.247°N, λ = 18.957°E
H = 09:41:06.5, M = 2.2

OJC Δ = 60km
Pg eZ 09 41 16.6
Sg eE 41 24.5

NIE Δ = 134km
Pg eZ 09 41 30.0
Sg eE 41 46.6

KSP Δ = 200km
Pg eZ 09 41 39.3
(Sg) eZ 42 05.1

APR 11

GIG: φ = 50.246°N, λ = 18.960°E
H = 05:28:48.0, M = 2.3

OJC Δ = 60km
Pg iZ 05 28 58.5 D
Sg iE 29 06.3

NIE Δ = 134km
Pg eZ 05 29 11.4
Sg eE 29 28.3

```
   KSP  Δ = 200km
        Pg eZ        05 29 21.2
        (Sg) eN         29 43.8
```

APR 11

GIG: φ = 50.269°N, λ = 18.924°E
H = 18:24:12.6, M = 2.5

```
   OJC  Δ = 63km
        Pg eZ        18 24 23.5
        Sg eE           24 31.6

   NIE  Δ = 138km
        Pg eZ        18 24 36.7
        Sg eE           24 53.8

   KSP  Δ = 197km
        Pg eZ        18 24 45.4
        Sg eN           25 08.7
```

APR 11

GIG: φ = 50.050°N, λ = 18.455°E
H = 20:58:36.3, M = 2.2

```
   RAC  Δ = 19km
        Pg iZ        20 58 39.8 D
        Sg iN           58 43.2

   OJC  Δ = 98km
        Pg eZ        20 58 52.6
        Sg eN           59 04.6

   NIE  Δ = 151km
        Pg eZ        20 59 02.7
        Sg eE           59 21.7

   KSP  Δ = 176km
        Pg eZ        20 59 05.1
        Sg eN           59 26.4
```

APR 12

GIG: φ = 50.273°N, λ = 18.829°E
H = 04:22:10.5, M = 2.1

```
   OJC  Δ = 70km
        Pg eZ        04 22 22.9
        Sg eE           22 31.2

   NIE  Δ = 144km
        Pg eZ        04 22 35.5
        Sg eE           22 53.1

   KSP  Δ = 190km
        Pg eE        04 22 41.8
        (Sg) eN         23 03.6
```

APR 12

GIG: φ = 50.243°N, λ = 18.958°E
H = 07:18:15.1, M = 2.2

```
   OJC  Δ = 60km
        Pg eZ        07 18 25.5
        Sg eE           18 33.3

   NIE  Δ = 134km
        Pg eZ        07 18 38.6
        Sg eE           18 55.1

   KSP  Δ = 200km
        Pg eZ        07 18 48.3
        Sg eN           19 11.6
```

APR 12

GIG: φ = 50.234°N, λ = 18.820°E
H = 04:22:10.7, M = 2.1

```
   OJC  Δ = 70km
        Pg eZ        13 44 32.2
        Sg eN           44 41.1

   NIE  Δ = 141km
        Pg eZ        13 44 44.5
        Sg eE           45 02.5

   KSP  Δ = 191km
        Pg eE        13 44 51.3
        Sn eE           45 14.9
```

APR 13

GIG: φ = 50.243°N, λ = 18.963°E
H = 04:09:31.3, M = 2.3

```
   OJC  Δ = 59km
        Pg iZ        04 09 41.6 D
        Sg eE           09 49.2

   NIE  Δ = 134km
        Pg eZ        04 09 54.5
        (Sg) eN         10 12.5

   KSP  Δ = 200km
        Pg eE        04 10 04.7
        Sg eE           10 28.3
```

APR 13

GIG: φ = 50.244°N, λ = 18.958°E
H = 04:34:54.9, M = 2.3

```
   OJC  Δ = 60km
        Pg iZ        04 35 05.3 D
        Sg eE           35 12.9
```

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NIE Δ = 134km
Pg eZ 04 35 18.2
Sg eE 35 36.1

KSP Δ = 200km
Pg eZ 04 35 28.2
Sg eE 35 51.5

APR 13
GIG: φ = 50.244°N, λ = 18.958°E
H = 09:27:38.8, M = 2.5

OJC Δ = 60km
Pg eZ 09 27 49.1
Sg eE 27 57.1

NIE Δ = 134km
Pg eZ 09 28 02.2
Sg eE 28 19.1

KSP Δ = 200km
Pg eZ 09 28 11.7
Sg eN 28 35.9

APR 13
GIG: φ = 50.059°N, λ = 18.437°E
H = 17:59:39.7, M = 2.3

RAC Δ = 18km
Pg eZ 17 59 43.2
Sg eNE 59 46.3

OJC Δ = 99km
Pg eZ 17 59 56.0
Sg eE 18 00 08.4

NIE Δ = 153km
Pg eZ 18 00 06.0
Sg eE 00 25.6

KSP Δ = 175km
Pg eZ 18 00 08.6
Sn eN 00 28.4

APR 14
GIG: φ = 50.247°N, λ = 18.958°E
H = 04:37:39.5, M = 2.2

OJC Δ = 60km
Pg eZ 04 37 49.9
Sg eE 37 57.7

NIE Δ = 134km
Pg eZ 04 38 02.7
Sg eE 38 19.5

KSP Δ = 200km
Pg eZ 04 38 12.8
Sg eN 38 36.0

APR 14
GIG: φ = 50.243°N, λ = 18.958°E
H = 10:39:40.1, M = 2.3

OJC Δ = 60km
Pg eZ 10 39 50.5
Sg eE 39 58.3

KSP Δ = 200km
Pg eZ 10 40 13.0
Sg eZ 40 37.4

APR 14
GIG: φ = 50.369°N, λ = 18.914°E
H = 11:06:10.9, M = 2.5

OJC Δ = 65km
Pg eZ 11 06 22.2
Sg eN 06 31.2

NIE Δ = 146km
Pg eZ 11 06 36.5
Sg eE 06 55.6

KSP Δ = 192km
Pg eZ 11 06 43.2
Sg eN 07 05.5

APR 14
GIG: φ = 50.079°N, λ = 19.123°E
H = 16:06:03.1, M = 2.3

OJC Δ = 50km
Pg eZ 16 06 11.5
Sg eN 06 18.0

NIE Δ = 113km
Pg eZ 16 06 22.3
Sg eE 06 38.2

KSP Δ = 218km
Pg eE 16 06 39.2
Sg eN 07 05.6

APR 15
φ = 49.99°N, λ = 18.55°E
H = 06:53:24.8, M = 2.0

RAC Δ = 28km
Pg eZ 06 53 30.8
Sg eNE 53 34.3

```
OJC  Δ = 92km
     Pg eZ        06 53 40.4
     Sg eE           53 52.0

KSP  Δ = 187km
     Pg eE        06 53 55.8
     Sg eN           54 19.3
```

APR 15

GIG: φ = 50.056°N, λ = 18.434°E
H = 08:33:58.7, M = 2.9

```
RAC  Δ = 18km
     Pg iZ        08 34 02.3 D
     Sg eNE          34 05.4

OJC  Δ = 99km
     Pg eZ        08 34 15.1
     Sg eN           34 27.3

NIE  Δ = 153km
     Pg eZ        08 34 25.0
     Sg eN           34 44.7

KSP  Δ = 175km
     Pn eZ        08 34 26.3
     Pg eZ           34 28.0
     Sg eN           34 48.2
```

APR 15

GIG: φ = 49.979°N, λ = 18.571°E
H = 12:26:43.1, M = 2.3

```
RAC  Δ = 29km
     Pg eZ        12 26 49.7
     Sg eNE          26 54.5

OJC  Δ = 92km
     Pg eZ        12 26 59.0
     Sg eN           27 10.5

NIE  Δ = 140km
     Pg eZ        12 27 08.3
     (Sg) eE         27 26.8

KSP  Δ = 188km
     Pg eZ        12 27 15.6
     Sn eN           27 35.6
```

APR 16

φ = 50.34°N, λ = 18.96°E
H = 23:38:36.5, M = 1.9

```
OJC  Δ = 62km
     Pg eZ        23 38 47.5
     Sg eN           38 55.2

NIE  Δ = 141km
     Pg eZ        23 39 00.8
     Sg eN           39 18.1

KSP  Δ = 196km
     Pg eZ        23 39 09.5
     Sg eN           39 32.5
```

APR 18

GIG: φ = 50.245°N, λ = 18.960°E
H = 11:02:11.1, M = 2.5

```
OJC  Δ = 60km
     Pg iZ        11 02 21.2 D
     Sg iE           02 29.1

NIE  Δ = 134km
     Pg eZ        11 02 34.1
     Sg eE           02 51.8

KSP  Δ = 200km
     Pn eZ        11 02 43.0
     Pg eZ           02 44.0
     Sg eN           03 07.4
```

APR 18

φ = 50.36°N, λ = 18.96°E
H = 16:14:25.3, M = 2.3

```
OJC  Δ = 62km
     Pg eZ        16 14 36.2
     Sg eE           14 44.2

NIE  Δ = 142km
     Pg eZ        16 14 49.6
     Sg eE           15 07.4

KSP  Δ = 196km
     Pg eZ        16 14 57.9
     Sg eN           15 21.6
```

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APR 19

GIG: φ = 50.248°N, λ = 18.959°E
H = 12:13:52.1, M = 2.4

OJC Δ = 60km
Pg eZ 12 14 02.5
Sg eE 14 10.3

NIE Δ = 134km
Pg eZ 12 14 14.9
Sg eE 14 32.2

KSP Δ = 200km
Pg eZ 12 14 25.0
Sg eN 14 48.5

APR 20

GIG: φ = 50.244°N, λ = 18.961°E
H = 04:18:23.3, M = 2.5

OJC Δ = 60km
Pg iZ 04 18 33.6 D
Sg eEN 18 41.4

NIE Δ = 134km
Pg eZ 04 18 46.0
Sg eE 19 03.1

KSP Δ = 200km
Pg eZ 04 18 56.3
Sg eE 19 19.7

APR 20

GIG: φ = 50.247°N, λ = 18.960°E
H = 09:45:44.0, M = 2.3

OJC Δ = 60km
Pg eZ 09 45 54.2
Sg eE 46 02.0

NIE Δ = 134km
Pg eZ 09 46 07.5
Sg eE 46 24.3

KSP Δ = 200km
Pg eZ 09 46 16.8
Sg eE 46 41.1

APR 20

φ = 50.38°N, λ = 18.90°E
H = 17:28:23.0, M = 2.4

OJC Δ = 67km
Pg eZ 17 28 34.4
Sg eE 28 43.1

NIE Δ = 148km
Pg eZ 17 28 48.9
Sg eE 29 07.2

KSP Δ = 191km
Pg eZ 17 28 54.4
Sg eN 29 18.9

APR 22

GIG: φ = 50.244°N, λ = 18.961°E
H = 00:21:41.6, M = 2.3

OJC Δ = 60km
Pg eZ 00 21 52.0
Sg eE 21 59.9

NIE Δ = 134km
Pg eZ 00 22 04.9
Sg eE 22 21.9

KSP Δ = 200km
Pg eZ 00 22 14.8
Sg eE 22 38.3

APR 22

GIG: φ = 50.248°N, λ = 18.884°E
H = 23:52:09.5, M = 2.7

RAC Δ = 52km
Pg eZ 23 52 19.3
Sg eNE 52 26.3

OJC Δ = 65km
Pg eZ 23 52 21.1
Sg eN 52 29.1

NIE Δ = 138km
Pg eZ 23 52 33.2
Sg eN 52 50.8

KSP Δ = 195km
Pg eZ 23 52 42.1
Sg eN 53 04.8

APR 24

GIG: φ = 50.244°N, λ = 18.960°E
H = 06:21:29.7, M = 2.6

OJC Δ = 60km
Pg eZ 06 21 40.0
Sg iE 21 47.9

NIE Δ = 134km
Pg eZ 06 21 52.9
Sg eE 22 10.3

KSP Δ = 200km
Pg eZ 06 22 02.8
Sg eN 22 26.1

APR 24
GIG: φ = 50.269°N, λ = 18.929°E
H = 13:21:33.5, M = 2.4

OJC Δ = 62km
Pg eZ 13 21 44.4
Sg eN 21 52.2

NIE Δ = 138km
Pg eZ 13 21 57.7
Sg eE 22 14.2

KSP Δ = 197km
Pg eZ 13 22 06.2
Sg eZ 22 29.8

APR 25
GIG: φ = 50.259°N, λ = 18.889°E
H = 01:46:19.3, M = 2.3

OJC Δ = 65km
Pg eZ 01 46 30.6
Sg eE 46 39.0

NIE Δ = 139km
Pg eZ 01 46 43.2
Sg eE 47 01.2

KSP Δ = 195km
Pg eZ 01 46 51.7
Sg eN 47 15.4

APR 25
GIG: φ = 50.238°N, λ = 18.933°E
H = 16:45:00.0, M = 2.2

OJC Δ = 62km
Pg eZ 16 45 10.5
Sg eE 45 18.6

NIE Δ = 135km
Pg eZ 16 45 23.2
Sg eE 45 40.4

KSP Δ = 198km
Pn eZ 16 45 31.2
Pg eZ 45 33.4
Sg eN 45 55.8

APR 26
GIG: φ = 50.051°N, λ = 18.455°E
H = 01:25:29.6, M = 2.1

RAC Δ = 19km
Pg eZ 01 25 33.3
Sg eNE 25 36.6

OJC Δ = 98km
Pg eZ 01 25 45.9
Sg eE 25 58.7

NIE Δ = 152km
Pg eZ 01 25 55.8
Sg eE 26 15.2

APR 26
GIG: φ = 50.055°N, λ = 18.431°E
H = 03:02:00.8, M = 2.0

RAC Δ = 17km
Pg eZ 03 02 03.8
Sg eNE 02 07.3

OJC Δ = 99km
Pg eZ 03 02 17.8
Sg eN 02 30.3

NIE Δ = 153km
Pg eZ 03 02 27.0
Sg eE 02 46.3

APR 26
GIG: φ = 50.244°N, λ = 18.960°E
H = 05:34:05.5, M = 2.4

OJC Δ = 60km
Pg eZ 05 34 15.7
Sg eE 34 23.6

NIE Δ = 134km
Pg eZ 05 34 29.1
Sg eE 34 46.1

KSP Δ = 200km
Pg eZ 05 34 38.2
Sg eN 35 02.0

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APR 27

GIG: φ = 50.034°N, λ = 18.436°E
H = 12:31:53.1, M = 2.5

RAC	Δ = 18km		
	Pg eZ	12	31 56.7
	Sg eNE		31 59.8
OJC	Δ = 99km		
	Pg eZ	12	32 09.9
	Sg eE		32 22.0
NIE	Δ = 152km		
	Pg eZ	12	32 19.2
	Sg eE		32 38.5
KSP	Δ = 177km		
	Pn eZ	12	32 21.0
	Pg eZ		32 23.0
	Sn eZ		32 42.0
	Sg eN		32 43.7

APR 27

φ = 50.36°N, λ = 18.82°E
H = 20:00:55.7, M = 2.7

RAC	Δ = 55km		
	Pg eZ	20	01 05.7
	Sg eNE		01 13.1
OJC	Δ = 71km		
	Pg eZ	20	01 08.2
	Sg eN		01 17.2
NIE	Δ = 150km		
	Pg eZ	20	01 21.4
	Sg eE		01 39.6
KSP	Δ = 186km		
	Pg eZ	20	01 26.9
	Sg eN		01 48.8

APR 28

GIG: φ = 50.244°N, λ = 18.956°E
H = 01:55:06.9, M = 2.2

OJC	Δ = 60km		
	Pg eZ	01	55 17.1
	Sg eE		55 25.0
NIE	Δ = 134km		
	Pg eZ	01	55 29.8
	Sg eE		55 46.8
KSP	Δ = 200km		
	Pg eZ	01	55 39.8
	Sg eN		56 03.3

APR 28

GIG: φ = 50.056°N, λ = 18.432°E
H = 04:41:15.3, M = 2.2

RAC	Δ = 18km		
	Pg eZ	04	41 18.9
	Sg eNE		41 22.0
OJC	Δ = 99km		
	Pg eZ	04	41 31.9
	Sg eE		41 44.2
NIE	Δ = 153km		
	Pg eZ	04	41 41.7
	Sg eE		42 01.0

APR 28

φ = 50.08°N, λ = 18.47°E
H = 15:08:39.2, M = 2.3

RAC	Δ = 20km		
	Pg eZ	15	08 43.2
	Sg eNE		08 46.6
OJC	Δ = 96km		
	Pg eZ	15	08 55.6
	Sg eE		09 07.8
NIE	Δ = 151km		
	Pg eZ	15	09 05.3
	Sg eE		09 23.8

APR 28

GIG: φ = 50.246°N, λ = 18.960°E
H = 20:44:31.5, M = 2.2

OJC	Δ = 60km		
	Pg eZ	20	44 41.7
	Sg eE		44 49.7
NIE	Δ = 134km		
	Pg eZ	20	44 54.7
	Sg eE		45 11.8
KSP	Δ = 200km		
	Pg eE	20	45 04.4
	Sg eN		45 27.9

Upper Silesian Coal Basin 2006

May 2

φ = 50.01°N, λ = 18.53°E
H = 15:39:43.2, M = 2.0

RAC	Δ = 26km		
	Pg eZ	15	39 49.0
	Sg eNE		39 52.3
OJC	Δ = 94km		
	Pg eZ	15	39 59.3
	Sg eN		40 11.0
NIE	Δ = 144km		
	Pg eZ	15	40 07.8
	Sg eE		40 26.3

May 2

GIG: φ = 50.247°N, λ = 18.962°E
H = 17:39:11.7, M = 2.4

OJC	Δ = 60km		
	Pg eZ	17	39 21.7
	Sg eE		39 29.6
NIE	Δ = 134km		
	Pg eZ	17	39 34.7
	Sg eE		39 52.2
KSP	Δ = 200km		
	Pg eZ	17	39 44.6
	Sg eN		40 09.1

May 3

GIG: φ = 50.084°N, λ = 18.439°E
H = 03:01:26.5, M = 2.0

RAC	Δ = 18km		
	Pg eZ	03	01 30.0
	Sg eNE		01 32.8
OJC	Δ = 98km		
	Pg eZ	03	01 43.3
	Sg eN		01 55.5
NIE	Δ = 154km		
	Pg eZ	03	01 53.3
	Sg eE		02 12.5
KSP	Δ = 174km		
	Pg eZ	03	01 56.2
	Sg eE		02 16.3

May 4

GIG: φ = 49.979°N, λ = 18.570°E
H = 18:38:49.5, M = 2.6

RAC	Δ = 29km		
	Pg eZ	18	38 55.5
	Sg eNE		38 59.9
OJC	Δ = 92km		
	Pg eZ	18	39 04.9
	Sg iN		39 16.5
NIE	Δ = 140km		
	Pg eZ	18	39 13.6
	Sg eE		39 32.3
KSP	Δ = 188km		
	Pg eZ	18	39 20.4
	Sn eN		39 42.0
	Sg eN		39 43.1

May 4

φ = 50.08°N, λ = 18.47°E
H = 23:32:26.7, M = 2.0

RAC	Δ = 20km		
	Pg eZ	23	32 30.8
	Sg eNE		32 34.4
OJC	Δ = 96km		
	Pg eZ	23	32 43.2
	Sg eN		32 55.2
NIE	Δ = 151km		
	Pg eZ	23	32 52.7
	Sg eN		33 11.3

May 5

GIG: φ = 50.247°N, λ = 18.962°E
H = 08:41:43.4, M = 2.2

OJC	Δ = 60km		
	Pg iZ	08	41 53.8 D
	Sg eE		42 01.6
NIE	Δ = 134km		
	Pg eZ	08	42 06.7
	Sg eE		42 23.6
KSP	Δ = 200km		
	Pg eZ	08	42 15.5
	Sg eE		42 40.7

Upper Silesian Coal Basin 2006

May 5

φ = 50.30°N, λ = 18.93°E
H = 19:50:16.9, M = 2.4

OJC	Δ = 62km		
	Pg eZ	19	50 28.2
	Sg eE		50 36.4
NIE	Δ = 140km		
	Pg eZ	19	50 41.0
	Sg eE		50 58.4
KSP	Δ = 196km		
	Pg eZ	19	50 49.9
	Sg eE		51 12.5

May 6

GIG: φ = 50.367°N, λ = 18.910°E
H = 15:03:05.3, M = 2.8

RAC	Δ = 60km		
	Pg eZ	15	03 16.3
	Sg eNE		03 24.1
OJC	Δ = 65km		
	Pg eZ	15	03 16.8
	Sg eE		03 25.0
NIE	Δ = 146km		
	Pg eZ	15	03 30.5
	Sg eN		03 48.3
KSP	Δ = 193km		
	Pn eZ	15	03 36.3
	Pg eZ		03 37.6
	Sg eE		04 00.8

May 7

GIG: φ = 49.978°N, λ = 18.570°E
H = 21:10:53.0, M = 2.4

RAC	Δ = 30km		
	Pg eZ	21	10 59.0
	Sg eNE		11 03.8
OJC	Δ = 92km		
	Pg eZ	21	11 08.4
	Sg eN		11 19.9
NIE	Δ = 140km		
	Pg eZ	21	11 17.0
	(Sg) eE		11 36.1
KSP	Δ = 188km		
	Pg eZ	21	11 25.2
	Sn eN		11 45.4
	Sg eN		11 47.5

May 8

GIG: φ = 50.232°N, λ = 18.917°E
H = 22:31:26.7, M = 2.1

OJC	Δ = 63km		
	Pg eZ	22	31 37.5
	Sg eE		31 45.9
NIE	Δ = 136km		
	Pg eZ	22	31 50.3
	Sg eE		32 07.3
KSP	Δ = 198km		
	Pg eZ	22	31 59.0
	Sg eN		32 22.4

May 9

GIG: φ = 50.244°N, λ = 18.958°E
H = 04:44:45.5, M = 2.6

OJC	Δ = 60km		
	Pg eZ	04	44 55.8
	Sg eE		45 03.8
NIE	Δ = 134km		
	Pg eZ	04	45 08.2
	Sg eE		45 25.6
KSP	Δ = 200km		
	Pg eZ	04	45 18.7
	Sg eN		45 42.8

May 9

GIG: φ = 50.100°N, λ = 19.154°E
H = 09:16:10.6, M = 2.6

OJC	Δ = 48km		
	Pg eZ	09	16 18.6
	Sg eN		16 24.8
NIE	Δ = 113km		
	Pg eZ	09	16 30.0
	(Sg) eE		16 46.1
KSP	Δ = 219km		
	Pg eE	09	16 46.5
	Sg eN		17 11.8

Upper Silesian Coal Basin 2006

May 9

GIG: φ = 50.050°N, λ = 18.455°E
H = 22:11:41.5, M = 2.2

RAC Δ = 19km
Pg eZ 22 11 45.4
Sg eNE 11 48.7

OJC Δ = 97km
Pg eZ 22 11 57.8
Sg eE 12 10.0

NIE Δ = 151km
Pg eZ 22 12 06.9
Sg eE 12 25.9

May 10

GIG: φ = 50.053°N, λ = 18.454°E
H = 21:16:51.2, M = 2.5

RAC Δ = 19km
Pg eZ 21 16 55.0
Sg eNE 16 58.4

OJC Δ = 98km
Pg eZ 21 17 07.9
Sg eN 17 19.6

NIE Δ = 152km
Pg eZ 21 17 17.5
Sg eE 17 35.9

KSP Δ = 176km
Pg eZ 21 17 21.2
Sg eN 17 41.3

May 10

GIG: φ = 50.244°N, λ = 18.958°E
H = 23:48:40.4, M = 2.3

OJC Δ = 60km
Pg eZ 23 48 50.9
Sg eE 48 58.7

NIE Δ = 134km
Pg eZ 23 49 03.2
Sg eE 49 20.7

KSP Δ = 200km
Pg eZ 23 49 13.6
Sg eE 49 36.9

May 11

GIG: φ = 50.273°N, λ = 18.829°E
H = 02:00:51.1, M = 2.4

OJC Δ = 69km
Pg eZ 02 01 03.3
Sg eE 01 11.9

NIE Δ = 143km
Pg eZ 02 01 15.6
Sg eN 01 33.2

KSP Δ = 190km
Pg eZ 02 01 22.8
Sg eN 01 45.9

May 11

GIG: φ = 50.244°N, λ = 18.960°E
H = 09:02:51.0, M = 2.4

OJC Δ = 60km
Pg iZ 09 03 01.6 D
Sg eE 03 09.5

NIE Δ = 134km
Pg eZ 09 03 14.5
Sg eE 03 31.8

KSP Δ = 200km
Pg eZ 09 03 23.8
Sg eE 03 47.3

May 11

GIG: φ = 50.083°N, λ = 18.435°E
H = 19:15:46.2, M = 2.1

RAC Δ = 18km
Pg eZ 19 15 49.7
Sg eNE 15 52.9

OJC Δ = 98km
Pg eZ 19 16 02.6
Sg eN 16 14.9

KSP Δ = 174km
Pg eE 19 16 16.2
Sg eE 16 36.2

May 12

φ = 50.03°N, λ = 18.55°E
H = 01:43:38.0, M = 1.9

RAC Δ = 26km
Pg eZ 01 43 44.2
(Sg) eNE 43 46.9

OJC Δ = 91km
Pg eZ 01 43 53.8
Sg eE 44 04.9

NIE Δ = 144km
Pg eZ 01 44 02.5
Sg eE 44 20.7

May 12
GIG: φ = 50.244°N, λ = 18.958°E
H = 03:36:40.5, M = 2.4

OJC Δ = 60km
Pg eZ 03 36 50.9
Sg eE 36 58.9

NIE Δ = 134km
Pg eZ 03 37 03.8
Sg eE 37 20.4

KSP Δ = 200km
Pg eZ 03 37 13.4
Sg eN 37 37.1

May 12
GIG: φ = 50.055°N, λ = 18.432°E
H = 04:44:10.1, M = 2.2

RAC Δ = 17km
Pg eZ 04 44 13.5
Sg eNE 44 16.6

OJC Δ = 99km
Pg eZ 04 44 26.6
Sg eE 44 39.1

NIE Δ = 153km
Pg eZ 04 44 36.3
Sg eN 44 56.0

May 12
GIG: φ = 50.245°N, λ = 18.958°E
H = 16:49:48.9, M = 2.4

OJC Δ = 60km
Pg eZ 16 49 59.3
Sg eE 50 07.1

KSP Δ = 200km
Pg eZ 16 50 22.0
Sg eZ 50 45.3

May 13
GIG: φ = 50.057°N, λ = 18.436°E
H = 09:11:59.2, M = 3.2

RAC Δ = 18km
Pg iZ 09 12 03.0 D
Sg eNE 12 06.2

OJC Δ = 99km
Pg iZ 09 12 15.7 D
Sg eEN 12 28.4

NIE Δ = 153km
Pg iZ 09 12 25.7
Sg eN 12 45.5

KSP Δ = 175km
Pn eZ 09 12 26.9
Pg eZ 12 27.6
Sg eN 12 48.7

May 16
GIG: φ = 50.244°N, λ = 18.958°E
H = 05:13:26.0, M = 2.4

OJC Δ = 60km
Pg iZ 05 13 36.4 D
Sg iE 13 44.3

NIE Δ = 134km
Pg eZ 05 13 49.3
Sg eE 14 05.9

KSP Δ = 200km
Pg eZ 05 13 59.3
Sg eN 14 22.7

May 17
GIG: φ = 50.246°N, λ = 18.955°E
H = 11:00:03.4, M = 2.4

OJC Δ = 60km
Pg iZ 11 00 13.7 D
Sg iE 00 21.7

KSP Δ = 200km
Pg eZ 11 00 36.5
Sg eN 01 00.9

Upper Silesian Coal Basin 2006

May 18

GIG: φ = 50.367°N, λ = 18.914°E
H = 13:56:47.1, M = 2.3

OJC	Δ = 65km		
	Pg eZ	13	56 58.6
	Sg eN		57 07.1
NIE	Δ = 146km		
	Pg eZ	13	57 12.4
	Sg eN		57 30.4
KSP	Δ = 192km		
	Pg eZ	13	57 19.0
	Sg eN		57 41.6

May 19

GIG: φ = 49.978°N, λ = 18.570°E
H = 04:48:53.9, M = 2.5

RAC	Δ = 29km		
	Pg eZ	04	48 59.8
	Sg eNE		49 04.5
OJC	Δ = 92km		
	Pg eZ	04	49 09.1
	Sg iE		49 20.8
NIE	Δ = 140km		
	Pg iZ	04	49 17.9 C
	(Sg) eE		49 36.7
KSP	Δ = 188km		
	Pg eZ	04	49 26.1
	Sn eN		49 48.2

May 19

GIG: φ = 50.252°N, λ = 18.860°E
H = 16:01:41.2, M = 2.3

OJC	Δ = 67km		
	Pg eZ	16	01 53.4
	Sg eE		02 01.3
NIE	Δ = 140km		
	Pg eZ	16	02 05.1
	Sg eE		02 23.2
KSP	Δ = 193km		
	Pg eZ	16	02 13.1
	Sg eN		02 35.8

May 19

GIG: φ = 50.083°N, λ = 18.436°E
H = 19:49:09.3, M = 2.5

RAC	Δ = 17km		
	Pg eZ	19	49 12.7
	Sg eNE		49 15.7
OJC	Δ = 98km		
	Pg eZ	19	49 26.0
	Sg eE		49 38.0
NIE	Δ = 154km		
	Pg eZ	19	49 36.0
	Sg eE		49 55.7
KSP	Δ = 174km		
	Pn eZ	19	49 36.7
	Pg eZ		49 38.5
	Sg eE		49 58.9

May 20

φ = 50.08°N, λ = 18.43°E
H = 01:27:56.6, M = 1.9

RAC	Δ = 17km		
	Pg eZ	01	28 00.2
	Sg eNE		28 03.2
OJC	Δ = 99km		
	Pg eZ	01	28 13.5
	Sg eN		28 26.0
NIE	Δ = 154km		
	Pg eZ	01	28 22.8
	Sg eN		28 42.4

May 20

φ = 50.01°N, λ = 18.55°E
H = 04:08:18.3, M = 2.0

RAC	Δ = 27km		
	Pg eZ	04	08 24.5
	Sg eNE		08 27.4
OJC	Δ = 92km		
	Pg eZ	04	08 34.4
	Sg eE		08 45.2
NIE	Δ = 143km		
	Pg eZ	04	08 42.6
	Sg eE		09 01.1

Upper Silesian Coal Basin 2006

May 21

GIG: φ = 50.243°N, λ = 18.954°E
H = 22:28:43.0, M = 2.2

OJC Δ = 61km
Pg eZ 22 28 54.1
Sg eE 29 01.5

NIE Δ = 134km
Pg eZ 22 29 06.5
Sg eE 29 22.5

KSP Δ = 200km
Pg eZ 22 29 16.2
(Sg) eN 29 38.6

May 22

φ = 50.07°N, λ = 18.45°E
H = 17:37:31.8, M = 2.3

RAC Δ = 19km
Pg eZ 17 37 35.5
Sg eNE 37 38.7

OJC Δ = 97km
Pg eZ 17 37 48.1
Sg eN 38 01.1

NIE Δ = 152km
Pg eZ 17 37 57.6
Sg eN 38 17.3

May 23

φ = 50.01°N, λ = 18.55°E
H = 22:07:17.8, M = 2.0

RAC Δ = 26km
Pg eZ 22 07 23.4
Sg eNE 07 26.8

OJC Δ = 93km
Pg eZ 22 07 33.6
Sg eE 07 45.2

NIE Δ = 143km
Pg eZ 22 07 42.0
Sg eE 08 00.6

May 25

GIG: φ = 50.230°N, λ = 19.074°E
H = 16:31:21.1, M = 2.5

OJC Δ = 51km
Pg eZ 16 31 29.9
Sg iE 31 36.9

NIE Δ = 127km
Pg eZ 16 31 43.5
Sg eE 32 00.0

KSP Δ = 208km
Pn eZ 16 31 54.1
Pg eZ 31 55.0
Sg eN 32 19.3

May 26

GIG: φ = 50.237°N, λ = 18.932°E
H = 21:31:57.8, M = 2.4

OJC Δ = 62km
Pg eZ 21 32 08.7
Sg eE 32 16.7

NIE Δ = 135km
Pg eZ 21 32 20.8
Sg eE 32 38.0

KSP Δ = 199km
Pg eZ 21 32 31.0
Sg eE 32 54.1

May 27

GIG: φ = 50.083°N, λ = 18.436°E
H = 00:13:35.1, M = 2.1

RAC Δ = 17km
Pg eZ 00 13 38.6
Sg eNE 13 41.5

OJC Δ = 98km
Pg eZ 00 13 51.3
Sg eN 14 03.5

NIE Δ = 154km
Pg eZ 00 14 01.3
Sg eE 14 21.5

May 29

GIG: φ = 50.246°N, λ = 18.956°E
H = 13:09:50.2, M = 2.3

OJC Δ = 60km
Pg eZ 13 10 00.9
Sg eE 10 08.7

NIE Δ = 134km
Pg eZ 13 10 13.6
Sg eE 10 30

KSP Δ = 200km
Pg eZ 13 10 22.9
Sn eN 10 44.9

May 30
GIG: φ = 49.978°N, λ = 18.571°E
H = 11:52:00.6, M = 2.4

RAC Δ = 29km
Pg eZ 11 52 06.7
Sg eNE 52 11.1

OJC Δ = 92km
Pg eZ 11 52 16.0
Sg eE 52 27.7

NIE Δ = 140km
Pg eZ 11 52 24.7
(Sg) eE 52 43.7

KSP Δ = 188km
Pg eZ 11 52 31.8
Sg eE 52 54.9

May 30
φ = 50.25°N, λ = 19.09°E
H = 21:07:10.5, M = 2.1

OJC Δ = 51km
Pg eZ 21 07 19.4
Sg eN 07 26.1

NIE Δ = 127km
Pg eZ 21 07 32.3
Sg eN 07 49.0

KSP Δ = 209km
Pg eZ 21 07 45.1
Sg eZ 08 10.0

May 31
GIG: φ = 50.245°N, λ = 18.959°E
H = 06:10:26.5, M = 2.3

OJC Δ = 60km
Pg eZ 06 10 37.1
Sg eE 10 44.9

NIE Δ = 134km
Pg eZ 06 10 49.9
(Sg) eN 11 08.1

KSP Δ = 200km
Pg eZ 06 10 59.7
Sg eE 11 23.2

May 31
GIG: φ = 50.229°N, λ = 18.917°E
H = 11:15:37.6, M = 2.6

OJC Δ = 62km
Pg eZ 11 15 48.8
Sg eE 15 56.5

NIE Δ = 135km
Pg eZ 11 16 00.9
Sg eE 16 17.9

KSP Δ = 198km
Pg eE 11 16 10.5
Sg eN 16 33.6

JUN 1
GIG: φ = 50.245°N, λ = 18.955°E
H = 02:39:32.0, M = 2.1

OJC Δ = 60km
Pg eZ 02 39 42.2
Sg eE 39 50.2

NIE Δ = 134km
Pg eZ 02 39 55.1
Sg eE 40 12.0

KSP Δ = 200km
Pg eZ 02 40 05.3
Sg eE 40 28.9

JUN 1
GIG: φ = 50.043°N, λ = 18.464°E
H = 03:15:51.5, M = 2.0

RAC Δ = 20km
Pg eZ 03 15 55.9
Sg eNE 15 59.0

OJC Δ = 97km
Pg eZ 03 16 07.6
Sg eN 16 20.6

NIE Δ = 150km
Pg eZ 03 16 17.2
Sg eN 16 36.4

KSP Δ = 178km
Pg eZ 03 16 22.2
Sg eE 16 42.2

JUN 1
GIG: φ = 50.083°N, λ = 18.437°E
H = 14:49:58.6, M = 2.1

RAC Δ = 18km
Pg eZ 14 50 02.3
Sg eNE 50 05.4

OJC Δ = 98km
Pg eZ 14 50 15.0
Sg eN 50 27.0

NIE Δ = 154km
Pg eZ 14 50 24.7
Sg eE 50 44.3

JUN 2
GIG: φ = 50.083°N, λ = 18.437°E
H = 00:18:28.4, M = 2.0

RAC Δ = 17km
Pg eZ 00 18 32.0
Sg eNE 18 35.0

OJC Δ = 98km
Pg eZ 00 18 45.3
Sg eN 18 57.2

NIE Δ = 154km
Pg eZ 00 18 55.1
Sg eN 19 14.4

JUN 2
GIG: φ = 50.045°N, λ = 18.454°E
H = 03:36:34.5, M = 2.1

RAC Δ = 19km
Pg eZ 03 36 38.4
Sg eNE 36 42.1

OJC Δ = 98km
Pg eZ 03 36 50.8
Sg eE 37 03.2

NIE Δ = 151km
Pg eZ 03 37 00.5
Sg eN 37 19.0

JUN 2
GIG: φ = 50.253°N, λ = 18.858°E
H = 07:05:22.6, M = 2.5

OJC Δ = 67km
Pg eZ 07 05 34.4
Sg eN 05 42.8

NIE Δ = 140km
Pg eZ 07 05 46.8
Sg eE 06 04.9

KSP Δ = 193km
Pg eZ 07 05 54.9
Sg eN 06 17.3

JUN 2
GIG: φ = 50.244°N, λ = 18.958°E
H = 09:27:15.2, M = 2.5

OJC Δ = 60km
Pg iZ 09 27 25.6 D
Sg eE 27 33.3

NIE Δ = 134km
Pg eZ 09 27 38.4
Sg eE 27 55.3

KSP Δ = 200km
Pg eZ 09 27 48.1
Sg eN 28 12.2

JUN 2
GIG: φ = 50.083°N, λ = 18.437°E
H = 15:16:05.9, M = 2.4

RAC Δ = 18km
Pg eZ 15 16 09.3
Sg eNE 16 12.3

OJC Δ = 98km
Pg eZ 15 16 22.1
Sg eN 16 34.5

NIE Δ = 154km
Pg eZ 15 16 32.7
Sg eE 16 52.1

KSP Δ = 174km
Pg eZ 15 16 35.7
(Sn) eN 16 55.3
Sg eN 16 56.2

Upper Silesian Coal Basin 2006

JUN 6

GIG: φ = 50.246°N, λ = 18.955°E
H = 10:56:47.0, M = 2.5

OJC	Δ = 60km		
	Pg eZ	10	56 57.1
	Sg eE		57 05.2
NIE	Δ = 134km		
	Pg eZ	10	57 10.7
	Sg eN		57 28.2
KSP	Δ = 200km		
	Pg eZ	10	57 19.5
	Sn eN		57 42.0
	Sg eN		57 43.3

JUN 6

φ = 50.27°N, λ = 18.73°E
H = 13:27:28.4, M = 2.5

OJC	Δ = 76km		
	Pg eZ	13	27 41.5
	Sg eN		27 51.5
NIE	Δ = 148km		
	Pg eZ	13	27 54.0
	Sg eN		28 11.7
KSP	Δ = 184km		
	Pg eZ	13	27 59.2
	Sg eN		28 20.8

JUN 8

GIG: φ = 50.237°N, λ = 18.931°E
H = 07:29:04.9, M = 2.7

OJC	Δ = 62km		
	Pg eZ	07	29 15.8
	Sg eEZ		29 23.9
NIE	Δ = 135km		
	Pg eZ	07	29 28.3
	Sg eE		29 45.1
KSP	Δ = 198km		
	Pg eZ	07	29 38.0
	Sg eE		30 00.6

JUN 9

φ = 50.09°N, λ = 18.44°E
H = 00:11:10.9, M = 1.9

RAC	Δ = 17km		
	Pg eZ	00	11 14.4
	Sg eNE		11 17.4
OJC	Δ = 98km		
	Pg eZ	00	11 27.7
	Sg eN		11 40.2
NIE	Δ = 154km		
	Pg eZ	00	11 37.1
	Sg eN		11 56.9

JUN 10

GIG: φ = 50.046°N, λ = 18.457°E
H = 03:36:43.7, M = 2.1

RAC	Δ = 19km		
	Pg eZ	03	36 47.6
	Sg eNE		36 51.2
OJC	Δ = 98km		
	Pg eZ	03	37 00.1
	Sg eN		37 12.6
NIE	Δ = 151km		
	Pg eZ	03	37 09.7
	Sg eE		37 29.0

JUN 10

GIG: φ = 50.083°N, λ = 18.436°E
H = 04:07:15.4, M = 2.5

RAC	Δ = 18km		
	Pg eZ	04	07 19.1
	Sg eNE		07 22.1
OJC	Δ = 98km		
	Pg eZ	04	07 31.8
	Sg eE		07 44.0
NIE	Δ = 154km		
	Pg eZ	04	07 41.9
	Sg eE		08 01.1
KSP	Δ = 174km		
	Pn eZ	04	07 43.1
	Pg eZ		07 45.0
	Sn eE		08 03.3
	Sg eE		08 05.3

Upper Silesian Coal Basin 2006

JUN 11

GIG: φ = 50.082°N, λ = 18.436°E
H = 15:30:28.5, M = 2.2

RAC Δ = 18km
Pg eZ 15 30 32.1
Sg eNE 30 35.3

OJC Δ = 98km
Pg eZ 15 30 44.8
Sg eNE 30 57.1

NIE Δ = 154km
(Pg) eZ 15 30 55.9
Sg eE 31 14.8

KSP Δ = 174km
Pg eZ 15 30 58.4
Sn eN 31 17.1
Sg eE 31 18.7

JUN 12

GIG: φ = 50.245°N, λ = 18.955°E
H = 18:22:47.7, M = 2.3

OJC Δ = 60km
Pg eZ 18 22 58.0
Sg eE 23 05.9

NIE Δ = 134km
Pg eZ 18 23 10.9
Sg eE 23 27.8

KSP Δ = 200km
Pg eZ 18 23 20.8
Sg eN 23 44.4

JUN 13

φ = 50.09°N, λ = 18.44°E
H = 00:11:59.7, M = 2.0

RAC Δ = 17km
Pg eZ 00 12 03.0
Sg eNE 12 06.2

OJC Δ = 98km
Pg eZ 00 12 16.2
Sg eE 12 28.6

NIE Δ = 155km
Pg eZ 00 12 25.9
Sg eE 12 46.0

JUN 13

GIG: φ = 50.247°N, λ = 18.960°E
H = 16:52:50.3, M = 2.3

OJC Δ = 60km
Pg iZ 16 53 00.7 D
Sg eE 53 08.6

NIE Δ = 134km
Pg eZ 16 53 14.1
Sg eE 53 31.1

KSP Δ = 200km
Pg eZ 16 53 23.3
Sg eN 53 46.7

JUN 13

GIG: φ = 50.043°N, λ = 18.462°E
H = 22:58:00.5, M = 2.1

RAC Δ = 20km
Pg eZ 22 58 04.4
Sg eNE 58 08.0

OJC Δ = 97km
Pg eZ 22 58 16.6
Sg eE 58 29.0

NIE Δ = 150km
Pg eZ 22 58 26.3
Sg eE 58 45.8

JUN 14

φ = 50.08°N, λ = 18.45°E
H = 00:29:28.6, M = 1.9

RAC Δ = 18km
Pg iZ 00 29 32.1 D
Sg eNE 29 35.6

OJC Δ = 97km
Pg eZ 00 29 45.0
Sg eN 29 57.8

NIE Δ = 153km
Pg eZ 00 29 54.8
Sg eE 30 13.9

JUN 17

GIG: φ = 50.245°N, λ = 18.954°E
H = 03:53:32.0, M = 2.4

OJC Δ = 60km
Pg eZ 03 53 42.1
Sg iE 53 50.0

Upper Silesian Coal Basin 2006

```
NIE  Δ = 134km
     Pg eZ        03 53 55.5
     Sg eN           54 13.2

KSP  Δ = 200km
     Pg eZ        03 54 04.7
     Sg eE           54 28.1
```

JUN 17

GIG: φ = 50.080°N, λ = 18.424°E
H = 04:52:34.4, M = 2.4

```
RAC  Δ = 17km
     Pg iZ        04 52 37.8 D
     Sg eNE          52 40.9

OJC  Δ = 99km
     Pg eZ        04 52 50.6
     (Sg) eE         53 02.6

NIE  Δ = 154km
     Pg eZ        04 53 01.3
     Sg eE           53 20.2

KSP  Δ = 173km
     Pn eZ        04 53 01.7
     Pg eZ           53 03.5
     Sn eE           53 22.2
     Sg eE           53 24.2
```

JUN 19

GIG: φ = 50.050°N, λ = 18.457°E
H = 17:52:33.7, M = 2.3

```
RAC  Δ = 19km
     Pg eZ        17 52 37.4
     Sg eNE          52 40.5

OJC  Δ = 98km
     Pg eZ        17 52 50.0
     Sg eN           53 02.2

NIE  Δ = 151km
     Pg eZ        17 53 00.2
     (Sg) eN         53 19.7

KSP  Δ = 177km
     Pg eZ        17 53 03.2
     Sg eN           53 23.6
```

JUN 19

φ = 50.28°N, λ = 18.89°E
H = 23:54:16.8, M = 2.2

```
OJC  Δ = 65km
     Pg eZ        23 54 28.0
     Sg eE           54 36.5

NIE  Δ = 140km
     Pg eZ        23 54 40.6
     Sg eE           54 58.6

KSP  Δ = 194km
     Pg eZ        23 54 49.2
     Sg eN           55 12.2
```

JUN 20

φ = 50.09°N, λ = 18.45°E
H = 02:23:41.6, M = 1.9

```
RAC  Δ = 19km
     Pg eZ        02 23 45.3
     Sg eNE          23 48.3

OJC  Δ = 97km
     Pg eZ        02 23 58.2
     Sg eN           24 10.3

NIE  Δ = 154km
     Pg eZ        02 24 08.1
     Sg eN           24 27.0
```

JUN 20

GIG: φ = 50.244°N, λ = 18.956°E
H = 09:21:03.6, M = 2.4

```
OJC  Δ = 60km
     Pg iZ        09 21 14.0 D
     Sg eE           21 21.8

NIE  Δ = 134km
     Pg eZ        09 21 27.4
     Sg eE           21 44.2

KSP  Δ = 200km
     Pg eZ        09 21 36.6
     Sg eZ           21 59.5
```

JUN 20

GIG: φ = 50.080°N, λ = 18.436°E
H = 10:53:14.6, M = 2.2

```
RAC  Δ = 18km
     Pg eZ        10 53 18.2
     Sg eNE          53 21.3
```

```
OJC  Δ = 98km
     Pg eZ        10 53 31.4
     Sg eN           53 43.3

KSP  Δ = 174km
     Pg eE        10 53 44.6
     Sg eE           54 04.5
```

JUN 21

GIG: φ = 50.238°N, λ = 18.891°E
H = 06:59:01.0, M = 3.0

```
RAC  Δ = 53km
     Pg eZ        06 59 10.8
     Sg eNE          59 17.7

OJC  Δ = 65km
     Pg eZ        06 59 12.1
     Sg eE           59 20.4

NIE  Δ = 138km
     Pg eZ        06 59 25.1
     Sg eE           59 42.3

KSP  Δ = 196km
     Pg eZ        06 59 33.2
     Sg eN           59 56.2

KWP  Δ = 281km
     Pg eZ        06 59 52.1
     Sg eNE       07 00 29.4

GKP  Δ= 356km
     Pg eZ        07 00 07.6
     Sg eNE          00 47.6
```

JUN 22

GIG: φ = 50.081°N, λ = 18.434°E
H = 22:42:45.3, M = 1.9

```
RAC  Δ = 17km
     Pg eZ        22 42 48.8
     Sg eNE          42 51.8

OJC  Δ = 98km
     Pg eZ        22 43 01.9
     Sg eN           43 13.8

NIE  Δ = 154km
     Pg eZ        22 43 11.8
     Sg eE           43 31.1
```

JUN 23

φ = 50.09°N, λ = 18.43°E
H = 01:47:54.8, M = 2.0

```
RAC  Δ = 17km
     Pg eZ        01 47 58.3
     Sg eNE          48 01.3

OJC  Δ = 98km
     Pg eZ        01 48 11.2
     Sg eN           48 24.0

NIE  Δ = 155km
     Pg eZ        01 48 21.1
     Sg eE           48 41.1
```

JUN 23

GIG: φ = 50.243°N, λ = 18.963°E
H = 20:52:12.7, M = 2.3

```
OJC  Δ = 60km
     Pg eZ        20 52 23.0
     Sg eE           52 30.7

NIE  Δ = 134km
     Pg eZ        20 52 36.1
     Sg eE           52 53.5

KSP  Δ = 200km
     Pg eZ        20 52 45.9
     Sg eN           53 09.2
```

JUN 23

φ = 50.06°N, λ = 18.42°E
H = 22:09:01.1, M = 1.9

```
RAC  Δ = 16km
     Pg eZ        22 09 04.3
     Sg eNE          09 07.3

OJC  Δ = 100km
     Pg eZ        22 09 17.6
     (Sg) eN         09 32.0

NIE  Δ = 154km
     Pg eZ        22 09 27.2
     Sg eE           09 47.2
```

JUN 24

GIG: φ = 50.259°N, λ = 18.890°E
H = 02:32:54.9, M = 2.2

```
OJC  Δ = 65km
     Pg eZ        02 33 06.3
     Sg eE           33 14.6
```

NIE Δ = 139km
Pg eZ 02 33 19.3
Sg eE 33 36.4

KSP Δ = 195km
Pg eE 02 33 27.2
Sg eN 33 50.2

JUN 24

GIG: φ = 50.082°N, λ = 18.437°E
H = 03:22:20.0, M = 2.5

RAC Δ = 17km
Pg eZ 03 22 23.6
Sg eNE 22 26.5

OJC Δ = 98km
Pg eZ 03 22 36.7
Sg eE 22 48.9

NIE Δ = 154km
Pg eZ 03 22 46.3
Sg eNE 23 05.9

KSP Δ = 174km
Pn eZ 03 22 48.0
Pg eZ 22 49.6
Sn eN 23 08.3
Sg eN 23 09.9

JUN 27

GIG: φ = 50.083°N, λ = 18.436°E
H = 04:40:25.7, M = 2.1

RAC Δ = 17km
Pg eZ 04 40 29.1
Sg eNE 40 32.2

OJC Δ = 98km
Pg eZ 04 40 42.3
Sg eN 40 54.9

NIE Δ = 154km
Pg eZ 04 40 51.9
Sg eE 41 11.9

KSP Δ = 174km
Pg eE 04 40 55.2
Sg eN 41 16.0

JUN 28

GIG: φ = 50.081°N, λ = 18.434°E
H = 05:13:37.8, M = 2.3

RAC Δ = 17km
Pg eZ 05 13 41.4
Sg eNE 13 44.4

OJC Δ = 98km
Pg eZ 05 13 54.2
Sg eN 14 06.7

NIE Δ = 154km
Pg eZ 05 14 04.2
Sg eE 14 23.9

KSP Δ = 174km
Pn eZ 05 14 05.5
Pg eZ 14 07.3
Sg eN 14 27.3

JUN 29

GIG: φ = 50.245°N, λ = 18.958°E
H = 06:32:51.8, M = 2.2

OJC Δ = 60km
Pg eZ 06 33 02.1
Sg eE 33 09.9

NIE Δ = 134km
Pg eZ 06 33 14.9
Sg eE 33 32.0

KSP Δ = 200km
Pg eZ 06 33 24.8
Sg eN 33 48.7

JUN 29

GIG: φ = 50.245°N, λ = 18.958°E
H = 19:51:52.5, M = 2.3

OJC Δ = 60km
Pg eZ 19 52 02.8
Sg eE 52 10.6

NIE Δ = 134km
Pg eZ 19 52 15.7
Sg eE 52 32.6

KSP Δ = 200km
Pg eZ 19 52 25.6
Sg eE 52 48.9

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JUN 30

GIG: φ = 50.081°N, λ = 18.434°E
H = 01:58:16.2, M = 2.2

RAC Δ = 17km
Pg eZ 01 58 19.9
Sg eNE 58 22.9

OJC Δ = 98km
Pg eZ 01 58 32.6
Sg eE 58 44.8

NIE Δ = 154km
Pg eZ 01 58 42.5
Sg eE 59 01.7

KSP Δ = 174km
Pn eZ 01 58 43.8
Pg eZ 58 45.2
Sg eE 59 05.5

JUN 30

φ = 50.24°N, λ = 18.71°E
H = 15:20:20.4, M = 2.4

OJC Δ = 78km
Pg eZ 15 20 33.8
Sg eN 20 43.8

NIE Δ = 146km
Pg eZ 15 20 45.4
Sg eN 21 04.0

KSP Δ = 184km
Pg eZ 15 20 51.3
Sg eE 21 12.6

JUL 1

GIG: φ = 50.245°N, λ = 18.958°E
H = 00:31:03.7, M = 2.3

OJC Δ = 60km
Pg eZ 00 31 14.2
Sg eE 31 22.1

NIE Δ = 134km
Pg eZ 00 31 26.9
Sg eE 31 44.2

KSP Δ = 200km
Pg eZ 00 31 36.5
Sg eE 32 01.3

JUL 3

GIG: φ = 50.081°N, λ = 18.435°E
H = 04:09:36.4, M = 2.2

RAC Δ = 18km
Pg eZ 04 09 40.0
Sg eNE 09 43.1

OJC Δ = 98km
Pg eZ 04 09 52.8
Sg eE 10 05.0

KSP Δ = 174km
Pg eE 04 10 06.1
Sg eE 10 26.2

JUL 3

GIG: φ = 50.246°N, λ = 18.955°E
H = 12:41:40.1, M = 2.3

OJC Δ = 60km
Pg iZ 12 41 50.7 D
Sg eE 41 58.5

KSP Δ = 200km
Pg eZ 12 42 13.4
Sg eN 42 36.7

JUL 4

GIG: φ = 50.244°N, λ = 18.958°E
H = 02:21:30.7, M = 2.1

OJC Δ = 60km
Pg iZ 02 21 41.2 D
Sg eE 21 49.0

NIE Δ = 134km
Pg eZ 02 21 54.1
Sg eE 22 11.3

KSP Δ = 200km
Pg eZ 02 22 03.7
Sg eE 22 27.1

JUL 5

GIG: φ = 50.246°N, λ = 18.954°E
H = 04:33:47.5, M = 2.5

OJC Δ = 60km
Pg iZ 04 33 57.7 D
Sg eE 34 05.6

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NIE Δ = 134km
Pg eZ 04 34 10.7
Sg eE 34 27.7

KSP Δ = 200km
Pg eZ 04 34 21.1
Sg eN 34 43.9

JUL 5
GIG: φ = 50.273°N, λ = 18.829°E
H = 06:55:49.4, M = 2.4

OJC Δ = 69km
Pg eZ 06 56 01.2
Sg eN 56 11.0

NIE Δ = 142km
Pg eZ 06 56 13.8
Sg eNE 56 31.2

KSP Δ = 190km
Pg eN 06 56 21.0
Sg eE 56 44.1

JUL 5
φ = 50.25°N, λ = 18.82°E
H = 22:19:57.3, M = 2.3

OJC Δ = 70km
Pg eZ 22 20 09.7
Sg eE 20 18.5

NIE Δ = 142km
Pg eZ 22 20 21.7
Sg eN 20 39.2

KSP Δ = 190km
Pg eZ 22 20 29.5
Sg eN 20 51.5

JUL 6
GIG: φ = 50.055°N, λ = 18.449°E
H = 07:28:24.6, M = 2.2

RAC Δ = 18km
Pg eZ 07 28 28.1
Sg eNE 28 31.2

OJC Δ = 98km
Pg eZ 07 28 41.3
Sg eE 28 54.1

NIE Δ = 152km
Pg eZ 07 28 51.2
Sg eE 29 10.4

JUL 6
GIG: φ = 50.246°N, λ = 18.959°E
H = 15:32:53.9, M = 2.6

OJC Δ = 60km
Pg eZ 15 33 04.3
Sg eE 33 12.2

NIE Δ = 134km
Pg eZ 15 33 17.0
Sg eE 33 33.8

KSP Δ = 200km
Pg eE 15 33 26.9
Sg eN 33 50.4

JUL 6
GIG: φ = 50.081°N, λ = 18.437°E
H = 18:50:08.0, M = 2.4

RAC Δ = 17km
Pg eZ 18 50 11.6
Sg eNE 50 14.6

OJC Δ = 98km
Pg eZ 18 50 24.9
Sg eE 50 36.5

NIE Δ = 154km
Pg eZ 18 50 34.8
Sg eN 50 54.4

KSP Δ = 174km
Pn eZ 18 50 35.8
Pg eZ 50 37.6
Sg eE 50 57.8

JUL 7
GIG: φ = 50.081°N, λ = 18.436°E
H = 20:05:05.6, M = 2.3

RAC Δ = 17km
Pg eZ 20 05 09.4
Sg eNE 05 12.5

OJC Δ = 98km
Pg eZ 20 05 22.5
Sg eN 05 34.5

NIE Δ = 154km
Pg eZ 20 05 32.3
Sg eE 05 51.9

```
   KSP  Δ = 174km
        Pg eZ        20 05 35.1
        Sg eN           05 56.0
```

JUL 8

GIG: φ = 50.243°N, λ = 18.920°E
H = 18:24:10.0, M = 2.4

```
   OJC  Δ = 62km
        Pg eZ        18 24 21.1
        Sg eN           24 29.0

   NIE  Δ = 136km
        Pg eZ        18 24 33.8
        Sg eE           24 49.7

   KSP  Δ = 198km
        Pg eZ        18 24 43.1
        Sg eN           25 06.3
```

JUL 9

GIG: φ = 50.237°N, λ = 18.937°E
H = 00:55:12.8, M = 2.3

```
   OJC  Δ = 61km
        Pg eZ        00 55 23.5
        Sg eE           55 31.4

   RAC  Δ = 56km
        Pg eZ        00 55 23.7
        Sg eNE          55 30.6

   NIE  Δ = 135km
        Pg eZ        00 55 35.6
        Sg eN           55 52.9

   KSP  Δ = 199km
        Pg eZ        00 55 45.7
        Sg eN           56 09.3
```

JUL 10

GIG: φ = 50.230°N, λ = 19.073°E
H = 07:42:04.7, M = 2.3

```
   OJC  Δ = 52km
        Pg eZ        07 42 13.5
        Sg eE           42 20.9

   KSP  Δ = 208km
        Pg eE        07 42 38.6
        Sg eN           43 03.8
```

JUL 10

GIG: φ = 50.051°N, λ = 18.457°E
H = 17:41:44.0, M = 2.1

```
   RAC  Δ = 19km
        Pg eZ        17 41 47.9
        Sg eNE          41 50.9

   OJC  Δ = 98km
        Pg eZ        17 42 00.2
        Sg eN           42 12.8

   NIE  Δ = 151km
        Pg eZ        17 42 10.1
        Sg eN           42 29.8
```

JUL 11

GIG: φ = 50.246°N, λ = 18.958°E
H = 04:34:59.6, M = 2.2

```
   OJC  Δ = 60km
        Pg eZ        04 35 09.7
        Sg eE           35 17.5

   NIE  Δ = 134km
        Pg eZ        04 35 23.1
        Sg eE           35 40.0

   KSP  Δ = 200km
        Pg eZ        04 35 32.2
        Sg eE           35 56.4
```

JUL 11

GIG: φ = 50.081°N, λ = 18.436°E
H = 12:15:23.7, M = 2.2

```
   RAC  Δ = 17km
        Pg eZ        12 15 27.1
        Sg eNE          15 30.6

   OJC  Δ = 98km
        Pg eZ        12 15 40.2
        Sg eE           15 52.5

   NIE  Δ = 154km
        Pg eZ        12 15 50.1
        Sg eE           16 10.2

   KSP  Δ = 174km
        Pn eZ        12 15 51.1
        Pg eZ           15 52.8
        Sg eN           16 13.2
```

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JUL 12

GIG: φ = 50.239°N, λ = 18.939°E
H = 02:01:12.8, M = 2.2

OJC Δ = 61km
Pg eZ 02 01 23.3
Sg eE 01 31.4

NIE Δ = 135km
Pg eZ 02 01 35.8
Sg eE 01 53.7

KSP Δ = 199km
Pg eZ 02 01 45.3
Sg eN 02 09.1

JUL 12

GIG: φ = 50.082°N, λ = 18.434°E
H = 14:09:41.9, M = 2.4

RAC Δ = 17km
Pg eZ 14 09 45.4
Sg eNE 09 48.6

OJC Δ = 98km
Pg eZ 14 09 58.2
Sg eN 10 11.0

NIE Δ = 154km
Pg eZ 14 10 08.5
Sg eE 10 28.2

KSP Δ = 174km
Pg eZ 14 10 11.6
Sg eE 10 31.9

JUL 13

GIG: φ = 50.081°N, λ = 18.436°E
H = 03:44:48.5, M = 2.0

RAC Δ = 17km
Pg eZ 03 44 51.8
Sg eNE 44 54.8

OJC Δ = 98km
Pg eZ 03 45 04.8
Sg eE 45 16.9

NIE Δ = 154km
Pg eZ 03 45 15.3
Sg eE 45 34.7

JUL 13

GIG: φ = 50.244°N, λ = 18.958°E
H = 09:19:50.6, M = 2.4

OJC Δ = 60km
Pg iZ 09 20 00.9 D
Sg eE 20 08.8

NIE Δ = 134km
Pg eZ 09 20 13.8
Sg eE 20 30.9

KSP Δ = 200km
Pg eZ 09 20 23.8
Sg eE 20 47.1

JUL 13

GIG: φ = 50.046°N, λ = 18.456°E
H = 17:09:13.2, M = 2.0

RAC Δ = 19km
Pg eZ 17 09 17.0
Sg eNE 09 20.0

OJC Δ = 98km
Pg eZ 17 09 29.4
Sg eN 09 41.9

NIE Δ = 151km
Pg eZ 17 09 39.1
Sg eN 09 58.5

JUL 13

φ = 50.09°N, λ = 18.43°E
H = 19:33:58.0, M = 2.0

RAC Δ = 17km
Pg eZ 19 34 01.5
Sg eNE 34 04.5

OJC Δ = 98km
Pg eZ 19 34 14.3
Sg eN 34 26.5

NIE Δ = 155km
Pg eZ 19 34 24.2
Sg eE 34 44.3

JUL 13

GIG: φ = 50.171°N, λ = 19.287°E
H = 22:15:39.5, M = 2.4

OJC Δ = 36km
Pg eZ 22 15 45.6
Sg eN 15 50.3

```
   NIE  Δ = 111km
        Pg eZ        22 15 58.2
        Sg eE           16 13.4

   KSP  Δ = 225km
        Pg eZ        22 16 17.0
        Sg eN           16 43.4
```

JUL 14

```
  GIG:  φ = 50.244°N, λ = 18.958°E
        H = 03:25:05.9, M = 2.4

   OJC  Δ = 60km
        Pg eZ        03 25 16.1
        Sg eE           25 24.1

   NIE  Δ = 134km
        Pg eZ        03 25 29.1
        Sg eE           25 46.2

   KSP  Δ = 200km
        Pg eZ        03 25 39.0
        Sg eE           26 03.1
```

JUL 14

```
  GIG:  φ = 50.081°N, λ = 18.434°E
        H = 15:29:16.6, M = 2.1

   RAC  Δ = 17km
        Pg eZ        15 29 19.9
        Sg eNE          29 23.1

   OJC  Δ = 99km
        Pg eZ        15 29 33.3
        Sg eN           29 45.3

   NIE  Δ = 154km
        Pg eZ        15 29 43.4
        Sg eE           30 02.8
```

JUL 14

```
  GIG:  φ = 50.243°N, λ = 18.923°E
        H = 20:38:30.2, M = 2.4

   OJC  Δ = 63km
        Pg eZ        20 38 41.2
        Sg iE           38 49.3

   NIE  Δ = 136km
        Pg eZ        20 38 53.5
        Sg eE           39 10.4

   KSP  Δ = 198km
        Pn eZ        20 39 01.5
        Pg eZ           39 02.9
        Sg eN           39 26.3
```

JUL 14

```
  GIG:  φ = 50.246°N, λ = 18.958°E
        H = 21:28:03.5, M = 2.1

   OJC  Δ = 60km
        Pg eZ        21 28 14.0
        Sg eE           28 21.9

   NIE  Δ = 134km
        Pg eZ        21 28 26.9
        Sg eE           28 44.0

   KSP  Δ = 200km
        Pg eZ        21 28 36.1
        Sg eN           29 00.3
```

JUL 15

```
  GIG:  φ = 50.258°N, λ = 18.891°E
        H = 01:00:39.5, M = 2.8

   RAC  Δ = 53km
        Pg eZ        01 00 49.4
        Sg eNE          00 56.2

   OJC  Δ = 65km
        Pg iZ        01 00 50.9 D
        Sg iN           00 59.2

   NIE  Δ = 138km
        Pg eZ        01 01 03.2
        Sg eE           01 21.4

   KSP  Δ = 195km
        Pg eZ        01 01 12.1
        Sg eN           01 34.8
```

JUL 17

```
  GIG:  φ = 50.246°N, λ = 18.954°E
        H = 15:57:19.7, M = 2.3

   OJC  Δ = 60km
        Pg iZ        15 57 30.2 D
        Sg eE           57 38.0

   NIE  Δ = 135km
        Pg eZ        15 57 43.1
        Sg eE           58 00.3
```

KSP Δ = 199km
Pg eZ 15 57 52.4
Sg eN 58 15.9

JUL 17
GIG: φ = 50.082°N, λ = 18.436°E
H = 16:54:57.7, M = 2.1

RAC Δ = 18km
Pg eZ 16 55 01.2
Sg eNE 55 04.3

OJC Δ = 98km
Pg eZ 16 55 14.0
Sg eE 55 26.6

NIE Δ = 154km
Pg eZ 16 55 24.1
Sg eE 55 44.1

KSP Δ = 174km
Pg eZ 16 55 27.0
Sg eN 55 47.7

JUL 17
φ = 50.09°N, λ = 18.44°E
H = 23:27:05.6, M = 1.9

RAC Δ = 18km
Pg eZ 23 27 09.2
Sg eNE 27 12.2

OJC Δ = 98km
Pg eZ 23 27 22.0
Sg eN 27 34.7

NIE Δ = 154km
Pg eZ 23 27 31.9
Sg eN 27 51.6

JUL 18
GIG: φ = 50.244°N, λ = 18.958°E
H = 09:45:30.7, M = 2.4

OJC Δ = 60km
Pg iZ 09 45 40.7 D
Sg eE 45 48.5

NIE Δ = 134km
Pg eZ 09 45 54.1
Sg eE 46 11.5

KSP Δ = 200km
Pg eZ 09 46 03.3
Sn eN 46 25.5
Sg eE 46 27.4

JUL 19
GIG: φ = 50.244°N, λ = 18.957°E
H = 01:56:02.0, M = 2.4

OJC Δ = 60km
Pg iZ 01 56 12.5 D
Sg eE 56 20.3

NIE Δ = 134km
Pg eZ 01 56 24.8
Sg eE 56 42.0

KSP Δ = 200km
Pg eZ 01 56 35.0
Sg eE 56 59.1

JUL 19
GIG: φ = 50.244°N, λ = 18.957°E
H = 08:31:17.2, M = 2.4

OJC Δ = 60km
Pg eZ 08 31 27.5
Sg eE 31 35.5

NIE Δ = 134km
Pg eZ 08 31 40.3
Sg eE 31 57.8

KSP Δ = 200km
Pg eZ 08 31 50.2
Sg eE 32 13.6

JUL 20
GIG: φ = 50.246°N, λ = 18.954°E
H = 02:21:35.2, M = 2.6

OJC Δ = 60km
Pg eZ 02 21 45.6
Sg eE 21 53.6

NIE Δ = 134km
Pg eZ 02 21 57.8
Sg eE 22 15.6

KSP Δ = 200km
Pg eZ 02 22 08.4
Sg eN 22 31.8

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JUL 21

GIG: φ = 50.246°N, λ = 18.958°E
H = 07:20:48.0, M = 2.5

OJC Δ = 60km
Pg iZ 07 20 58.3 D
Sg iZE 21 06.2

NIE Δ = 134km
Pg eZ 07 21 10.9
Sg eE 21 28.2

KSP Δ = 200km
Pg eZ 07 21 21.0
Sg eN 21 45.0

JUL 21

φ = 50.08°N, λ = 18.42°E
H = 23:17:50.6, M = 1.8

RAC Δ = 16km
Pg eZ 23 17 53.8
Sg eNE 17 56.9

OJC Δ = 99km
Pg eZ 23 18 07.8
Sg eN 18 19.8

NIE Δ = 155km
Pg eZ 23 18 16.7
Sg eE 18 36.7

JUL 22

φ = 50.10°N, λ = 18.44°E
H = 00:18:42.1, M = 1.8

RAC Δ = 17km
Pg eZ 00 18 45.6
Sg eNE 18 48.6

OJC Δ = 98km
Pg eZ 00 18 58.9
Sg eE 19 11.2

NIE Δ = 155km
Pg eZ 00 19 08.5
Sg eE 19 28.5

JUL 23

GIG: φ = 50.345°N, λ = 18.979°E
H = 05:29:01.2, M = 2.7

OJC Δ = 60km
Pg iZ 05 29 11.7 D
Sg iN 29 19.6

RAC Δ = 64km
Pg eZ 05 29 12.8
Sg eNE 29 21.0

NIE Δ = 141km
Pg eZ 05 29 25.2
Sg eN 29 42.7

KSP Δ = 198km
Pn eZ 05 29 32.6
Pg E 29 34.3
Sg eE 29 58.1

JUL 24

GIG: φ = 50.246°N, λ = 18.958°E
H = 09:02:41.2, M = 2.5

OJC Δ = 60km
Pg iZ 09 02 51.6 D
Sg eE 02 59.5

KSP Δ = 200km
Pg eZ 09 03 14.2
Sg eN 03 38.2

JUL 25

GIG: φ = 50.244°N, λ = 18.957°E
H = 05:16:03.2, M = 2.2

OJC Δ = 60km
Pg eZ 05 16 13.6
Sg eEZ 16 21.4

NIE Δ = 134km
Pg eZ 05 16 26.4
Sg eE 16 43.2

KSP Δ = 200km
Pg eE 05 16 36.0
Sg eE 17 00.2

JUL 25

GIG: φ = 50.244°N, λ = 18.956°E
H = 14:56:54.0, M = 2.5

OJC Δ = 60km
Pg eZ 14 57 04.0
Sg eE 57 12.0

NIE Δ = 134km
Pg eZ 14 57 16.9
Sg eE 57 34.6

KSP Δ = 200km
Pg eZ 14 57 26.9
Sg eE 57 50.2

JUL 26
φ = 50.10°N, λ = 18.43°E
H = 02:05:01.4, M = 1.9

RAC Δ = 17km
Pg eZ 02 05 04.7
Sg eNE 05 07.9

OJC Δ = 98km
Pg eZ 02 05 18.1
Sg eN 05 30.5

NIE Δ = 155km
Pg eZ 02 05 27.6
Sg eE 05 47.6

JUL 26
GIG: φ = 50.081°N, λ = 18.435°E
H = 03:42:47.8, M = 1.9

RAC Δ = 17km
Pg eZ 03 42 51.1
Sg eNE 42 54.2

OJC Δ = 98km
Pg eZ 03 43 04.4
(Sg) eN 43 16.1

NIE Δ = 154km
Pg eZ 03 43 14.5
Sg eN 43 32.9

JUL 26
GIG: φ = 50.245°N, λ = 18.953°E
H = 13:12:34.6, M = 2.5

OJC Δ = 60km
Pg eZ 13 12 45.0
Sg eE 12 53.0

KSP Δ = 200km
Pg eZ 13 13 07.9
Sg eN 13 30.8

JUL 26
GIG: φ = 50.345°N, λ = 18.975°E
H = 20:27:53.5, M = 2.5

OJC Δ = 60km
Pg iZ 20 28 03.7 D
Sg eN 28 11.7

NIE Δ = 141km
Pg eZ 20 28 18.2
Sg eE 28 36.3

KSP Δ = 197km
Pg eZ 20 28 26.3
Sg eE 28 49.7

JUL 27
GIG: φ = 50.261°N, λ = 18.893°E
H = 00:06:16.4, M = 3.1

RAC Δ = 54km
Pg eZ 00 06 26.3
Sg eNE 06 33.7

OJC Δ = 65km
Pg iZ 00 06 27.8 D
Sg iE 06 36.2

NIE Δ = 139km
Pg iZ 00 06 40.0 D
Sg iE 06 58.5

KSP Δ = 195km
Pn eZ 00 06 46.5
Pg iZ 06 49.1
Sg eN 07 11.6

JUL 27
GIG: φ = 50.247°N, λ = 18.957°E
H = 04:36:32.4, M = 2.1

OJC Δ = 60km
Pg iZ 04 36 42.5 C
Sg eE 36 50.3

NIE Δ = 135km
Pg eZ 04 36 55.8
Sg eE 37 12.6

KSP Δ = 200km
Pg eE 04 37 04.8
Sg eE 37 29.2

JUL 27
GIG: φ = 50.247°N, λ = 18.956°E
H = 04:36:32.3, M = 2.2

OJC Δ = 60km
Pg iZ 05 27 30.4 D
Sg iE 27 38.2

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NIE Δ = 135km
Pg eZ 05 27 42.9
Sg eN 28 00.6

KSP Δ = 200km
Pg eZ 05 27 53.1
Sg eE 28 16.3

JUL 28
GIG: φ = 50.049°N, λ = 18.456°E
H = 01:01:53.4, M = 1.9

RAC Δ = 19km
Pg eZ 01 01 56.9
Sg eNE 02 00.1

OJC Δ = 98km
Pg eZ 01 02 10.2
Sg eN 02 22.4

NIE Δ = 151km
Pg eZ 01 02 19.9
Sg eE 02 37.8

JUL 28
φ = 50.09°N, λ = 18.43°E
H = 01:04:38.9, M = 1.9

RAC Δ = 16km
Pg eZ 01 04 41.9
Sg eNE 04 45.1

OJC Δ = 99km
Pg eZ 01 04 55.6
Sg eN 05 08.6

NIE Δ = 155km
Pg eZ 01 05 05.3
Sg eE 05 25.6

JUL 28
GIG: φ = 50.051°N, λ = 18.458°E
H = 04:50:01.2, M = 2.3

RAC Δ = 19km
Pg eZ 04 50 05.0
Sg eNE 50 08.3

OJC Δ = 97km
Pg eZ 04 50 17.3

NIE Δ = 151km
Pg eZ 04 50 26.9
Sg eN 50 46.7

JUL 28
GIG: φ = 50.246°N, λ = 18.957°E
H = 07:55:01.9, M = 2.4

OJC Δ = 60km
Pg iZ 07 55 12.4 D
Sg iE 55 20.2

NIE Δ = 134km
Pg eZ 07 55 24.9
Sg eE 55 41.4

KSP Δ = 200km
Pg eZ 07 55 35.0
Sn eN 55 57.3

JUL 28
GIG: φ = 50.244°N, λ = 18.957°E
H = 11:28:43.4, M = 2.4

OJC Δ = 60km
Pg eZ 11 28 53.6
Sg eE 29 01.6

KSP Δ = 200km
Pg eZ 11 29 16.5
Sg eE 29 40.4

JUL 29
GIG: φ = 50.217°N, λ = 18.721°E
H = 03:43:33.5, M = 2.2

OJC Δ = 77km
Pg eZ 03 43 46.6
Sg eN 43 56.5

NIE Δ = 145km
Pg eZ 03 43 58.3
Sg eN 44 16.8

KSP Δ = 185km
Pg eZ 03 44 04.7
Sg eN 44 26.0

JUL 30
GIG: φ = 50.083°N, λ = 18.435°E
H = 20:48:16.6, M = 2.1

RAC Δ = 17km
Pg eZ 20 48 19.8
Sg eNE 48 23.4

OJC Δ = 98km
Pg eZ 20 48 33.0
Sg eE 48 45.5

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```
   NIE  Δ = 154km
        Pg eZ        20 48 43.2
        Sg eN           49 03.1
```

AUG 1

```
  GIG:  φ = 50.248°N, λ = 18.955°E
        H = 05:23:51.4, M = 2.4

   OJC  Δ = 60km
        Pg iZ        05 24 01.8 D
        Sg eE           24 09.5

   NIE  Δ = 134km
        Pg eZ        05 24 14.6
        Sg eE           24 31.3

   KSP  Δ = 200km
        Pg eN        05 24 24.5
        Sg eE           24 48.4
```

AUG 2

```
        φ = 50.09°N, λ = 18.43°E
        H = 02:49:41.2, M = 1.8

   RAC  Δ = 17km
        Pg eZ        02 49 44.3
        Sg eNE          49 47.7

   OJC  Δ = 99km
        Pg eZ        02 49 57.4
        Sg eN           50 10.4

   NIE  Δ = 155km
        Pg eZ        02 50 08.0
        Sg eE           50 27.6
```

AUG 2

```
  GIG:  φ = 50.247°N, λ = 18.958°E
        H = 07:50:19.3, M = 2.4

   OJC  Δ = 60km
        Pg iZ        07 50 29.4 D
        Sg eE           50 37.2

   NIE  Δ = 134km
        Pg eZ        07 50 42.7
        Sg eE           50 59.8

   KSP  Δ = 200km
        Pg eZ        07 50 52.0
        Sg eN           51 16.1
```

AUG 3

```
  GIG:  φ = 50.103°N, λ = 19.157°E
        H = 23:41:50.5, M = 2.9

   OJC  Δ = 47km
        Pg eZ        23 41 58.4
        Sg eN           42 04.7

   RAC  Δ = 69km
        Pg eZ        23 42 02.8
        Sg eNE          42 12.3

   NIE  Δ = 113km
        Pg eZ        23 42 09.4
        Sg eE           42 25.1

   KSP  Δ = 219km
        Pn eZ        23 42 24.4
        Pg eZ           42 25.7
        Sg eN           42 52.1

   KWP  Δ = 260km
        Pn eZ        23 42 24.0
        Sg eNE          42 52.0

   GKP  Δ =375km
        Pn eZ        23 42 44.0
        Pg eZ           42 58.0
```

AUG 5

```
  GIG:  φ = 50.243°N, λ = 18.953°E
        H = 02:35:40.7, M = 2.7

   RAC  Δ = 57km
        Pg eZ        02 35 51.2
        Sg eNE          35 58.3

   OJC  Δ = 60km
        Pg iZ        02 35 51.2 D
        Sg eE           35 59.3

   NIE  Δ = 134km
        Pg eZ        02 36 03.5
        Sg eE           36 21.1

   KSP  Δ = 200km
        Pn eZ        02 36 12.8
        Pg eZ           36 14.1
        Sg eN           36 37.4

   KWP  Δ = 276km
        Pn eZ        02 36 22.3
        Pg eZ           36 29.4
```

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AUG 5

GIG: φ = 50.051°N, λ = 18.456°E
H = 22:14:45.0, M = 2.4

RAC Δ = 19km
Pg iZ 22 14 48.4 D
Sg eNE 14 52.0

OJC Δ = 98km
Pg eZ 22 15 01.0
Sg eE 15 14.0

NIE Δ = 151km
Pg eZ 22 15 10.6
Sg iE 15 30.7

KSP Δ = 177km
Pn eZ 22 15 12.6
Pg eZ 15 14.4
Sg eE 15 35.0

AUG 6

GIG: φ = 50.266°N, λ = 18.869°E
H = 13:47:55.5, M = 2.5

OJC Δ = 66km
Pg eZ 13 48 07.1
Sg eE 48 15.7

NIE Δ = 141km
Pg eZ 13 48 19.4
Sg eE 48 37.5

KSP Δ = 193km
Pg eE 13 48 27.6
Sg eE 48 50.3

AUG 6

GIG: φ = 50.238°N, λ = 18.939°E
H = 14:22:45.6, M = 2.1

OJC Δ = 62km
Pg eZ 14 22 56.3
Sg eE 23 04.4

NIE Δ = 135km
Pg eZ 14 23 09.2
Sg eE 23 26.6

KSP Δ = 199km
Pg eZ 14 23 17.8
Sg eN 23 42.2

AUG 7

GIG: φ = 50.280°N, λ = 18.842°E
H = 18:47:32.6, M = 2.3

OJC Δ = 69km
Pg eZ 18 47 44.7
Sg eE 47 53.6

NIE Δ = 143km
Pg eZ 18 47 57.4
Sg eE 48 14.7

KSP Δ = 191km
Pg eZ 18 48 04.1
Sg eN 48 26.8

AUG 8

GIG: φ = 50.237°N, λ = 18.895°E
H = 14:54:44.6, M = 2.7

RAC Δ = 53km
Pg eZ 14 54 54.2
Sg eNE 55 01.3

OJC Δ = 65km
Pg eZ 14 54 56.0
Sg eE 55 04.4

NIE Δ = 137km
Pg eZ 14 55 08.3
Sg eE 55 26.3

KSP Δ = 196km
Pg eZ 14 55 16.9
Sg eE 55 40.1

AUG 9

GIG: φ = 50.244°N, λ = 18.957°E
H = 06:49:10.1, M = 2.5

OJC Δ = 60km
Pg iZ 06 49 20.0 D
Sg eE 49 27.9

NIE Δ = 134km
Pg eZ 06 49 33.5
Sg eN 49 51.1

KSP Δ = 200km
Pg eZ 06 49 42.8
Sg eZ 50 07.0

KWP Δ = 276km
Pg eZ 06 49 58.4

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AUG 9

GIG: φ = 50.080°N, λ = 18.434°E
H = 20:57:50.4, M = 2.5

RAC	Δ = 18km		
	Pg eZ	20	57 53.9
	Sg eNE		57 57.1
OJC	Δ = 98km		
	Pg eZ	20	58 06.9
	Sg eN		58 19.1
NIE	Δ = 154km		
	Pg eZ	20	58 16.6
	Sg eE		58 35.8
KSP	Δ = 174km		
	Pg eZ	20	58 20.1
	Sg eE		58 39.9

AUG 9

GIG: φ = 50.081°N, λ = 18.437°E
H = 22:25:17.9, M = 1.8

RAC	Δ = 17km		
	Pg eZ	22	25 21.3
	Sg eNE		25 24.3
OJC	Δ = 98km		
	Pg eZ	22	25 34.4
	Sg eN		25 47.1
NIE	Δ = 154km		
	Pg eZ	22	25 44.5
	Sg eE		26 04.1

AUG 10

GIG: φ = 50.245°N, λ = 18.957°E
H = 09:24:23.7, M = 2.3

OJC	Δ = 60km		
	Pg eZ	09	24 34.0
	Sg eE		24 41.8
NIE	Δ = 134km		
	Pg eZ	09	24 47.5
	Sg eE		25 04.1
KSP	Δ = 200km		
	Pg eE	09	24 56.6
	Sg eN		25 20.4

AUG 11

GIG: φ = 50.244°N, λ = 18.955°E
H = 10:36:19.4, M = 2.4

OJC	Δ = 60km		
	Pg eZ	10	36 29.8
	Sg eE		36 37.4
NIE	Δ = 134km		
	Pg eZ	10	36 43.0
	Sg eE		37 00.0
KSP	Δ = 200km		
	Pg eZ	10	36 52.3
	Sg eN		37 15.8

AUG 12

GIG: φ = 50.261°N, λ = 18.899°E
H = 02:25:25.7, M = 2.8

RAC	Δ = 54km		
	Pg eZ	02	25 35.5
	Sg eNE		25 43.0
OJC	Δ = 64km		
	Pg iZ	02	25 37.0 D
	Sg eE		25 45.6
NIE	Δ = 138km		
	Pg eZ	02	25 49.1
	Sg eE		26 06.8
KSP	Δ = 196km		
	Pn eZ	02	25 56.3
	Pg iZ		25 58.4
	Sg eE		26 21.3

AUG 12

GIG: φ = 50.247°N, λ = 18.952°E
H = 15:05:06.9, M = 2.4

OJC	Δ = 60km		
	Pg eZ	15	05 17.2
	Sg eE		05 24.9
NIE	Δ = 134km		
	Pg eZ	15	05 30.0
	Sg eE		05 47.3
KSP	Δ = 200km		
	Pg eZ	15	05 39.9
	Sg eN		06 03.2

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AUG 16

GIG: φ = 50.241°N, λ = 18.924°E
H = 12:29:45.9, M = 2.3

OJC	Δ = 62km		
	Pg eZ	12 29 56.2	
	Sg eN	30 04.2	
NIE	Δ = 136km		
	Pg eZ	12 30 09.6	
	Sg eE	30 26.6	
KSP	Δ = 198km		
	Pg eZ	12 30 18.5	
	Sg eZ	30 42.1	

AUG 16

GIG: φ = 50.080°N, λ = 18.434°E
H = 22:36:05.1, M = 2.1

RAC	Δ = 17km		
	Pg eZ	22 36 08.4	
	Sg eNE	36 11.6	
OJC	Δ = 99km		
	Pg eZ	22 36 21.3	
	Sg eN	36 34.2	
NIE	Δ = 154km		
	Pg eZ	22 36 31.1	
	Sg eE	36 51.4	

AUG 17

GIG: φ = 50.243°N, λ = 18.956°E
H = 02:18:06.6, M = 2.7

RAC	Δ = 57km		
	Pg eZ	02 18 17.0	
	Sg eNE	18 24.9	
OJC	Δ = 60km		
	Pg iZ	02 18 17.0	D
	Sg eE	18 24.9	
NIE	Δ = 134km		
	Pg eZ	02 18 29.2	
	Sg eE	18 46.2	
KSP	Δ = 200km		
	Pg eZ	02 18 39.8	
	Sg eN	19 03.1	
KWP	Δ = 276km		
	Pn eZ	02 18 46.9	
	Pg eZ	18 55.5	
	Sn eNE	19 26.1	
	Sg eNE	19 34.5	

AUG 18

GIG: φ = 50.082°N, λ = 18.432°E
H = 07:00:48.3, M = 2.3

RAC	Δ = 17km		
	Pg eZ	07 00 51.7	
	Sg eNE	00 54.7	
OJC	Δ = 99km		
	Pg eZ	07 01 05.0	
	Sg eZ	01 17.2	
NIE	Δ = 154km		
	Pg eZ	07 01 15.2	
	Sg eN	01 34.3	

AUG 18

GIG: φ = 50.244°N, λ = 18.953°E
H = 10:53:50.2, M = 2.5

OJC	Δ = 60km		
	Pg iZ	10 54 00.4	D
	Sg eE	54 08.3	
NIE	Δ = 134km		
	Pg eZ	10 54 13.8	
	Sg eE	54 30.7	
KSP	Δ = 200km		
	Pg eZ	10 54 23.2	
	Sg eE	54 46.4	

AUG 21

GIG: φ = 50.245°N, λ = 18.957°E
H = 21:53:53.1, M = 2.3

OJC	Δ = 60km		
	Pg eZ	21 54 03.5	
	Sg eE	54 11.3	
KSP	Δ = 200km		
	Pg eZ	21 54 26.2	
	Sg eE	54 50.3	

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AUG 22

GIG: φ = 50.245°N, λ = 18.957°E
H = 09:04:24.2, M = 2.5

OJC	Δ = 60km		
	Pg eZ	09 04 34.5	
	Sg eE	04 42.4	
NIE	Δ = 134km		
	Pg eZ	09 04 47.8	
	Sg eE	05 04.7	
KSP	Δ = 200km		
	Pg eZ	09 04 57.4	
	Sg eN	05 20.7	

AUG 24

GIG: φ = 50.218°N, λ = 18.719°E
H = 02:29:06.2, M = 2.5

RAC	Δ = 40km		
	Pg eZ	02 29 13.9	
	Sg eNE	29 19.3	
OJC	Δ = 77km		
	Pg eZ	02 29 19.3	
	Sg eN	29 29.2	
NIE	Δ = 145km		
	Pg eZ	02 29 30.7	
	Sg eN	29 49.4	
KSP	Δ = 186km		
	Pg eZ	02 29 37.0	
	Sn eN	29 57.1	
	Sg eN	29 58.8	

AUG 24

GIG: φ = 50.244°N, λ = 18.956°E
H = 16:17:29.4, M = 2.4

OJC	Δ = 60km		
	Pg iZ	16 17 39.5	D
	Sg eE	17 47.1	
NIE	Δ = 134km		
	Pg eZ	16 17 52.0	
	Sg eE	18 10.0	

AUG 25

GIG: φ = 50.244°N, λ = 18.958°E
H = 12:50:37.5, M = 2.8

RAC	Δ = 57km		
	Pg eZ	12 50 47.7	
	Sg eNE	50 55.4	
OJC	Δ = 60km		
	Pg iZ	12 50 48.0	D
	Sg eE	50 55.9	
NIE	Δ = 134km		
	Pg eZ	12 51 00.3	
	Sg eE	51 17.1	
KSP	Δ = 200km		
	Pg eE	12 51 10.7	
	Sg eN	51 34.8	
KWP	Δ = 276km		
	Pn eZ	12 51 23.3	
	Pg eZ	51 29.2	
	Sg eNE	52 05.5	

AUG 28

GIG: φ = 50.045°N, λ = 18.451°E
H = 23:40:07.5, M = 2.0

RAC	Δ = 19km		
	Pg eZ	23 40 11.2	
	Sg eNE	40 14.6	
OJC	Δ = 98km		
	Pg eZ	23 40 24.0	
	Sg eN	40 36.2	
NIE	Δ = 151km		
	Pg eZ	23 40 33.6	
	Sg eE	40 51.9	

AUG 29

GIG: φ = 50.243°N, λ = 18.953°E
H = 01:28:27.7, M = 2.3

OJC	Δ = 61km		
	Pg iZ	01 28 38.3	D
	Sg eE	28 46.1	
NIE	Δ = 134km		
	Pg eZ	01 28 50.6	
	Sg eE	29 07.2	

KSP Δ = 200km
Pg eZ 01 29 00.1
Sg eN 29 24.9

AUG 29
GIG: φ = 50.245°N, λ = 18.955°E
H = 13:15:05.1, M = 2.3

OJC Δ = 60km
Pg eZ 13 15 15.8
Sg eE 15 23.6

NIE Δ = 135km
Pg eZ 13 15 28.7
(Sg) eN 15 46.9

KSP Δ = 200km
Pg eZ 13 15 37.5
Sg eN 16 01.7

AUG 30
GIG: φ = 50.245°N, λ = 18.957°E
H = 05:54:34.2, M = 2.3

OJC Δ = 60km
Pg iZ 05 54 44.6 D
Sg eE 54 52.4

NIE Δ = 134km
Pg eZ 05 54 57.5
Sg eE 55 14.8

KSP Δ = 200km
Pg eZ 05 55 07.4
Sg eE 55 30.2

SEP 1
GIG: φ = 50.245°N, λ = 18.953°E
H = 03:39:18.7, M = 2.4

OJC Δ = 60km
Pg iZ 03 39 28.7 D
Sg eE 39 36.6

NIE Δ = 135km
Pg eZ 03 39 42.0
Sg eN 39 59.7

KSP Δ = 200km
Pg eZ 03 39 51.4
Sg eE 40 15.4

SEP 1
GIG: φ = 50.237°N, λ = 18.893°E
H = 12:25:48.2, M = 2.5

OJC Δ = 64km
Pg eZ 12 25 59.4
Sg eE 26 07.9

NIE Δ = 137km
Pg eZ 12 26 11.9
Sg eE 26 29.2

KSP Δ = 196km
Pg eE 12 26 20.5
Sg eN 26 43.6

SEP 2
GIG: φ = 50.198°N, λ = 19.136°E
H = 15:18:53.1, M = 2.5

OJC Δ = 47km
Pg eZ 15 19 00.9
Sg eN 19 07.3

NIE Δ = 121km
Pg eZ 15 19 14.4
Sg eE 19 30.2

KSP Δ = 214km
Pg eZ 15 19 28.7
Sg eN 19 53.8

SEP 4
GIG: φ = 50.245°N, λ = 18.951°E
H = 11:19:24.4, M = 2.4

OJC Δ = 60km
Pg eZ 11 19 34.6
Sg eE 19 42.6

NIE Δ = 135km
Pg eZ 11 19 47.9
Sg eE 20 04.8

KSP Δ = 199km
Pg eZ 11 19 56.9
Sg eE 20 20.7

SEP 4
GIG: φ = 50.239°N, λ = 18.937°E
H = 20:16:08.8, M = 2.3

OJC Δ = 61km
Pg eZ 20 16 19.5
Sg eN 16 27.3

NIE Δ = 135km
Pg eZ 20 16 32.0
Sg eE 16 48.6

KSP Δ = 199km
Pg eZ 20 16 41.7
Sg eE 17 05.2

SEP 5

GIG: φ = 50.246°N, λ = 18.952°E
H = 03:20:57.6, M = 2.4

OJC Δ = 60km
Pg eZ 03 21 07.9
Sg eE 21 15.7

NIE Δ = 134km
Pg eZ 03 21 20.7
Sg eE 21 37.4

KSP Δ = 200km
Pg eZ 03 21 30.4
Sg eE 21 54.7

SEP 6

GIG: φ = 50.239°N, λ = 18.937°E
H = 21:52:23.2, M = 2.1

OJC Δ = 62km
Pg eZ 21 52 33.7
Sg eN 52 41.8

NIE Δ = 135km
Pg eZ 21 52 46.7
(Sg) eE 53 04.7

KSP Δ = 199km
Pg eE 21 52 56.0
Sg eN 53 19.7

SEP 7

GIG: φ = 50.244°N, λ = 18.956°E
H = 00:44:44.2, M = 2.6

RAC Δ = 57km
Pg eZ 00 44 54.6
Sg eNE 45 02.5

OJC Δ = 60km
Pg eZ 00 44 54.6
Sg eE 45 02.7

NIE Δ = 134km
Pg eZ 00 45 07.1
Sg eE 45 23.8

KSP Δ = 200km
Pg eZ 00 45 17.4
Sg eN 45 40.9

SEP 7

GIG: φ = 50.367°N, λ = 18.928°E
H = 14:27:00.6, M = 2.3

OJC Δ = 64km
Pg eZ 14 27 11.8
Sg eN 27 20.1

NIE Δ = 145km
Pg eZ 14 27 25.7
(Sg) eN 27 42.9

KSP Δ = 194km
Pg eE 14 27 33.2
Sg eN 27 56.6

SEP 7

GIG: φ = 50.252°N, λ = 18.892°E
H = 15:25:20.2, M = 2.5

OJC Δ = 65km
Pg eZ 15 25 31.7
Sg eE 25 39.4

NIE Δ = 138km
Pg eZ 15 25 44.0
Sg eE 26 00.8

KSP Δ = 195km
Pg eZ 15 25 52.8
Sg eN 26 15.8

SEP 8

GIG: φ = 50.244°N, λ = 18.956°E
H = 16:17:25.5, M = 2.5

OJC Δ = 60km
Pg iZ 16 17 35.6 D
Sg iE 17 43.5

NIE Δ = 134km
Pg eZ 16 17 48.4
Sg eE 18 06.1

KSP Δ = 200km
Pg eZ 16 17 58.3
Sg eN 18 22.3

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KWP Δ = 276km
Pn eZ 16 18 14.0

SEP 9
GIG: φ = 50.237°N, λ = 19.070°E
H = 12:54:01.0, M = 2.6

OJC Δ = 52km
Pg eZ 12 54 10.1
Sg iE 54 17.1

NIE Δ = 128km
Pg eZ 12 54 23.5
Sg eN 54 39.7

KSP Δ = 208km
Pg eZ 12 54 35.0
Sg eN 54 59.7

SEP 11
GIG: φ = 50.237°N, λ = 18.939°E
H = 14:43:51.6, M = 2.4

OJC Δ = 61km
Pg eZ 14 44 02.0
Sg eE 44 09.9

NIE Δ = 134km
Pg eZ 14 44 14.6
Sg eE 44 31.3

KSP Δ = 199km
Pg eZ 14 44 24.7
Sg eN 44 47.9

SEP 12
φ = 50.04°N, λ = 18.44°E
H = 01:03:51.2, M = 1.9

RAC Δ = 18km
Pg eZ 01 03 54.7
Sg eNE 03 58.1

OJC Δ = 98km
Pg eZ 01 04 07.8
Sg eN 04 20.7

NIE Δ = 152km
Pg eZ 01 04 16.8
Sg eE 04 36.6

SEP 12
GIG: φ = 50.246°N, λ = 18.958°E
H = 11:53:19.1, M = 2.4

OJC Δ = 60km
Pg iZ 11 53 29.4 D
Sg eEZ 53 37.2

NIE Δ = 134km
Pg eZ 11 53 42.2
Sg eE 53 58.9

KSP Δ = 200km
Pg eZ 11 53 52.0
(Sg) eE 54 15.2

SEP 12
GIG: φ = 50.043°N, λ = 18.463°E
H = 19:06:33.5, M = 2.1

RAC Δ = 20km
Pg eZ 19 06 37.5
Sg eNE 06 40.7

OJC Δ = 97km
Pg eZ 19 06 50.0
Sg eNZ 07 02.8

NIE Δ = 150km
Pg eZ 19 06 59.5
Sg eE 07 19.0

KSP Δ = 178km
Pg eZ 19 07 03.2
Sg eE 07 23.9

SEP 14
GIG: φ = 50.248°N, λ = 18.954°E
H = 01:31:17.2, M = 2.2

OJC Δ = 60km
Pg iZ 01 31 27.6 D
Sg eE 31 35.5

NIE Δ = 134km
Pg eZ 01 31 40.0
Sg eE 31 56.6

KSP Δ = 200km
Pg eZ 01 31 50.5
Sg eE 32 14.3

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SEP 15

GIG: φ = 50.198°N, λ = 19.136°E
H = 08:46:47.0, M = 2.5

OJC Δ = 47km
Pg eZ 08 46 54.8
Sg iN 47 01.0

NIE Δ = 121km
Pg eZ 08 47 08.3
Sg eE 47 24.4

KSP Δ = 214km
Pg eZ 08 47 22.9
Sg eN 47 47.0

SEP 15

GIG: φ = 50.263°N, λ = 18.872°E
H = 10:45:59.9, M = 2.2

OJC Δ = 66km
Pg eZ 10 46 11.0
Sg eE 46 19.4

NIE Δ = 140km
Pg eZ 10 46 24.3
Sg eN 46 42.1

KSP Δ = 194km
Pg eZ 10 46 32.1
Sg eN 46 55.7

SEP 15

GIG: φ = 50.261°N, λ = 18.874°E
H = 17:45:38.7, M = 2.4

OJC Δ = 66km
Pg eZ 17 45 50.2
Sg eE 45 58.8

NIE Δ = 140km
Pg eZ 17 46 02.7
Sg eE 46 20.7

KSP Δ = 194km
Pg eZ 17 46 10.9
Sg eNE 46 33.9

SEP 15

GIG: φ = 50.238°N, λ = 18.939°E
H = 20:58:31.9, M = 2.1

OJC Δ = 61km
Pg eZ 20 58 42.3
Sg eE 58 50.5

NIE Δ = 135km
Pg eZ 20 58 55.0
Sg eE 59 12.7

KSP Δ = 199km
Pg eZ 20 59 04.4
Sg eN 59 28.4

SEP 19

GIG: φ = 50.245°N, λ = 18.955°E
H = 04:19:41.0, M = 2.3

OJC Δ = 60km
Pg iZ 04 19 51.4 D
Sg eE 19 59.1

NIE Δ = 134km
Pg eZ 04 20 04.2
Sg eE 20 21.6

KSP Δ = 200km
Pg eZ 04 20 14.0
Sg eN 20 37.7

SEP 20

GIG: φ = 50.245°N, λ = 18.955°E
H = 06:36:22.5, M = 2.8

RAC Δ = 57km
Pg eZ 06 36 32.7
Sg eNE 36 40.2

OJC Δ = 60km
Pg eZ 06 36 33.0
Sg iEZ 36 41.0

NIE Δ = 134km
Pg eZ 06 36 45.3
Sg eE 37 02.0

KSP Δ = 200km
Pg eZ 06 36 55.7
Sg eE 37 19.2

SEP 20

GIG: φ = 50.056°N, λ = 18.453°E
H = 21:55:52.7, M = 2.1

RAC Δ = 19km
Pg eZ 21 55 56.4
Sg eNE 55 59.8

OJC Δ = 98km
Pg eZ 21 56 09.0
Sg eE 56 21.4

NIE Δ = 152km
Pg eZ 21 56 18.8
Sg eE 56 38.4

KSP Δ = 176km
Pg eZ 21 56 22.5
Sg eN 56 42.8

SEP 22
GIG: φ = 50.247°N, λ = 18.955°E
H = 19:08:24.5, M = 2.3

OJC Δ = 60km
Pg iZ 19 08 35.2 D
Sg eE 08 42.8

NIE Δ = 134km
Pg eZ 19 08 47.5
Sg eE 09 03.8

KSP Δ = 200km
Pg eZ 19 08 57.8
Sg eE 09 21.9

SEP 22
GIG: φ = 50.261°N, λ = 18.874°E
H = 21:14:04.9, M = 2.6

RAC Δ = 52km
Pg eZ 21 14 14.4
Sg eNE 14 21.1

OJC Δ = 66km
Pg eZ 21 14 16.5
Sg eE 14 25.1

NIE Δ = 139km
Pg eZ 21 14 28.7
Sg eE 14 46.5

KSP Δ = 194km
Pg eZ 21 14 37.3
Sg eN 15 00.6

KWP Δ = 282km
Pn eZ 21 14 48.8
Pg eZ 14 55.2

SEP 23
φ = 50.25°N, λ = 18.93°E
H = 00:19:20.1, M = 2.0

OJC Δ = 62km
Pg eZ 00 19 31.0
Sg eE 19 39.0

NIE Δ = 136km
Pg eZ 00 19 43.5
Sg eE 20 00.3

KSP Δ = 198km
Pg eZ 00 19 52.7
Sg eN 20 17.2

SEP 23
GIG: φ = 50.198°N, λ = 19.137°E
H = 20:10:46.4, M = 2.4

OJC Δ = 47km
Pg eZ 20 10 54.5
Sg eN 11 00.8

NIE Δ = 121km
Pg eZ 20 11 07.7
Sg eN 11 22.5

KSP Δ = 214km
Pg eZ 20 11 22.3
Sg eN 11 46.4

SEP 25
GIG: φ = 49.962°N, λ = 18.650°E
H = 22:27:33.1, M = 2.1

RAC Δ = 35km
Pg eZ 22 27 40.1
Sg eNE 27 45.1

OJC Δ = 87km
Pg eZ 22 27 47.7
Sg eE 27 59.2

NIE Δ = 134km
Pg eZ 22 27 56.5
(Sg) eE 28 14.5

SEP 26
GIG: φ = 50.350°N, λ = 18.978°E
H = 16:10:51.7, M = 2.7

OJC Δ = 60km
Pg eZ 16 11 02.3
Sg eN 11 10.0

NIE Δ = 141km
Pg eZ 16 11 16.4
Sg eN 11 33.1

KSP Δ = 198km
Pg eZ 16 11 25.0
Sn N 11 47.0
Sg eN 11 48.5

SEP 28
GIG: φ = 50.248°N, λ = 18.955°E
H = 01:41:37.7, M = 2.3

OJC Δ = 60km
Pg eZ 01 41 48.0
Sg eE 41 56.0

NIE Δ = 135km
Pg eZ 01 42 00.9
Sg eE 42 17.6

SEP 28
GIG: φ = 50.261°N, λ = 18.874°E
H = 09:07:18.6, M = 2.4

OJC Δ = 66km
Pg eZ 09 07 30.0
Sg eE 07 38.6

NIE Δ = 140km
Pg eZ 09 07 42.6
Sg eN 08 00.2

KSP Δ = 194km
Pg eZ 09 07 50.8
Sg eN 08 14.8

SEP 28
φ = 50.01°N, λ = 18.44°E
H = 10:28:42.9, M = 2.2

RAC Δ = 20km
Pg eZ 10 28 46.4
Sg eNE 28 49.6

OJC Δ = 99km
Pg eZ 10 28 59.4
Sg eE 29 12.8

NIE Δ = 150km
Pg eZ 10 29 07.9
Sg eE 29 27.9

SEP 29
GIG: φ = 50.245°N, λ = 18.955°E
H = 12:37:11.0, M = 2.8

RAC Δ = 58km
Pg eZ 12 37 21.3
Sg eNE 37 29.2

OJC Δ = 60km
Pg eZ 12 37 21.4
Sg eE 37 29.4

NIE Δ = 135km
Pg eZ 12 37 33.7
Sg eE 37 51.6

KSP Δ = 200km
Pg eE 12 37 44.1
Sg eN 38 07.6

KWP Δ = 276km
Pn eZ 12 37 57.1
Sg eNE 38 38.9

OCT 2
GIG: φ = 50.239°N, λ = 18.940°E
H = 02:21:28.5, M = 2.0

OJC Δ = 61km
Pg eZ 02 21 39.2
Sg eE 21 47.3

NIE Δ = 135km
Pg eZ 02 21 51.9
(Sg) eE 22 09.6

KSP Δ = 199km
Pg eZ 02 22 01.5
Sg eN 22 24.9

OCT 3
GIG: φ = 50.262°N, λ = 18.874°E
H = 03:35:22.2, M = 2.4

OJC Δ = 66km
Pg eZ 03 35 33.7
Sg eE 35 42.3

NIE Δ = 140km
Pg eZ 03 35 46.1
Sg eE 36 03.9

KSP Δ = 194km
Pn eZ 03 35 52.6
Pg iZ 35 54.5
Sg eE 36 17.4

OCT 3
GIG: φ = 50.248°N, λ = 18.955°E
H = 13:53:48.8, M = 2.3

OJC Δ = 60km
Pg iZ 13 53 59.3 D
Sg eE 54 07.1

NIE Δ = 135km
Pg eZ 13 54 12.2
Sg eE 54 29.5

KSP Δ = 199km
Pg eZ 13 54 21.6
Sg eN 54 45.6

OCT 3
GIG: φ = 50.054°N, λ = 18.450°E
H = 20:40:26.8, M = 2.0

RAC Δ = 19km
Pg eZ 20 40 30.6
Sg eNE 40 33.9

OJC Δ = 98km
Pg eZ 20 40 43.1
Sg eE 40 55.3

NIE Δ = 152km
Pg eZ 20 40 52.9
Sg eE 41 12.4

OCT 4
GIG: φ = 50.044°N, λ = 18.461°E
H = 21:34:55.6, M = 2.2

RAC Δ = 20km
Pg eZ 21 34 59.7
Sg eNE 35 03.0

OJC Δ = 97km
Pg eZ 21 35 11.9
Sg eE 35 24.4

NIE Δ = 150km
Pg eZ 21 35 21.0
Sg eN 35 40.0

OCT 5
GIG: φ = 50.239°N, λ = 18.884°E
H = 00:23:13.0, M = 2.3

OJC Δ = 66km
Pg eZ 00 23 24.8
Sg eN 23 32.9

NIE Δ = 138km
Pg eZ 00 23 36.9
Sg eE 23 53.7

KSP Δ = 195km
Pg eZ 00 23 45.1
Sg eN 24 08.8

OCT 5
GIG: φ = 50.245°N, λ = 18.955°E
H = 01:29:22.7, M = 2.4

OJC Δ = 60km
Pg eZ 01 29 33.3
Sg eE 29 41.1

NIE Δ = 134km
Pg eZ 01 29 45.6
Sg eE 30 02.2

KSP Δ = 200km
Pg eZ 01 29 55.7
Sg eE 30 19.7

OCT 5
GIG: φ = 50.244°N, λ = 18.955°E
H = 16:26:20.1, M = 2.4

OJC Δ = 60km
Pg iZ 16 26 30.6 D
Sg eE 26 38.5

NIE Δ = 134km
Pg eZ 16 26 43.6
Sg eE 27 00.1

KSP Δ = 200km
Pg eZ 16 26 52.7
Sg eN 27 17.2

OCT 6
φ = 50.27°N, λ = 18.86°E
H = 01:58:20.6, M = 2.0

OJC Δ = 67km
Pg eZ 01 58 32.4
Sg eE 58 40.7

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NIE Δ = 140km
Pg eZ 01 58 44.6
Sg eE 59 02.3

KSP Δ = 193km
Pg eZ 01 58 52.6
Sg eE 59 16.0

OCT 9
GIG: φ = 50.245°N, λ = 18.955°E
H = 06:32:15.2, M = 2.3

OJC Δ = 60km
Pg eZ 06 32 25.7
Sg eE 32 33.5

NIE Δ = 134km
Pg eZ 06 32 38.1
Sg eE 32 55.8

KSP Δ = 200km
Pg eZ 06 32 48.3
Sg eE 33 11.6

OCT 9
GIG: φ = 50.245°N, λ = 18.957°E
H = 16:20:29.7, M = 2.8

RAC Δ = 58km
Pg eZ 16 20 40.2
Sg eNE 20 48.0

OJC Δ = 60km
Pg eZ 16 20 40.2
Sg eE 20 48.1

NIE Δ = 134km
Pg eZ 16 20 52.6
Sg eE 21 09.3

KSP Δ = 200km
Pg eZ 16 21 02.9
Sg eN 21 26.1

OCT 10
GIG: φ = 49.981°N, λ = 18.691°E
H = 23:48:56.5, M = 2.2

RAC Δ = 37km
Pg eZ 23 49 04.0
Sg eNE 49 10.0

OJC Δ = 84km
Pg eZ 23 49 10.8
Sg eN 49 21.4

NIE Δ = 133km
Pg eZ 23 49 19.9
Sg eE 49 36.2

OCT 12
GIG: φ = 50.057°N, λ = 18.452°E
H = 05:26:01.8, M = 2.3

RAC Δ = 19km
Pg eZ 05 26 05.3
Sg eNE 26 08.5

OJC Δ = 98km
Pg eZ 05 26 18.0
Sg eE 26 30.2

NIE Δ = 152km
Pg eZ 05 26 27.7
Sg eN 26 47.6

KSP Δ = 176km
Pg eZ 05 26 31.7
Sg eN 26 51.5

OCT 12
GIG: φ = 50.045°N, λ = 18.447°E
H = 08:44:11.0, M = 2.1

RAC Δ = 18km
Pg eZ 08 44 15.0
Sg eNE 44 17.8

OJC Δ = 98km
Pg eZ 08 44 28.0
Sg eE 44 39.7

NIE Δ = 152km
Pg eZ 08 44 37.0
Sg eE 44 56.5

OCT 12
GIG: φ = 50.237°N, λ = 18.827°E
H = 14:36:53.9, M = 2.6

RAC Δ = 49km
Pg eZ 14 37 02.8
Sg eNE 37 09.7

OJC Δ = 69km
Pg eZ 14 37 05.7
Sg eE 37 14.7

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NIE Δ = 141km
Pg eZ 14 37 17.8
Sg eN 37 35.9

KSP Δ = 191km
Pn eZ 14 37 23.4
Pg eZ 37 25.3
Sg eE 37 48.9

OCT 12

GIG: φ = 50.214°N, λ = 18.720°E
H = 14:45:52.6, M = 2.6

RAC Δ = 40km
Pg eZ 14 46 00.3
Sg eNE 46 05.6

OJC Δ = 77km
Pg eZ 14 46 05.8
Sg eN 46 15.9

NIE Δ = 145km
Pg eZ 14 46 17.4
Sg eE 46 35.4

KSP Δ = 185km
Pg eZ 14 46 23.5
Sg eN 46 45.3

OCT 12

GIG: φ = 50.247°N, λ = 18.957°E
H = 16:15:20.2, M = 2.4

OJC Δ = 60km
Pg eZ 16 15 30.3
Sg eE 15 38.3

NIE Δ = 134km
Pg eZ 16 15 43.3
Sg eE 16 00.6

OCT 13

GIG: φ = 50.086°N, λ = 19.109°E
H = 19:59:16.6, M = 2.4

OJC Δ = 51km
Pg eZ 19 59 25.1
Sg eN 59 31.8

NIE Δ = 115km
Pg eZ 19 59 36.0
(Sg) eE 59 52.8

KSP Δ = 216km
Pg eZ 19 59 51.7
Sg eN 20 00 17.6

OCT 13

GIG: φ = 50.044°N, λ = 18.461°E
H = 21:09:05.8, M = 2.4

RAC Δ = 20km
Pg eZ 21 09 09.9
Sg eNE 09 13.1

OJC Δ = 97km
Pg eZ 21 09 22.1
Sg eE 09 34.5

NIE Δ = 150km
Pg eZ 21 09 31.1
Sg eN 09 50.4

KSP Δ = 178km
Pg eZ 21 09 34.6
Sg eE 09 55.6

OCT 14

φ = 50.17°N, λ = 19.31°E
H = 03:30:36.3, M = 2.5

OJC Δ = 35km
Pg eZ 03 30 42.5
Sg eN 30 47.2

NIE Δ = 110km
Pg eZ 03 30 55.1
Sg eE 31 10.0

KSP Δ = 227km
Pg eZ 03 31 14.0
Sg eN 31 40.1

OCT 16

GIG: φ= 50.053°N, λ = 18.450°E
H = 19:40:25.3, M = 2.0

RAC Δ = 19km
Pg eZ 19 40 28.9
Sg eNE 40 32.3

OJC Δ = 98km
Pg eZ 19 40 41.6
Sg eN 40 54.1

NIE Δ = 152km
Pg eZ 19 40 51.4
Sg eN 41 10.7

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OCT 17

GIG: φ = 50.043°N, λ = 18.462°E
H = 05:55:49.1, M = 2.2

RAC Δ = 20km
Pg eZ 05 55 52.9
Sg eNE 55 56.1

OJC Δ = 98km
Pg eZ 05 56 05.5
Sg eN 56 18.7

NIE Δ = 151km
Pg eZ 05 56 15.0
(Sg) eN 56 35.1

OCT 18

GIG: φ = 50.245°N, λ = 18.955°E
H = 10:16:40.2, M = 2.3

OJC Δ = 60km
Pg eZ 10 16 50.9
Sg eE 16 58.8

NIE Δ = 134km
Pg eZ 10 17 02.8
Sg eE 17 19.6

OCT 20

GIG: φ = 50.043°N, λ = 18.461°E
H = 00:12:32.6, M = 2.1

RAC Δ = 20km
Pg eZ 00 12 36.4
Sg eNE 12 39.7

OJC Δ = 97km
Pg eZ 00 12 48.6
Sg eE 13 01.7

NIE Δ = 150km
Pg eZ 00 12 58.1
Sg eE 13 17.8

OCT 20

GIG: φ = 50.255°N, λ = 18.827°E
H = 13:02:58.6, M = 2.6

RAC Δ = 50km
Pg eZ 13 03 07.9
Sg eNE 03 14.5

OJC Δ = 69km
Pg eZ 13 03 10.7
Sg iE 03 19.5

NIE Δ = 142km
Pg eZ 13 03 22.4
Sg eN 03 40.7

KSP Δ = 191km
Pn eZ 13 03 28.3
Pg eZ 03 30.5
Sg eN 03 52.8

OCT 20

GIG: φ = 50.245°N, λ = 18.955°E
H = 20:25:09.6, M = 2.4

OJC Δ = 60km
Pg iZ 20 25 20.0 D
Sg iE 25 27.9

NIE Δ = 134km
Pg eZ 20 25 32.2
Sg eE 25 49.0

OCT 24

GIG: φ = 50.053°N, λ = 18.450°E
H = 02:36:27.8, M = 2.3

RAC Δ = 19km
Pg eZ 02 36 31.7
Sg eNE 36 35.0

OJC Δ = 98km
Pg eZ 02 36 44.3
Sg eN 36 56.1

NIE Δ = 151km
Pg eZ 02 36 54.0
Sg eN 37 13.3

KSP Δ = 177km
Pg eZ 02 36 57.9
Sg eN 37 17.9

OCT 26

φ = 50.26°N, λ = 19.00°E
H = 23:35:11.6, M = 2.3

OJC Δ = 57km
Pg eZ 23 35 21.6
Sg eNZ 35 29.2

NIE Δ = 132km
Pg eZ 23 35 34.6
Sg eN 35 50.2

```
   KSP  Δ = 202km
        Pg eZ        23 35 46.1
        (Sg) eE         36 08.3
```

OCT 27

φ = 50.10°N, λ = 18.47°E
H = 01:43:20.3, M = 2.2

```
   RAC  Δ = 20km
        Pg eZ        01 43 24.2
        Sg eNE          43 27.4

   OJC  Δ = 96km
        Pg eZ        01 43 36.7
        Sg eN           43 48.9

   NIE  Δ = 153km
        Pg eZ        01 43 46.6
        Sg eN           44 05.9
```

OCT 27

GIG: **φ = 50.269°N, λ = 18.867°E**
H = 05:00:57.2, M = 2.9

```
   RAC  Δ = 52km
        Pg eZ        05 01 06.8
        Sg eNE          01 13.2

   OJC  Δ = 67km
        Pg eZ        05 01 09.0
        Sg eEN          01 17.4

   NIE  Δ = 140km
        Pg eZ        05 01 21.3
        Sg eN           01 38.4

   KSP  Δ = 193km
        Pn eZ        05 01 27.8
        Pg iZ           01 29.6
        Sg eE           01 52.4
```

OCT 27

GIG: **φ = 50.366°N, λ = 18.914°E**
H = 17:26:10.2, M = 2.7

```
   RAC  Δ = 60km
        Pg eZ        17 26 21.3
        Sg eNE          26 29.4

   OJC  Δ = 65km
        Pg eZ        17 26 21.7
        Sg eE           26 29.8

   NIE  Δ = 146km
        Pg eZ        17 26 35.2
        Sg eN           26 53.0

   KSP  Δ = 193km
        Pn eZ        17 26 40.6
        Pg eZ           26 42.4
        Sg eE           27 05.7
```

OCT 28

GIG: **φ = 50.239°N, λ = 18.886°E**
H = 18:48:26.0, M = 2.9

```
   RAC  Δ = 53km
        Pg eZ        18 48 35.8
        Sg eNE          48 42.9

   OJC  Δ = 65km
        Pg eZ        18 48 37.3
        Sg eE           48 45.5

   NIE  Δ = 138km
        Pg eZ        18 48 49.4
        Sg eE           49 07.3

   KSP  Δ = 195km
        Pn eZ        18 48 56.6
        Pg iZ           48 58.5
        Sg eN           49 21.4
```

OCT 29

GIG: **φ = 50.362°N, λ = 18.928°E**
H = 01:33:10.1, M = 2.4

```
   OJC  Δ = 64km
        Pg eZ        01 33 21.4
        Sg eN           33 30.1

   NIE  Δ = 145km
        Pg eZ        01 33 34.8
        Sg eN           33 52.2

   KSP  Δ = 194km
        Pg eZ        01 33 42.0
        Sg eN           34 05.6
```

OCT 30

GIG: **φ = 50.054°N, λ = 18.450°E**
H = 21:05:49.2, M = 2.3

```
   RAC  Δ = 19km
        Pg iZ        21 05 52.7 D
        Sg eNE          05 56.1
```

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```
   OJC  Δ = 98km
        Pg eZ        21 06 05.3
        Sg eN           06 18.7

   NIE  Δ = 151km
        Pg eZ        21 06 15.2
        Sg eE           06 33.4

   KSP  Δ = 177km
        Pn eZ        21 06 17.7
        Pg eNZ          06 19.3
        Sg eN           06 40.5
```

OCT 31

GIG: φ = 50.245°N, λ = 18.956°E
H = 23:41:43.0, M = 2.5

```
   OJC  Δ = 60km
        Pg eZ        23 41 53.7
        Sg eE           42 01.3

   NIE  Δ = 134km
        Pg eZ        23 42 06.0
        Sg eE           42 23.9

   KSP  Δ = 200km
        Pg eZ        23 42 16.4
        Sg eN           42 39.9
```

NOV 1

φ = 50.07°N, λ = 18.44°E
H = 01:01:55.0, M = 2.1

```
   RAC  Δ = 17km
        Pg eZ        01 01 58.3
        Sg eNE          02 01.6

   OJC  Δ = 99km
        Pg eZ        01 02 11.6
        Sg eE           02 24.7

   NIE  Δ = 154km
        Pg eZ        01 02 21.1
        Sg eNE          02 40.8
```

NOV 1

GIG: φ = 50.057°N, λ = 18.452°E
H = 06:26:24.9, M = 2.1

```
   RAC  Δ = 19km
        Pg eZ        06 26 28.7
        Sg eNE          26 31.7

   OJC  Δ = 98km
        Pg eZ        06 26 41.3
        Sg eE           26 53.7

   NIE  Δ = 152km
        Pg eZ        06 26 51.1
        Sg eN           27 10.2
```

NOV 3

GIG: φ = 50.213°N, λ = 18.722°E
H = 08:18:14.6, M = 2.5

```
   OJC  Δ = 77km
        Pg eZ        08 18 27.7
        Sg eN           18 37.7

   NIE  Δ = 145km
        Pg eZ        08 18 39.8
        Sg eE           18 57.2

   KSP  Δ = 186km
        Pg eZ        08 18 45.4
        Sn eN           19 06.2
        Sg eN           19 07.1
```

NOV 3

GIG: φ = 49.960°N, λ = 18.650°E
H = 15:30:22.1, M = 2.2

```
   RAC  Δ = 35km
        Pg eZ        15 30 29.1
        Sg eNE          30 33.3

   OJC  Δ = 87km
        Pg eZ        15 30 36.8
        Sg eE           30 47.6

   NIE  Δ = 134km
        Pg eZ        15 30 45.9
        (Sg) eE         31 03.6
```

NOV 8

GIG: φ = 50.225°N, λ = 18.815°E
H = 00:45:16.5, M = 2.4

```
   OJC  Δ = 70km
        Pg eZ        00 45 28.5
        Sg eN           45 37.7

   NIE  Δ = 141km
        Pg eZ        00 45 40.3
        Sg eE           45 58.2
```

```
   KSP  Δ = 191km
        Pn eZ        00 45 47.0
        Pg eZ           45 48.0
        Sg eN           46 10.6
```

NOV 8

GIG: φ = 50.085°N, λ = 19.108°E
H = 09:08:03.5, M = 2.3

```
   OJC  Δ = 52km
        Pg eZ        09 08 12.7
        Sg eN           08 19.2

   NIE  Δ = 115km
        Pg eZ        09 08 23.6

   KSP  Δ = 216km
        Pg eZ        09 08 38.9
        Sg eN           09 05.1
```

NOV 8

GIG: φ = 50.053°N, λ = 18.450°E
H = 20:41:51.2, M = 2.4

```
   RAC  Δ = 18km
        Pg iZ        20 41 54.8 D
        Sg eNE          41 58.1

   OJC  Δ = 98km
        Pg eZ        20 42 07.4
        Sg eN           42 21.3

   NIE  Δ = 152km
        Pg eZ        20 42 17.2
        Sg eN           42 36.2

   KSP  Δ = 176km
        Pg eZ        20 42 19.8
        Sg eN           42 41.0
```

NOV 10

GIG: φ = 50.254°N, λ = 18.865°E
H = 02:10:08.5, M = 2.4

```
   RAC  Δ = 52km
        Pg eZ        02 10 18.0
        Sg eNE          10 24.8

   OJC  Δ = 67km
        Pg eZ        02 10 20.1
        Sg eN           10 28.7

   NIE  Δ = 140km
        Pg eZ        02 10 32.6
        Sg eE           10 50.6

   KSP  Δ = 193km
        Pg iZ        02 10 40.9 C
        Sg eN           11 03.6
```

NOV 10

GIG: φ = 50.043°N, λ = 18.447°E
H = 13:25:30.5, M = 2.3

```
   RAC  Δ = 19km
        Pg eZ        13 25 34.6
        Sg eNE          25 37.4

   OJC  Δ = 98km
        Pg eZ        13 25 47.1
        Sg eE           25 59.3

   NIE  Δ = 151km
        Pg eZ        13 25 55.9
        Sg eE           26 15.6
```

NOV 10

GIG: φ = 50.045°N, λ = 18.462°E
H = 22:43:25.3, M = 2.1

```
   RAC  Δ = 20km
        Pg eZ        22 43 29.1
        Sg eNE          43 32.5

   OJC  Δ = 97km
        Pg eZ        22 43 41.4
        Sg eE           43 54.4

   NIE  Δ = 151km
        Pg eZ        22 43 50.8
        Sg eE           44 10.5
```

NOV 11

φ = 50.19°N, λ = 19.29°E
H = 03:45:30.5, M = 2.3

```
   OJC  Δ = 36km
        Pg eZ        03 45 37.2
        Sg eN           45 42.0

   NIE  Δ = 114km
        Pg eZ        03 45 49.8
        Sg eE           46 04.8
```

NOV 13

GIG: φ = 50.247°N, λ = 18.951°E
H = 10:59:28.5, M = 2.4

```
   OJC  Δ = 60km
        Pg eZ        10 59 38.8
        Sg eE           59 46.7
```

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NIE Δ = 135km
Pg eZ 10 59 52.2
Sg eN 11 00 09.9

KSP Δ = 199km
Pg eZ 11 00 01.5
Sg eN 00 25.0

NOV 13

φ = 50.28°N, λ = 18.91°E
H = 16:53:32.9, M = 2.2

OJC Δ = 64km
Pg eZ 16 53 44.0
Sg eN 53 52.5

NIE Δ = 139km
Pg eZ 16 53 56.7
Sg eE 54 14.2

KSP Δ = 195km
Pg eZ 16 54 05.5
Sg eN 54 28.5

NOV 15
GIG: **φ = 50.054°N, λ = 18.450°E**
H = 00:46:46.5, M = 2.3

RAC Δ = 19km
Pg iZ 00 46 50.4 D
Sg eNE 46 53.6

OJC Δ = 98km
Pg eZ 00 47 03.0
Sg eN 47 15.2

NIE Δ = 152km
Pg eZ 00 47 12.7
Sg eN 47 32.1

KSP Δ = 176km
Pg eZ 00 47 16.2
Sg eN 47 36.5

NOV 15
GIG: **φ = 50.211°N, λ = 19.064°E**
H = 09:04:11.6, M = 2.3

OJC Δ = 52km
Pg eZ 09 04 20.9
Sg eN 04 27.6

NIE Δ = 126km
Pg eZ 09 04 33.9
Sg eE 04 49.9

NOV 15
GIG: **φ = 50.245°N, λ = 18.955°E**
H = 10:44:18.5, M = 2.3

OJC Δ = 60km
Pg iZ 10 44 29.0 D
Sg eE 44 36.8

NIE Δ = 134km
Pg eZ 10 44 41.5
Sg eE 44 59.1

NOV 16
GIG: **φ = 50.245°N, λ = 18.955°E**
H = 08:39:45.3, M = 2.3

OJC Δ = 60km
Pg eZ 08 39 55.3
Sg eE 40 03.2

NIE Δ = 135km
Pg eZ 08 40 08.7
Sg eE 40 25.8

NOV 16
GIG: **φ = 50.248°N, λ = 18.896°E**
H = 10:05:55.3, M = 2.3

OJC Δ = 64km
Pg eZ 10 06 06.1
Sg eE 06 14.2

NIE Δ = 137km
Pg eZ 10 06 18.6
Sg eE 06 36.4

NOV 16
GIG: **φ = 50.045°N, λ = 18.448°E**
H = 14:01:27.0, M = 2.3

RAC Δ = 18km
Pg eZ 14 01 30.5
Sg eNE 01 33.7

OJC Δ = 98km
Pg eZ 14 01 43.5
Sg eE 01 55.9

NIE Δ = 152km
Pg eZ 14 01 53.1
Sg eE 02 12.5

NOV 16

GIG: φ = 50.362°N, λ = 18.865°E
H = 19:49:00.5, M = 2.4

OJC Δ = 69km
Pg eZ 19 49 12.8
Sg eE 49 21.1

NIE Δ = 148km
Pg eZ 19 49 26.3
Sg eE 49 43.5

KSP Δ = 189km
Pn eZ 19 49 30.5
Pg eZ 49 31.5
Sg eN 49 54.2

NOV 17

GIG: φ = 50.212°N, λ = 19.066°E
H = 02:22:57.3, M = 2.3

OJC Δ = 52km
Pg eZ 02 23 06.2
Sg eN 23 13.2

NIE Δ = 126km
Pg eZ 02 23 19.1
Sg eE 23 35.2

KSP Δ = 208km
Pg eZ 02 23 32.6
Sg eN 23 56.4

NOV 17

GIG: φ = 50.052°N, λ = 18.434°E
H = 04:24:44.5, M = 2.1

RAC Δ = 18km
Pg eZ 04 24 47.9
Sg eNE 24 51.4

OJC Δ = 99km
Pg eZ 04 25 00.9
Sg eN 25 13.7

NIE Δ = 153km
Pg eZ 04 25 10.6
Sg eE 25 29.2

NOV 17

φ = 50.26°N, λ = 18.67°E
H = 11:29:28.7, M = 2.3

OJC Δ = 80km
Pg eZ 11 29 42.5
Sg eEZ 29 53.0

NIE Δ = 150km
Pg eZ 11 29 54.5
Sg eE 30 12.9

KSP Δ = 180km
Pg eZ 11 29 57.6
(Sg) eN 30 21.5

NOV 17

GIG: φ = 50.046°N, λ = 18.446°E
H = 15:49:37.3, M = 2.3

RAC Δ = 18km
Pg eZ 15 49 40.9
Sg eNE 49 44.0

OJC Δ = 98km
Pg eZ 15 49 54.4
Sg eN 50 06.8

KSP Δ = 176km
Pg eZ 15 50 06.7
(Sg) eN 50 26.6

NOV 17

GIG: φ = 50.106°N, λ = 19.156°E
H = 16:32:56.8, M = 2.8

OJC Δ = 47km
Pg eZ 16 33 04.6
Sg eN 33 11.2

NIE Δ = 113km
Pg eZ 16 33 15.9
Sg eN 33 31.9

KSP Δ = 219km
Pn eZ 16 33 31.9
Pg eZ 33 33.2
Sg eN 33 58.4

KWP Δ = 268km
Pg eZ 16 33 44.0

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NOV 17

GIG: φ = 50.247°N, λ = 18.911°E
H = 20:33:12.5, M = 2.3

OJC Δ = 63km
Pg eZ 20 33 23.8
Sg eE 33 31.9

NIE Δ = 137km
Pg eZ 20 33 36.1
Sg eE 33 53.2

KSP Δ = 197km
Pg eZ 20 33 45.1
Sg eN 34 08.0

NOV 17

GIG: φ = 50.211°N, λ = 19.067°E
H = 23:13:45.9, M = 2.3

OJC Δ = 52km
Pg eZ 23 13 54.9
Sg eN 14 01.6

NIE Δ = 126km
Pg eZ 23 14 07.8
Sg eE 14 23.9

KSP Δ = 209km
Pg eZ 23 14 21.0
Sg eN 14 44.7

NOV 18

GIG: φ = 50.245°N, λ = 18.955°E
H = 08:40:47.1, M = 2.5

OJC Δ = 60km
Pg eZ 08 40 57.6
Sg iE 41 05.5

NIE Δ = 135km
Pg eZ 08 41 10.7
Sg eE 41 28.1

KSP Δ = 200km
Pg eZ 08 41 20.3
Sg eE 41 43.7

NOV 19

GIG: φ = 50.238°N, λ = 18.889°E
H = 13:28:18.2, M = 2.9

RAC Δ = 53km
Pg eZ 13 28 28.0
Sg eNE 28 35.2

OJC Δ = 65km
Pg iZ 13 28 29.7 C
Sg iE 28 38.1

NIE Δ = 138km
Pg eZ 13 28 41.6
Sg eE 28 59.5

KSP Δ = 196km
Pn eZ 13 28 49.8
Pg eZ 28 50.7
Sg eN 29 13.6

NOV 20

GIG: φ = 50.085°N, λ = 19.105°E
H = 10:15:00.8, M = 2.2

OJC Δ = 51km
Pg eZ 10 15 09.7
Sg eN 15 16.4

NIE Δ = 115km
Pg eZ 10 15 20.6

KSP Δ = 216km
Pg eZ 10 15 36.4
Sg eN 16 02.1

NOV 20

GIG: φ = 50.247°N, λ = 18.955°E
H = 11:48:19.9, M = 2.3

OJC Δ = 60km
Pg eZ 11 48 30.3
Sg eE 48 38.1

NIE Δ = 134km
Pg eZ 11 48 43.1
Sg eE 49 00.5

KSP Δ = 200km
Pg eZ 11 48 53.0
Sg eE 49 16.8

NOV 20

GIG: φ = 50.269°N, λ = 18.867°E
H = 16:59:41.3, M = 2.4

OJC Δ = 66km
Pg eZ 16 59 52.9
Sg eE 17 00 01.5

NIE Δ = 141km
Pg eZ 17 00 05.3
Sg eE 00 23.1

```
   KSP  Δ = 193km
        Pg eZ        17 00 12.9
        Sg eE           00 36.6
```

NOV 20

GIG: φ = 50.214°N, λ = 18.719°E
H = 21:05:36.1, M = 2.5

```
   RAC  Δ = 40km
        Pg eZ        21 05 43.9
        Sg eNE          05 49.2

   OJC  Δ = 77km
        Pg eZ        21 05 49.3
        Sg eN           05 59.4

   NIE  Δ = 145km
        Pg eZ        21 06 01.0
        Sg eEN          06 18.9

   KSP  Δ = 185km
        Pg eZ        21 06 07.0
        Sg eN           06 28.8
```

NOV 20

GIG: φ = 50.051°N, λ = 18.434°E
H = 22:04:53.6, M = 2.2

```
   RAC  Δ = 18km
        Pg eZ        22 04 57.0
        Sg eNE          05 00.5

   OJC  Δ = 99km
        Pg eZ        22 05 09.9
        Sg eN           05 22.6

   NIE  Δ = 153km
        Pg eZ        22 05 19.6
        Sg eE           05 39.5
```

NOV 21

GIG: φ = 50.055°N, λ = 18.450°E
H = 03:35:51.3, M = 2.4

```
   RAC  Δ = 19km
        Pg iZ        03 35 55.1 D
        Sg eNE          35 58.4

   OJC  Δ = 98km
        Pg eZ        03 36 07.6
        Sg eN           36 19.9

   NIE  Δ = 152km
        Pg eZ        03 36 17.5
        Sg eN           36 36.7

   KSP  Δ = 176km
        Pn eZ        03 36 19.2
        Pg eZ           36 20.7
        Sg eE           36 41.3
```

NOV 21

GIG: φ = 50.086°N, λ = 19.107°E
H = 04:48:03.3, M = 2.2

```
   OJC  Δ = 52km
        Pg eZ        04 48 12.5
        Sg eN           48 19.0

   NIE  Δ = 115km
        Pg eZ        04 48 23.5
        (Sg) eE         48 39.9

   KSP  Δ = 216km
        Pg eZ        04 48 38.1
        Sg eN           49 04.4
```

NOV 21

GIG: φ = 50.045°N, λ = 18.446°E
H = 21:14:24.1, M = 2.3

```
   RAC  Δ = 19km
        Pg iZ        21 14 27.8 D
        Sg eNE          14 31.1

   OJC  Δ = 98km
        Pg eZ        21 14 40.7
        Sg eE           14 53.0

   NIE  Δ = 151km
        Pg eZ        21 14 50.0
        Sg eE           15 09.7
```

NOV 21

GIG: φ = 50.232°N, λ = 19.073°E
H = 23:09:37.8, M = 2.6

```
   OJC  Δ = 52km
        Pg eZ        23 09 46.9
        Sg eN           09 53.8

   NIE  Δ = 128km
        Pg eZ        23 09 59.9
        Sg eE           10 16.3
```

Upper Silesian Coal Basin 2006

NOV 22

GIG: φ = 50.349°N, λ = 18.976°E
H = 02:59:37.4, M = 2.4

OJC Δ = 60km
Pg eZ 02 59 48.0
Sg eN 59 55.8

NIE Δ = 141km
Pg eZ 03 00 01.8
Sg eZE 00 18.6

NOV 22

GIG: φ = 50.045°N, λ = 18.447°E
H = 19:36:02.0, M = 2.1

RAC Δ = 19km
Pg eZ 19 36 05.7
Sg eNE 36 09.1

OJC Δ = 98km
Pg eZ 19 36 18.3
Sg eN 36 30.8

NIE Δ = 151km
Pg eZ 19 36 28.0
Sg eE 36 47.4

NOV 23

GIG: φ = 50.245°N, λ = 18.956°E
H = 03:06:16.1, M = 2.3

OJC Δ = 60km
Pg eZ 03 06 26.6
Sg eE 06 34.5

NIE Δ = 134km
Pg eZ 03 06 39.5
Sg eE 06 56.3

KSP Δ = 200km
Pg eZ 03 06 49.3
Sg eE 07 13.2

NOV 24

GIG: φ = 50.055°N, λ = 18.449°E
H = 01:12:31.9, M = 2.1

RAC Δ = 18km
Pg eZ 01 12 35.6
Sg eNE 12 38.8

OJC Δ = 98km
Pg eZ 01 12 48.1
Sg eE 13 00.6

NIE Δ = 152km
Pg eZ 01 12 58.0
Sg eN 13 17.5

NOV 24

GIG: φ = 50.053°N, λ = 18.450°E
H = 02:11:40.1, M = 2.2

RAC Δ = 19km
Pg eZ 02 11 43.8
Sg eNE 11 47.2

OJC Δ = 98km
Pg eZ 02 11 56.6
Sg eN 12 08.8

NIE Δ = 152km
Pg eZ 02 12 06.0
Sg eE 12 25.2

NOV 24

GIG: φ = 50.086°N, λ = 19.107°E
H = 17:29:29.9, M = 2.4

OJC Δ = 51km
Pg eZ 17 29 39.0
Sg eN 29 45.4

NIE Δ = 115km
Pg eZ 17 29 49.9
(Sg) eE 30 06.1

KSP Δ = 216km
Pg eZ 17 30 05.3
Sg eE 30 31.2

NOV 25

φ = 50.24°N, λ = 18.75°E
H = 05:32:38.1, M = 2.0

OJC Δ = 75km
Pg eZ 05 32 50.8
Sg eE 33 01.2

NIE Δ = 145km
Pg eZ 05 33 02.9
Sg eE 33 20.8

KSP Δ = 186km
Pg eZ 05 33 09.8
(Sg) eE 33 30.5

Upper Silesian Coal Basin 2006

NOV 26

GIG: φ = 50.232°N, λ = 19.075°E
H = 19:02:29.1, M = 2.3

OJC	Δ = 52km			
	Pg eZ	19	02	38.5
	Sg eN		02	45.4
NIE	Δ = 127km			
	Pg eZ	19	02	51.4
	Sg eE		03	07.4
KSP	Δ = 208km			
	Pn eZ	19	03	01.1
	Pg eZ		03	03.5
	Sg eN		03	28.0

NOV 26

GIG: φ = 50.282°N, λ = 18.840°E
H = 22:08:27.7, M = 2.2

OJC	Δ = 69km			
	Pg eZ	22	08	39.7
	Sg eE		08	47.9
NIE	Δ = 143km			
	Pg eZ	22	08	52.9
	Sg eE		09	10.3
KSP	Δ = 191km			
	Pg eZ	22	08	59.5
	Sg eN		09	22.3

NOV 27

GIG: φ = 50.044°N, λ = 18.446°E
H = 21:30:13.9, M = 2.0

RAC	Δ = 18km			
	Pg eZ	21	30	17.4
	Sg eNE		30	20.7
OJC	Δ = 98km			
	Pg eZ	21	30	30.8
	Sg eE		30	42.6
NIE	Δ = 152km			
	Pg eZ	21	30	39.7
	Sg eN		30	59.7

NOV 27

GIG: φ = 50.055°N, λ = 18.451°E
H = 23:12:52.0, M = 2.1

RAC	Δ = 19km			
	Pg eZ	23	12	55.7
	Sg eNE		12	59.2
OJC	Δ = 98km			
	Pg eZ	23	13	08.6
	Sg eE		13	20.7
NIE	Δ = 152km			
	Pg eZ	23	13	18.0
	Sg eE		13	37.5
KSP	Δ = 176km			
	Pg eZ	23	13	21.6
	Sg eN		13	42.0

NOV 28

GIG: φ = 50.232°N, λ = 19.075°E
H = 16:36:41.3, M = 2.4

OJC	Δ = 51km			
	Pg eZ	16	36	50.0
	Sg eN		36	56.9
NIE	Δ = 127km			
	Pg eZ	16	37	03.6
	Sg eN		37	20.2
KSP	Δ = 208km			
	Pg eZ	16	37	15.2
	Sg eN		37	40.5

NOV 28

GIG: φ = 50.256°N, λ = 18.827°E
H = 19:30:43.8, M = 2.8

RAC	Δ = 49km			
	Pg eZ	19	30	53.0
	Sg eNE		30	59.5
OJC	Δ = 69km			
	Pg eZ	19	30	55.8
	Sg eN		31	04.4
NIE	Δ = 142km			
	Pg eZ	19	31	07.9
	Sg eE		31	26.0

KSP Δ = 191km
Pn eZ 19 31 13.9
Pg iZ 31 15.7
Sg eE 31 38.2

NOV 28
GIG: φ = 50.247°N, λ = 18.952°E
H = 22:03:31.6, M = 2.4

RAC Δ = 57km
Pg eZ 22 03 42.0
Sg eNE 03 49.7

OJC Δ = 60km
Pg eZ 22 03 42.1
Sg eE 03 49.9

NIE Δ = 135km
Pg eZ 22 03 54.9
Sg eE 04 11.6

KSP Δ = 199km
Pg eZ 22 04 04.8
Sg eN 04 28.2

NOV 28
GIG: φ = 50.269°N, λ = 18.867°E
H = 22:22:17.4, M = 2.3

OJC Δ = 67km
Pg eZ 22 22 29.1
Sg eE 22 37.4

NIE Δ = 140km
Pg eZ 22 22 41.3
Sg eE 22 59.0

KSP Δ = 193km
Pg eZ 22 22 49.4
Sg eN 23 12.8

NOV 28
GIG: φ = 50.198°N, λ = 19.134°E
H = 23:22:24.8, M = 2.9

OJC Δ = 48km
Pg eZ 23 22 33.1
Sg eN 22 39.5

RAC Δ = 68km
Pg eZ 23 22 36.7
Sg eNE 22 45.5

NIE Δ = 121km
Pg eZ 23 22 45.5
Sg eE 23 01.6

KSP Δ = 214km
Pg eZ 23 23 00.7
Sg eN 23 24.8

NOV 30
GIG: φ = 50.171°N, λ = 19.284°E
H = 02:25:04.8, M = 2.3

OJC Δ = 36km
Pg eZ 02 25 10.6
Sg eN 25 15.3

NIE Δ = 112km
Pg eZ 02 25 24.5
Sg eE 25 38.9

KSP Δ = 225km
Pg eZ 02 25 42.5
Sg eN 26 08.2

NOV 30
GIG: φ = 50.245°N, λ = 18.954°E
H = 08:12:10.1, M = 2.4

OJC Δ = 60km
Pg eZ 08 12 20.7
Sg eZE 12 28.5

NIE Δ = 134km
Pg eZ 08 12 33.5
Sg eE 12 49.6

DEC 1
GIG: φ = 50.055°N, λ = 18.449°E
H = 13:08:07.9, M = 2.5

RAC Δ = 18km
Pg iZ 13 08 11.6 D
Sg eNE 08 14.9

OJC Δ = 98km
Pg eZ 13 08 24.1
Sg eE 08 36.6

NIE Δ = 152km
Pg eZ 13 08 34.1
Sg eE 08 53.2

Upper Silesian Coal Basin 2006

DEC 1

GIG: φ = 50.284°N, λ = 18.838°E
H = 18:23:27.3, M = 2.3

OJC	Δ = 69km			
	Pg eZ	18	23	39.0
	Sg eE		23	48.2
NIE	Δ = 144km			
	Pg eZ	18	23	52.2
	Sg eE		24	09.8
KSP	Δ = 190km			
	Pg eZ	18	23	59.0
	Sg eN		24	22.8

DEC 2

GIG: φ = 50.247°N, λ = 18.981°E
H = 02:09:41.6, M = 2.3

OJC	Δ = 58km			
	Pg eZ	02	09	51.9
	Sg iN		09	59.6
NIE	Δ = 133km			
	Pg eZ	02	10	04.4
	Sg eE		10	20.7
KSP	Δ = 201km			
	Pn eZ	02	10	13.3
	Pg eZ		10	15.1
	Sg eN		10	39.0

DEC 2

GIG: φ = 50.245°N, λ = 18.955°E
H = 02:43:10.6, M = 2.2

OJC	Δ = 60km			
	Pg eZ	02	43	21.0
	Sg eE		43	29.0
NIE	Δ = 134km			
	Pg eZ	02	43	34.0
	Sg eE		43	51.3
KSP	Δ = 200km			
	Pg eZ	02	43	43.8
	Sg eE		44	07.5

DEC 2

GIG: φ = 50.172°N, λ = 19.285°E
H = 10:37:14.9, M = 2.4

OJC	Δ = 37km			
	Pg eZ	10	37	21.2
	Sg eN		37	25.9
NIE	Δ = 112km			
	Pg eZ	10	37	34.4
	Sg eE		37	49.1

DEC 2

GIG: φ= 50.239°N, λ = 19.034°E
H = 23:08:03.4, M = 2.3

OJC	Δ = 54km			
	Pg eZ	23	08	12.8
	Sg eN		08	20.1
NIE	Δ = 130km			
	Pg eZ	23	08	26.0
	Sg eE		08	42.5
KSP	Δ = 205km			
	Pg eZ	23	08	37.5
	Sg eN		09	01.7

DEC 3

GIG: φ = 50.243°N, λ = 18.904°E
H = 18:44:11.5, M = 2.7

RAC	Δ = 53km			
	Pg eZ	18	44	21.1
	Sg eNE		44	28.2
OJC	Δ = 64km			
	Pg eZ	18	44	22.9
	Sg eE		44	31.1
NIE	Δ = 136km			
	Pg eZ	18	44	34.9
	Sg eE		44	52.1
KSP	Δ = 197km			
	Pn eZ	18	44	42.9
	Pg eZ		44	44.3
	Sg eN		45	07.8

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DEC 5

GIG: φ = 50.232°N, λ = 19.076°E
H = 11:58:12.9, M = 2.4

OJC Δ = 51km
Pg eZ 11 58 22.2
Sg eN 58 29.1

KSP Δ = 208km
Pg eZ 11 58 47.7
Sg eE 59 12.1

DEC 6

GIG: φ = 50.270°N, λ = 18.866°E
H = 01:21:02.6, M = 2.2

OJC Δ = 67km
Pg eZ 01 21 14.1
Sg eE 21 23.0

NIE Δ = 140km
Pg eZ 01 21 26.3
Sg eN 21 43.9

KSP Δ = 193km
Pg eZ 01 21 34.7
Sg eE 21 58.1

DEC 6

GIG: φ = 50.245°N, λ = 18.955°E
H = 01:48:27.6, M = 2.4

OJC Δ = 60km
Pg eZ 01 48 38.2
Sg eZE 48 46.0

NIE Δ = 134km
Pg eZ 01 48 50.6
Sg eE 49 07.4

KSP Δ = 200km
Pg eZ 01 49 00.9
Sg eE 49 24.9

DEC 6

GIG: φ = 50.053°N, λ = 18.450°E
H = 17:55:39.9, M = 2.5

RAC Δ = 19km
Pg eZ 17 55 43.6
Sg eNE 55 46.8

OJC Δ = 98km
Pg eZ 17 55 56.2
Sg eE 56 08.4

NIE Δ = 152km
Pg eZ 17 56 06.1
Sg eN 56 25.4

KSP Δ = 176km
Pn eZ 17 56 08.0
Pg eZ 56 10.4
Sn eN 56 28.6
Sg eN 56 31.5

DEC 7

GIG: φ = 50.084°N, λ = 19.109°E
H = 14:55:35.3, M = 2.4

OJC Δ = 51km
Pg eZ 14 55 44.6
Sg eN 55 51.3

NIE Δ = 114km
Pg eZ 14 55 54.9
(Sg) eN 56 12.4

DEC 7

GIG: φ = 50.232°N, λ = 19.075°E
H = 21:02:09.8, M = 2.3

OJC Δ = 51km
Pg eZ 21 02 18.8
Sg eN 02 25.6

NIE Δ = 127km
Pg eZ 21 02 32.0
Sg eE 02 48.1

KSP Δ = 209km
Pg eEZ 21 02 44.2
Sg eE 03 09.3

DEC 7

GIG: φ = 50.243°N, λ = 18.904°E
H = 22:05:29.3, M = 2.9

RAC Δ = 53km
Pg eZ 22 05 38.9
Sg eNE 05 46.1

OJC Δ = 64km
Pg eZ 22 05 40.5
Sg eN 05 48.6

NIE Δ = 136km
Pg eZ 22 05 52.7
Sg eE 06 10.1

KSP Δ = 196km
Pg eZ 22 06 02.1
Sg eN 06 25.3

DEC 8
φ = 50.19°N, λ = 19.29°E
H = 08:25:48.1, M = 2.3

OJC Δ = 36km
Pg eZ 08 25 54.7
Sg eN 25 59.4

NIE Δ = 113km
Pg eZ 08 26 07.5
Sg eE 26 22.3

DEC 8
GIG: φ = 50.247°N, λ = 18.954°E
H = 12:19:24.7, M = 2.3

OJC Δ = 60km
Pg eZ 12 19 34.6
Sg eE 19 42.4

NIE Δ = 134km
Pg eZ 12 19 48.3
Sg eE 20 05.2

DEC 8
GIG: φ = 50.232°N, λ = 19.076°E
H = 19:34:29.3, M = 2.4

OJC Δ = 51km
Pg eZ 19 34 38.0
Sg eN 34 44.8

NIE Δ = 127km
Pg eZ 19 34 51.5
Sg eE 35 08.0

DEC 9
GIG: φ = 50.055°N, λ = 18.449°E
H = 00:37:19.8, M = 2.4

RAC Δ = 18km
Pg eZ 00 37 23.6
Sg eNE 37 27.0

OJC Δ = 98km
Pg eZ 00 37 36.4
Sg eE 37 48.3

NIE Δ = 152km
Pg eZ 00 37 46.0
Sg eN 38 05.4

DEC 11
GIG: φ = 50.232°N, λ = 19.075°E
H = 18:53:12.9, M = 2.5

OJC Δ = 52km
Pg eZ 18 53 22.0
Sg eN 53 28.8

NIE Δ = 127km
Pg eZ 18 53 35.5
Sg eE 53 51.9

KSP Δ = 208km
Pg eZ 18 53 46.2
Sg eE 54 12.8

DEC 12
GIG: φ = 50.246°N, λ = 18.955°E
H = 10:06:24.4, M = 2.3

OJC Δ = 60km
Pg eZ 10 06 34.8
Sg eE 06 42.6

NIE Δ = 134km
Pg eZ 10 06 47.6
Sg eE 07 04.9

DEC 12
φ = 50.16°N, λ = 19.04°E
H = 13:33:32.3, M = 2.3

OJC Δ = 55km
Pg eZ 13 33 42.3
Sg eE 33 49.4

NIE Δ = 124km
Pg eZ 13 33 53.0
Sg eE 34 09.5

DEC 12
GIG: φ = 50.214°N, λ = 18.714°E
H = 19:44:41.5, M = 2.3

RAC Δ = 40km
Pg eZ 19 44 49.6
Sg eNE 44 55.3

OJC Δ = 77km
Pg eZ 19 44 54.1
Sg eN 45 03.8

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DEC 13

GIG: φ = 50.247°N, λ = 18.983°E
H = 02:03:43.1, M = 2.3

OJC Δ = 58km
Pg eZ 02 03 53.2
Sg eN 04 01.1

NIE Δ = 133km
Pg eZ 02 04 06.3
Sg eE 04 23.2

KSP Δ = 201km
Pg eZ 02 04 16.4
Sg eN 04 40.6

DEC 14

GIG: φ = 50.172°N, λ = 19.285°E
H = 04:30:39.9, M = 2.3

OJC Δ = 37km
Pg eZ 04 30 46.0
Sg eN 30 50.7

NIE Δ = 112km
Pg eZ 04 31 00.1
Sg eN 31 14.0

DEC 14

GIG: φ = 50.199°N, λ = 19.133°E
H = 11:48:00.3, M = 2.6

OJC Δ = 47km
Pg eZ 11 48 08.0
Sg eN 48 14.4

NIE Δ = 122km
Pg eZ 11 48 21.5
Sg eN 48 36.7

KSP Δ = 214km
Pg eZ 11 48 36.0
Sg eN 49 00.8

DEC 15

GIG: φ = 50.242°N, λ = 18.954°E
H = 02:44:57.6, M = 2.2

OJC Δ = 60km
Pg eZ 02 45 08.3
Sg eE 45 16.0

NIE Δ = 134km
Pg eZ 02 45 21.0
Sg eE 45 38.3

KSP Δ = 200km
Pg eZ 02 45 30.3
Sg eN 45 54.4

DEC 15

GIG: φ = 50.232°N, λ = 19.075°E
H = 11:46:33.3, M = 2.5

OJC Δ = 52km
Pg eZ 11 46 42.3
Sg eN 46 49.3

NIE Δ = 127km
Pg eZ 11 46 55.4
Sg eN 47 12.1

KSP Δ = 208km
Pn eZ 11 47 05.5
Pg eZ 47 07.6
Sg eN 47 32.5

DEC 16

GIG: φ = 50.106°N, λ = 19.157°E
H = 02:30:48.4, M = 3.0

OJC Δ = 47km
Pg eZ 02 30 56.7
Sg eNE 31 03.1

RAC Δ = 69km
Pg eZ 02 31 00.6
Sg eEN 31 09.8

NIE Δ = 114km
Pg eZ 02 31 08.0
(Sg) eE 31 24.7

KSP Δ = 219km
Pg eZ 02 31 24.6
Sg eN 31 50.7

KWP Δ = 260km
Pg eZ 02 31 36.7

DEC 16

GIG: φ = 50.058°N, λ = 18.450°E
H = 05:52:52.6, M = 2.6

RAC Δ = 19km
Pg iZ 05 52 56.3 D
Sg eNE 52 59.4

```
   OJC  Δ = 98km
        Pg eZ        05 53 08.8
        Sg eNZ          53 21.2

   NIE  Δ = 152km
        Pg eZ        05 53 18.7
        Sg eN           53 38.2

   KSP  Δ = 176km
        Pn eZ        05 53 20.4
        Pg eZ           53 22.7
        Sg eN           53 44.0
```

DEC 16

GIG: φ = 50.212°N, λ = 19.067°E
H = 13:57:39.0, M = 2.2

```
   OJC  Δ = 52km
        Pg eZ        13 57 47.8
        Sg eE           57 54.7

   NIE  Δ = 126km
        Pg eZ        13 58 00.6
        Sg eE           58 16.9

   KSP  Δ = 209km
        Pg eZ        13 58 13.9
        Sg eN           58 37.8
```

DEC 17

GIG: φ = 49.978°N, λ = 18.574°E
H = 20:21:49.4, M = 2.3

```
   RAC  Δ = 29km
        Pg eZ        20 21 55.0
        Sg eEN          21 59.4

   OJC  Δ = 92km
        Pg eZ        20 22 04.4
        Sg eE           22 16.9

   NIE  Δ = 140km
        Pg eZ        20 22 13.2
        (Sg) eE         22 32.0

   KSP  Δ = 188km
        Pg eZ        20 22 20.5
        Sg eN           22 42.6
```

DEC 19

GIG: φ = 50.246°N, λ = 18.954°E
H = 01:36:20.2, M = 2.4

```
   OJC  Δ = 60km
        Pg iZ        01 36 30.6 D
        Sg eEZ          36 38.4

   NIE  Δ = 134km
        Pg eZ        01 36 43.4
        Sg eE           37 00.7
```

DEC 19

GIG: φ = 50.056°N, λ = 18.449°E
H = 02:20:28.2, M = 2.0

```
   RAC  Δ = 18km
        Pg eZ        02 20 31.9
        Sg eNE          20 35.1

   OJC  Δ = 98km
        Pg eZ        02 20 44.6
        Sg eN           20 56.9

   NIE  Δ = 152km
        Pg eZ        02 20 54.3
        Sg eN           21 13.7
```

DEC 19

GIG: φ = 50.060°N, λ = 18.447°E
H = 02:35:12.2, M = 3.1

```
   RAC  Δ = 18km
        Pg iZ        02 35 16.0 D
        Sg eNEZ         35 18.9

   OJC  Δ = 98km
        Pg iZ        02 35 28.3 D
        Sg eN           35 41.7

   NIE  Δ = 152km
        Pg iZ        02 35 38.3
        Sg eEN          35 58.0

   KSP  Δ = 176km
        Pn eZ        02 35 39.7
        Pg eZ           35 42.1
        Sg eE           36 02.9

   KWP  Δ = 309km
        Pn eZ        02 35 57.3
        Pg eZ           36 05.0
        Sg eNE          36 50.5
```

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GKP Δ = 366km
Pn eZ 02 36 04.8
Pg eZ 36 19.5

SUW Δ = 545km
Pn eZ 02 36 26.2

DEC 21

φ = 50.26°N, λ = 19.22°E
H = 00:47:29.5, M = 2.2

OJC Δ = 42km
Pg eZ 00 47 36.5
Sg eE 47 43.0

NIE Δ = 123km
Pg eZ 00 47 50.0
Sg eE 48 06.5

KSP Δ = 217km
Pg eZ 00 48 04.6
Sg eN 48 31.7

DEC 21

GIG: φ = 50.246°N, λ = 18.954°E
H = 02:52:48.0, M = 2.4

OJC Δ = 60km
Pg iZ 02 52 58.3 D
Sg iE 53 06.2

NIE Δ = 134km
Pg eZ 02 53 10.6
Sg eE 53 28.5

KSP Δ = 200km
Pg eZ 02 53 21.0
Sg eN 53 44.3

DEC 21

GIG: φ = 50.246°N, λ = 18.982°E
H = 18:36:12.3, M = 2.1

OJC Δ = 58km
Pg eZ 18 36 22.3
Sg eN 36 30.3

NIE Δ = 133km
Pg eZ 18 36 35.5
Sg eE 36 52.3

KSP Δ = 201km
Pg eZ 18 36 45.6
Sg eN 37 09.5

DEC 22

GIG: φ = 50.172°N, λ = 19.286°E
H = 01:15:25.7, M = 2.3

OJC Δ = 36km
Pg eZ 01 15 31.8
Sg eN 15 36.4

NIE Δ = 112km
Pg eZ 01 15 45.5
Sg eE 16 00.0

DEC 22

GIG: φ = 50.200°N, λ = 19.133°E
H = 03:24:17.6, M = 2.2

OJC Δ = 47km
Pg eZ 03 24 25.4
Sg eE 24 32.3

NIE Δ = 121km
Pg eZ 03 24 38.5
Sg eN 24 54.6

KSP Δ = 214km
Pg eZ 03 24 52.9
Sg eN 25 16.8

DEC 22

GIG: φ = 50.246°N, λ = 18.954°E
H = 06:40:40.7, M = 2.3

OJC Δ = 60km
Pg eZ 06 40 51.2
Sg eE 40 59.1

NIE Δ = 135km
Pg eZ 06 41 04.1
Sg eE 41 21.4

KSP Δ = 200km
Pg eZ 06 41 13.8
Sg eN 41 37.4

DEC 22

GIG: φ = 50.093°N, λ = 18.432°E
H = 11:25:28.3, M = 2.4

RAC Δ = 17km
Pg eZ 11 25 31.7
Sg eEN 25 34.6

OJC Δ = 99km
Pg eZ 11 25 45.2
Sg eN 25 57.5

```
   NIE  Δ = 155km
        Pg eZ        11 25 54.6
        Sg eN           26 14.3

   KSP  Δ = 173km
        Pg eZ        11 25 57.4
        Sg eN           26 17.4
```

DEC 22

GIG: φ = 50.213°N, λ = 19.066°E
H = 19:34:03.9, M = 2.3

```
   OJC  Δ = 52km
        Pg eZ        19 34 12.6
        Sg eN           34 19.8

   NIE  Δ = 126km
        Pg eZ        19 34 25.9
        Sg eN           34 42.4

   KSP  Δ = 208km
        Pn eZ        19 34 36.9
        Pg eZ           34 39.2
        Sg eN           35 02.8
```

DEC 22

GIG: φ = 50.233°N, λ = 19.074°E
H = 22:54:27.0, M = 2.3

```
   OJC  Δ = 52km
        Pg eZ        22 54 36.1
        Sg eN           54 43.0

   NIE  Δ = 128km
        Pg eZ        22 54 49.6
        Sg eE           55 06.4

   KSP  Δ = 208km
        Pn eZ        22 54 59.2
        Pg eZ           55 00.8
        Sg eN           55 25.6
```

DEC 23

GIG: φ = 50.225°N, λ = 19.084°E
H = 18:42:45.1, M = 2.0

```
   OJC  Δ = 51km
        Pg eZ        18 42 54.7
        Sg eN           43 00.3

   NIE  Δ = 126km
        Pg eZ        18 43 06.8
        Sg eN           43 22.5

   KSP  Δ = 209km
        Pg eZ        18 43 19.9
        Sg eE           43 44.6
```

DEC 25

GIG: φ = 50.238°N, λ = 18.888°E
H = 00:03:56.3, M = 2.7

```
   RAC  Δ = 53km
        Pg eZ        00 04 06.0
        Sg eEN          04 12.6

   OJC  Δ = 65km
        Pg eZ        00 04 07.9
        Sg eEZ          04 16.2

   NIE  Δ = 138km
        Pg eZ        00 04 20.1
        Sg eE           04 37.7

   KSP  Δ = 195km
        Pg eZ        00 04 28.9
        Sg eN           04 52.1
```

DEC 28

GIG: φ = 50.270°N, λ = 18.868°E
H = 11:10:57.3, M = 2.5

```
   OJC  Δ = 66km
        Pg eZ        11 11 08.9
        Sg eN           11 17.3

   NIE  Δ = 141km
        Pg eZ        11 11 21.4
        Sg eE           11 39.6

   KSP  Δ = 193km
        Pg eZ        11 11 29.5
        Sg eE           11 52.3
```

DEC 29

φ = 50.30°N, λ = 19.20°E
H = 10:31:24.1, M = 2.4

```
   OJC  Δ = 43km
        Pg eZ        10 31 31.3
        Sg eN           31 37.0

   NIE  Δ = 126km
        Pg eZ        10 31 46.3
        Sg eE           32 01.5
```

Upper Silesian Coal Basin 2006

DEC 29

GIG: φ = 50.045°N, λ = 18.445°E
H = 22:12:59.4, M = 2.7

RAC	Δ = 19km		
	Pg iZ	22 13 03.2	D
	Sg eNE	13 06.4	
OJC	Δ = 98km		
	Pg eZ	22 13 15.8	
	Sg eN	13 28.1	
NIE	Δ = 151km		
	Pg eZ	22 13 24.9	
	Sg eN	13 44.2	

DEC 30

GIG: φ = 50.245°N, λ = 18.954°E
H = 00:11:50.8, M = 2.4

OJC	Δ = 60km	
	Pg eZ	00 12 01.2
	Sg eE	12 09.1
NIE	Δ = 134km	
	Pg eZ	00 12 14.1
	Sg eE	12 31.3

Lubin Copper Basin 2006

JAN 3

φ = 51.478°N, λ = 16.111°E
H = 16:54:50.4, M = 2.8

KSP Δ = 72.0km
Pg iZ 16 55 02.2 D
Sg eE 55 11.0

OJC Δ = 295.7km
Pg eZ 16 55 39.9
Sg eN 56 15.8

NIE Δ = 377.1km
P eZ 16 55 53.5
S eE 56 40.9

JAN 3

φ = 51.533°N, λ = 16.143°E
H = 19:10:25.7, M = 2.2

KSP Δ = 77.7km
Pg eZ 19 10 38.4
Sg eE 10 47.9

JAN 5

φ = 51.54°N, λ = 16.03°E
H = 17:33:17, M = 2.6

KSP Δ = 79.9km
Pg iZ 17 33 29.9 D
Sg eE 33 39.5

OJC Δ = 303.9km
Pg eZ 17 34 07.2
Sg eN 34 43.4

JAN 9

φ = 51.534°N, λ = 16.061°E
H = 11:12:02.4, M = 2.6

KSP Δ = 78.8km
Pg eZ 11 12 15.3
Sg eZ 12 24.8

OJC Δ = 301.7km
Pg eZ 11 12 53.7
Sg eZ 13 28.5

JAN 11

φ = 51.584°N, λ = 15.989°E
H = 02:48:25.6, M = 3.0

KSP Δ = 85.4km
Pg iZ 02 48 39.6 D
Sg eE 48 49.7

RAC Δ = 228.6km
P eZ 02 49 04.6
S eNE 49 30.4

OJC Δ = 308.7km
Pg eZ 02 49 17.0
Sg eN 49 52.4

NIE Δ = 390.9km
P eZ 02 49 30.5
S eE 50 14.8

JAN 12

φ = 51.53°N, λ = 16.06°E
H = 05:08:35, M = 2.8

KSP Δ = 78km
Pg iZ 05 08 48.3 D
Sg iE 08 58.3

RAC Δ = 221km
P eZ 05 09 13.0
S eNE 09 38.8

OJC Δ = 302km
Pg eZ 05 09 27.4
Sg eN 10 03.6

NIE Δ = 383km
P eZ 05 09 40.0
S eN 10 26.1

JAN 14

φ = 51.473°N, λ = 16.107°E
H = 10:34:08.2, M = 2.6

KSP Δ = 71.5km
Pg iZ 10 34 19.9 D
Sg eE 34 28.3

JAN 14

φ = 51.532°N, λ = 16.091°E
H = 16:42:57.2, M = 3.1

KSP Δ = 78.2km
Pg iZ 16 43 10.0 D
Sg eE 43 19.2

RAC Δ = 219.5km
P eZ 16 43 33.3
S eNE 43 58.7

OJC Δ = 299.7km
Pg eZ 16 43 46.9
Sg eN 44 22.3

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NIE Δ = 381.8km
P eZ 16 43 46.9
S eN 44 22.3

KWP Δ = 515.2km
P eZ 16 44 21.2

JAN 25

φ = 51.583°N, λ = 15.991°E
H = 04:57:46.2, M = 2.6

KSP Δ = 85.2km
Pg iZ 04 58 00.2 D
Sg eE 58 10.2

OJC Δ = 308.6km
Pg eZ 04 58 37.9
Sg eN 59 14.2

JAN 26

φ = 51.446°N, λ = 16.191°E
H = 17:20:04.8, M = 2.9

KSP Δ = 67.7km
Pg iZ 17 20 15.9 D
Sg eE 20 23.9

OJC Δ = 289.2km
Pg eZ 17 20 52.8
Sg eN 21 27.6

NIE Δ = 370.5km
P eZ 17 21 06.3
S eN 21 50.8

JAN 31

φ = 51.534°N, λ = 16.054°E
H = 01:07:44.9, M = 2.8

KSP Δ = 78.9km
Pg iZ 01 07 57.8 D
Sg eN 08 07.1

OJC Δ = 302.1km
Pg eZ 01 08 34.9
Sg eN 09 10.5

NIE Δ = 384.0km
P eZ 01 08 49.4
S eN 09 34.4

FEB 3

φ = 51.44°N, λ = 16.12°E
H = 16:30:45, M = 3.0

KSP Δ = 68km
Pg eZ 16 30 56.2 D
Sg eE 31 03.4

RAC Δ = 211km
P eZ 16 31 20.2
S eNE 31 43.4

OJC Δ = 293km
Pn eZ 16 31 24.8
Pg eZ 31 33.5
Sn eN 31 55.3
Sg iN 32 09.3

NIE Δ = 374km
P eZ 16 31 48.5
S eE 32 34.4

FEB 4

φ = 51.484°N, λ = 16.096°E
H = 11:32:37.6, M = 3.1

KSP Δ = 72.8km
Pg iZ 11 32 49.5 D
Sg eE 32 58.1

RAC Δ = 215.4km
P eZ 11 33 12.5
S eNE 33 39.0

OJC Δ = 297.0km
Pn eZ 11 33 20.2
Pg eZ 33 27.1
Sn eN 33 48.4
Sg eN 34 02.2

NIE Δ = 378.3km
P eZ 11 33 12.5
S eE 33 39.0

FEB 6

φ = 51.54°N, λ = 16.01°E
H = 13:28:02, M = 2.7

KSP Δ = 80km
Pg iZ 13 28 15.2 D
Sg eE 28 25.1

OJC Δ = 305km
Pg eZ 13 28 54.1
Sg eN 29 28.9

NIE Δ = 387km
P eZ 13 29 06.6
S eE 29 51.5

FEB 7

φ = 51.524°N, λ = 16.108°E
H = 04:01:57.6, M = 2.8

KSP Δ = 77.1km
Pg iZ 04 02 10.2 D
Sg iE 02 19.4

OJC Δ = 298.3km
Pg eZ 04 02 47.6
Sg eN 03 22.5

NIE Δ = 380.3km
P eZ 04 03 00.9
S eN 03 46.1

FEB 8

φ = 51.444°N, λ = 16.117°E
H = 05:00:06.5, M = 2.7

KSP Δ = 68.2km
Pg iZ 05 00 17.7 D
Sg eE 00 25.0

RAC Δ = 211.2km
P eZ 05 00 41.2
S eNE 01 07.2

OJC Δ = 293.7km
Pg eZ 05 00 56.4
Sg eN 01 31.2

NIE Δ = 374.3km
P eZ 05 01 07.6
S eN 01 51.8

FEB 9

φ = 51.457°N, λ = 16.130°E
H = 00:19:58.6, M = 2.6

KSP Δ = 69.5km
Pg iZ 00 20 10.0 D
Sg eE 20 18.9

RAC Δ = 211.6km
P eZ 00 20 33.9
S eNE 20 59.1

OJC Δ = 293.5km
Pg eZ 00 20 47.5
Sg eN 21 23.1

NIE Δ = 374.6km
P eZ 00 20 59.9
S eE 21 45.6

FEB 10

φ = 51.524°N, λ = 16.108°E
H = 02:28:38.0, M = 2.5

KSP Δ = 77.1km
Pg iZ 02 28 50.6 D
Sg eE 28 59.9

OJC Δ = 298.3km
Pg eZ 02 29 28.1
Sg eN 30 02.9

NIE Δ = 380.3km
P eZ 02 29 41.3
S eE 30 25.7

FEB 10

φ = 51.55°N, λ = 16.05°E
H = 16:58:35, M = 2.8

KSP Δ = 81km
Pg eZ 16 58 48.3
Sg eE 58 58.1

RAC Δ = 223km
P eZ 16 59 12.1
S eNE 59 38.1

OJC Δ = 303km
Pg eZ 16 59 25.3
Sg eE 17 00 01.4

NIE Δ = 385km
P eZ 16 59 39.4
S eE 17 00 25.8

FEB 13

φ = 51.448°N, λ = 16.175°E
H = 19:55:27.5, M = 2.7

KSP Δ = 68.0km
Pg iZ 19 55 38.7 D
Sg eE 55 47.1

OJC Δ = 290.3km
Pg eZ 19 56 17.6
Sg eE 56 51.4

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FEB 16

φ = 51.452°N, λ = 16.171°E
H = 19:21:47.2, M = 2.5

KSP Δ = 68.5km
Pg iZ 19 21 58.4 C
Sg eE 22 06.6

FEB 18

φ = 51.44°N, λ = 16.12°E
H = 04:15:23, M = 2.6

KSP Δ = 68km
Pg iZ 04 15 34.4 D
Sg eE 15 41.5

RAC Δ = 211km
P eZ 04 15 58.5
S eNE 16 23.7

OJC Δ = 293km
Pg eZ 04 16 13.1
Sg eN 16 47.4

NIE Δ = 374km
P eZ 04 16 27.0
S eE 17 12.7

FEB 21

φ = 51.524°N, λ = 16.107°E
H = 02:20:19.4, M = 3.2

KSP Δ = 77.1km
Pg iZ 02 20 32.0 D
Sg eE 20 41.6

RAC Δ = 218.1km
Pn eZ 02 20 51.5
Pg eZ 20 55.3
S eNE 21 21.4

GKP Δ = 209.5km
P eZ 02 20 58.4
S eE 21 21.8

OJC Δ = 298.3km
P eZ 02 21 09.7
S eE 21 44.4

NIE Δ = 380.3km
P eZ 02 21 22.6
S eE 22 08.8

FEB 21

φ = 51.525°N, λ = 16.110°E
H = 02:22:53.9, M = 2.8

KSP Δ = 77.2km
Pg iZ 02 23 06.6 D
Sg eE 23 16.2

RAC Δ = 218.0km
P eZ 02 23 30.3
S eNE 23 55.4

OJC Δ = 298.2km
P eZ 02 23 44.1
S eN 24 19.4

NIE Δ = 380.2km
P eZ 02 23 55.7
S eE 24 43.1

FEB 23

φ = 51.447°N, λ = 16.173°E
H = 22:37:26.0, M = 3.1

KSP Δ = 67.9km
Pg iZ 22 37 37.1 D
Sg eE 37 44.9

RAC Δ = 208.7km
Pn eZ 22 37 56.7
eZ 38 00.8
S eNE 38 24.5

GKP Δ = 215.9km
P eZ 22 38 06.9
S eE 38 36.4

OJC Δ = 290.3km
Pn eZ 22 38 06.2
Pg eZ 38 14.0
Sg eE 38 48.4

NIE Δ = 371.6km
Pn eZ 22 38 18.3
eZ 38 28.1
S eE 39 12.5

KWP Δ = 506.4km
Pn eZ 22 38 34.5
S eNE 39 56.1

SUW Δ = 554.0km
Pn eZ 22 38 40.2

Lubin Copper Basin 2006

FEB 26

φ = 51.516°N, λ = 16.116°E
H = 03:08:00.1, M = 2.7

KSP Δ = 76.1km
Pg iZ 03 08 12.6 D
Sg eE 08 21.2

RAC Δ = 217.0km
P eZ 03 08 37.1
S eN 09 02.2

GKP Δ = 210.1km
(Pn) eZ 03 08 38.5
S eE 09 04.6

OJC Δ = 297.4km
Pg eZ 03 08 49.2
Sg eN 09 24.6

NIE Δ = 379.3km
P eZ 03 09 03.7
S eE 09 49.3

FEB 27

φ = 51.532°N, λ = 16.099°E
H = 16:47:06.2, M = 2.8

KSP Δ = 78.1km
Pg iZ 16 47 19.0 D
Sg eE 47 28.3

GKP Δ = 208.8km
P eZ 16 47 45.0
S eE 48 07.4

OJC Δ = 299.2km
Pg eZ 16 47 56.2
Sg eN 48 31.3

NIE Δ = 381.3km
P eZ 16 48 10.1
S eN 48 55.3

FEB 27

φ = 51.471°N, λ = 16.106°E
H = 21:34:26.6, M = 2.5

KSP Δ = 71.3km
Pg iZ 21 34 38.3 D
Sg eE 34 46.8

OJC Δ = 295.7km
Pg eZ 21 35 16.8
Sg eN 35 52.6

MAR 1

φ = 51.535°N, λ = 16.062°E
H = 12:31:30.7, M = 2.7

KSP Δ = 78.9km
Pg eZ 12 31 43.6
Sg iE 31 53.0

OJC Δ = 301.7km
Pg eZ 12 32 21.7
Sg eN 32 56.9

MAR 1

φ = 51.524°N, λ = 16.108°E
H = 13:03:52.2, M = 3.0

KSP Δ = 77.1km
Pg eZ 13 04 04.8
Sg eE 04 13.9

RAC Δ = 218.1km
P eZ 13 04 30.1
S eNE 04 54.1

GKP Δ = 209.4km
Pg eZ 13 04 32.4
S eE 04 53.8

OJC Δ = 298.3km
Pg eZ 13 04 41.9
Sg eN 05 17.1

NIE Δ = 380.3km
P eZ 13 04 56.0
S eN 05 40.8

MAR 3

φ = 51.448°N, λ = 16.191°E
H = 19:44:08.8, M = 2.7

KSP Δ = 67.9km
Pg iZ 19 44 19.9 D
Sg eE 44 28.1

OJC Δ = 289.3km
Pn eZ 19 44 49.2
Pg eZ 44 56.7
Sg eE 45 31.6

NIE Δ = 370.6km
P eZ 19 45 08.3
S eN 45 53.5

Lubin Copper Basin 2006

MAR 6

φ = 51.47°N, λ = 16.11°E
H = 16:57:36, M = 3.0

KSP	Δ = 71km		
	Pg iZ	16 57 48.1	D
	Sg iE	57 56.7	
RAC	Δ = 214km		
	P eZ	16 58 12.1	
	S eNE	58 36.3	
OJC	Δ = 295km		
	Pg eZ	16 58 26.9	
	Sg eN	59 01.3	
NIE	Δ = 377km		
	P eZ	16 58 39.3	
	S eN	59 26.1	

MAR 7

φ = 51.555°N, λ = 16.100°E
H = 06:07:49.1, M = 2.6

KSP	Δ = 80.6km		
	Pg iZ	06 08 02.3	D
	Sg eE	08 11.9	
OJC	Δ = 300.4km		
	Pg eZ	06 08 38.0	
	Sg eN	09 14.3	
NIE	Δ = 382.8km		
	P eZ	06 08 52.5	
	S eE	09 38.9	

MAR 9

φ = 51.536°N, λ = 16.058°E
H = 11:26:17.7, M = 2.8

KSP	Δ = 79.0km		
	Pg eZ	11 26 30.7	
	Sg eE	26 40.2	
OJC	Δ = 302.0km		
	Pg eZ	11 27 08.4	
	Sg eN	27 44.2	
NIE	Δ = 383.9km		
	P eZ	11 27 21.9	
	S eE	28 07.9	

MAR 13

φ = 51.583°N, λ = 15.991°E
H = 04:01:40.8, M = 2.5

KSP	Δ = 85.2km		
	Pg iZ	04 01 54.8	D
	Sg eE	02 05.0	
OJC	Δ = 308.6km		
	Pg eZ	04 02 32.0	
	Sg eEN	03 08.2	
NIE	Δ = 390.7km		
	P eZ	04 02 45.7	
	S eN	03 31.5	

MAR 14

φ = 51.500°N, λ = 16.139°E
H = 04:30:42.0, M = 3.5

KSP	Δ = 74.1km		
	Pg iZ	04 30 54.1	D
	Sg eE	31 03.2	
RAC	Δ = 214.6km		
	Pn eZ	04 31 13.3	
	Pg eZ	31 17.7	
	S eNE	31 43.5	
GKP	Δ = 211.2km		
	Pn eZ	04 31 14.8	
	Pg eZ	31 19.1	
	S eNE	31 43.4	
OJC	Δ = 295.1km		
	Pn eZ	04 31 22.8	
	Pg eZ	31 30.3	
	Sn eN	31 55.4	
	Sg eN	32 05.5	
NIE	Δ = 377.0km		
	Pn eZ	04 31 34.8	
	eZ	31 44.8	
	S eEN	32 28.7	
KWP	Δ = 510.8km		
	Pn eZ	04 31 50.5	
	Pg eZ	32 05.5	
	S eNE	33 16.5	
SUW	Δ = 552.7km		
	Pn eZ	04 31 56.1	
	S eNE	33 28.7	

Lubin Copper Basin 2006

MAR 14

φ = 51.47°N, λ = 16.11°E
H = 17:06:39, M = 2.5

KSP Δ = 71km
Pg iZ 17 06 50.9 D
Sg eE 06 59.4

OJC Δ = 295km
Pg eZ 17 07 29.4
Sg eN 08 05.2

MAR 15

φ = 51.515°N, λ = 16.112°E
H = 00:27:16.4, M = 2.5

KSP Δ = 76.0km
Pg iZ 00 27 28.9 D
Sg eE 27 37.8

RAC Δ = 217.2km
P eZ 00 27 53.3
S eNE 28 18.3

GKP Δ = 210.3km
P eZ 00 27 55.4

OJC Δ = 297.6km
Pg eZ 00 28 05.8
Sg eN 28 41.2

NIE Δ = 379.5km
P eZ 00 28 19.6
S eE 29 05.9

MAR 15

φ = 51.524°N, λ = 16.108°E
H = 02:47:26.6, M = 2.4

KSP Δ = 77.1km
Pg eZ 02 47 39.2
Sg eE 47 48.4

OJC Δ = 298.3km
Pg eZ 02 48 16.8
Sg eN 48 51.8

MAR 15

φ = 51.486°N, λ= 16.100°E
H = 17:02:18.2, M = 2.7

KSP Δ = 73.0km
Pg iZ 17 02 30.2 D
Sg eE 02 38.9

RAC Δ = 215.4km
P eZ 17 02 54.4
S eNE 03 20.4

OJC Δ = 296.8km
Pg eZ 17 03 07.9
Sg eE 03 43.1

NIE Δ = 378.2km
P eZ 17 03 21.4
S eE 04 06.6

MAR 16

φ = 51.480°N, λ = 16.037°E
H = 17:08:53.3, M = 2.8

KSP Δ = 73.3km
Pg iZ 17 09 05.3 D
Sg eE 09 14.0

RAC Δ = 218.0km
P eZ 17 09 28.8
S eNE 09 54.8

OJC Δ = 300.5km
Pg eZ 17 09 44.6
Sg eE 10 20.2

NIE Δ = 381.4km
P eZ 17 09 56.5
S eE 10 42.1

MAR 20

φ = 51.510°N, λ = 16.058°E
H = 20:35:47.9, M = 3.3

KSP Δ = 76.2km
Pg iZ 20 36 00.4 D
Sg eE 36 09.5

RAC Δ = 219.3km
Pn eZ 20 36 19.9
eZ 36 23.6
S eNE 36 50.8

GKP Δ = 212.2km
Pn eZ 20 36 20.9
S eE 36 52.9

OJC Δ = 300.6km
Pn eZ 20 36 29.3
Pg eZ 36 37.9
Sn eE 37 02.2
Sg eN 37 13.7

NIE Δ = 382.3km
Pn eZ 20 36 40.3
iZ 36 51.7
Sn eE 37 18.4
eN 37 37.7

KWP Δ = 516.4km
Pn eZ 20 36 57.4
S eNE 38 17.5

MAR 24

φ = 51.483°N, λ = 16.098°E
H = 10:14:24.6, M = 2.7

KSP Δ = 72.7km
Pg eZ 10 14 36.5
Sg eE 14 45.4

OJC Δ = 296.8km
Pg eZ 10 15 14.5
Sg eN 15 49.5

NIE Δ = 378.1km
P eZ 10 15 28.1
S eN 16 13.7

MAR 26

φ = 51.533°N, λ = 16.093°E
H = 07:45:19.8, M = 2.3

KSP Δ = 78.2km
Pg eZ 07 45 32.6
Sg eE 45 41.9

MAR 27

φ = 51.469°N, λ = 16.106°E
H = 22:37:25.1, M = 2.5

KSP Δ = 71.1km
Pg eZ 22 37 36.8
Sg eE 37 44.7

MAR 28

φ = 51.484°N, λ = 16.095°E
H = 16:45:53.4, M = 2.7

KSP Δ = 72.8km
Pg iZ 16 46 05.4 D
Sg eE 46 14.0

RAC Δ = 215.5km
P eZ 16 46 29.2
S eNE 46 56.2

OJC Δ = 297.0km
Pn eNZ 16 46 34.6
Pg eZ 46 42.9
Sg eN 47 18.6

MAR 30

φ = 51.485°N, λ = 16.095°E
H = 19:35:31.0, M = 2.7

KSP Δ = 73.0km
Pg iZ 19 35 43.0 D
Sg eE 35 51.9

RAC Δ = 215.6km
P eZ 19 36 07.3
S eNE 36 32.5

OJC Δ = 297.1km
Pg eZ 19 36 20.8
Sg eN 36 55.9

NIE Δ = 378.4km
P eZ 19 36 33.5
S eN 37 18.2

APR 1

φ = 51.534°N, λ = 16.057°E
H = 11:27:33.2, M = 2.9

KSP Δ = 78.9km
Pg iZ 11 27 46.1 D
Sg iE 27 55.5

RAC Δ = 221.3km
P eZ 11 28 09.7
S eNE 28 36.6

OJC Δ = 301.9km
Pg eZ 11 28 23.2
Sg eE 28 58.6

APR 4

φ = 51.534°N, λ= 16.063°E
H = 03:58:46.7, M = 2.5

KSP Δ = 78.8km
Pg eZ 03 58 59.6
Sg eE 59 09.0

OJC Δ = 301.6km
Pg eZ 03 59 38.2
Sg eN 04 00 12.9

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APR 5

φ = 51.469°N, λ = 16.107°E
H = 03:04:38.6, M = 2.4

KSP Δ = 71.1km
Pg iZ 03 04 50.3 D
Sg eE 04 58.8

APR 5

φ = 51.534°N, λ = 16.144°E
H = 20:19:39.7, M = 2.6

KSP Δ = 77.8km
Pg eZ 20 19 52.4
Sg eE 20 01.8

OJC Δ = 296.6km
Pg eZ 20 20 29.6
Sg eN 21 05.1

APR 7

φ = 51.484°N, λ = 16.094°E
H = 04:55:17.5, M = 2.5

KSP Δ = 72.9km
Pg eZ 04 55 29.5
Sg eE 55 37.8

OJC Δ = 297.1km
Pg eZ 04 56 07.2
Sg eN 56 43.3

APR 7

φ = 51.449°N, λ = 16.173°E
H = 13:44:05.6, M = 2.7

KSP Δ = 68.1km
Pg iZ 13 44 16.8 D
Sg eE 44 25.0

OJC Δ = 290.4km
Pg eZ 13 44 53.7
Sg eN 45 29.0

APR 8

φ = 51.517°N, λ = 16.115°E
H = 06:42:05.6, M = 3.0

KSP Δ = 76.2km
Pg iZ 06 42 18.1 D
Sg eE 42 27.0

RAC Δ = 217.2km
P eZ 06 42 41.7
S eNE 43 07.4

OJC Δ = 297.5km
Pn eZ 06 42 48.0
Pg eZ 42 55.6
Sg eEN 43 30.4

NIE Δ = 379.4km
P eZ 06 43 08.8
S eE 43 54.1

KWP Δ = 513.0km
P eZ 06 43 29.3
S eNE 44 36.8

APR 9

φ = 51.539°N, λ = 16.017°E
H = 04:56:35.9, M = 2.7

KSP Δ = 80.0km
Pg iZ 04 56 49.0 D
Sg eE 56 58.6

RAC Δ = 223.7km
P eZ 04 57 13.0
S eNE 57 39.3

OJC Δ = 304.7km
Pn eZ 04 57 17.6
Pg eZ 57 26.5
Sn eN 57 51.0
Sg eN 58 02.4

NIE Δ = 386.4km
P eZ 04 57 40.2
S eE 58 25.1

APR 11

φ = 51.484°N, λ = 16.097°E
H = 05:19:14.7, M = 2.8

KSP Δ = 72.8km
Pg iZ 05 19 26.6 D
Sg eE 19 35.1

OJC Δ = 296.9km
Pg eZ 05 20 04.4
Sg eE 20 39.4

NIE Δ = 378.3km
P eZ 05 20 17.9
S eE 21 02.3

KWP Δ = 512.8km
P eZ 05 20 38.4

Lubin Copper Basin 2006

APR 13

φ = 51.448°N, λ = 16.172°E
H = 01:29:56.3, M = 2.5

KSP Δ = 68.0km
Pg eZ 01 30 07.5
Sg eE 30 15.7

OJC Δ = 290.4km
Pg eZ 01 30 44.7
Sg eN 31 19.9

APR 13

φ = 51.582°N, λ = 15.991°E
H = 21:42:39.3, M = 2.9

KSP Δ = 85.1km
Pg iZ 21 42 53.3 D
Sg iE 43 03.2

RAC Δ = 228.4km
P eZ 21 43 17.3
S eNE 43 43.1

OJC Δ = 308.5km
Pg eZ 21 43 30.8
Sg eN 44 05.9

NIE Δ = 390.7km
P eZ 21 43 44.2
S eN 44 30.1

APR 23

φ = 51.447°N, λ = 16.191°E
H = 03:37:27.3, M = 2.5

KSP Δ = 67.8km
Pg iZ 03 37 38.4 D
Sg eE 37 46.2

APR 23

φ = 51.485°N, λ = 16.094°E
H = 11:01:56.4, M = 2.6

KSP Δ = 73.0km
Pg eZ 11 02 08.4
Sg eE 02 17.0

OJC Δ = 297.2km
Pg eZ 11 02 46.0
Sg eN 03 21.6

APR 23

φ = 51.503°N, λ = 16.035°E
H = 13:01:19.7, M = 2.5

KSP Δ = 75.8km
Pg iZ 13 01 32.1 D
Sg eE 01 41.2

OJC Δ = 301.7km
Pg eZ 13 02 09.9
Sg eN 02 45.5

APR 24

φ = 51.554°N, λ = 16.099°E
H = 09:11:50.1, M = 2.6

KSP Δ = 80.5km
Pg eZ 09 12 03.3
Sg eE 12 12.2

OJC Δ = 300.4km
Pg eZ 09 12 39.8
Sg eE 13 15.6

APR 27

φ = 51.448°N, λ = 16.174°E
H = 03:44:46.3, M = 2.8

KSP Δ = 68.0km
Pg iN 03 44 57.5 D
Sg eE 45 04.5

OJC Δ = 290.3km
Pg eZ 03 45 34.6
Sg eE 46 08.8

NIE Δ = 371.6km
P eZ 03 45 48.4
S eN 46 34.3

KWP Δ = 506.4km
P eZ 03 46 09.5
S eN 47 18.5

MAY 3

φ = 51.450°N, λ = 16.174°E
H = 03:46:15.4, M = 2.5

KSP Δ = 68.2km
Pg eN 03 46 26.6
Sg iE 46 35.2

OJC Δ = 290.4km
Pg eZ 03 47 04.7
Sg eN 47 38.4

Lubin Copper Basin 2006

MAY 5

φ = 51.448°N, λ = 16.174°E
H = 03:40:41.7, M = 2.9

KSP Δ = 68.0km
Pg iZ 03 40 52.9 D
Sg eE 41 01.0

OJC Δ = 290.3km
Pg eZ 03 41 29.5
Sg eE 42 04.2

NIE Δ = 371.6km
P eZ 03 41 45.4
S eN 42 28.9

MAY 8

φ = 51.493°N, λ = 16.061°E
H = 14:58:39.1, M = 2.6

KSP Δ = 74.3km
Pg iZ 14 58 51.3 D
Sg eE 58 58.9

OJC Δ = 299.6km
Pg eZ 14 59 29.3
Sg eN 15 00 05.3

MAY 11

φ= 51.47°N, λ= 16.11°E
H = 16:03:41, M = 3.1

KSP Δ = 71km
Pg iZ 16 03 52.7 D
Sg eE 04 01.0

RAC Δ = 214km
P eZ 16 04 16.5
S eNE 04 40.3

OJC Δ = 295km
Pn eZ 16 04 21.9
Pg eZ 04 31.2
Sn eN 04 52.6
Sg eN 05 05.7

NIE Δ = 377km
P eZ 16 04 44.7
S eE 05 28.2

MAY 13

φ = 51.535°N, λ = 16.065°E
H = 12:35:53.2, M = 2.5

KSP Δ = 78.9km
Pg eZ 12 36 06.1
Sg eE 36 15.5

OJC Δ = 301.5km
Pg eZ 12 36 44.0
Sg eN 37 19.4

MAY 13

φ = 51.477°N, λ = 16.104°E
H = 16:07:07.1, M = 3.3

KSP Δ = 72.0km
Pg iZ 16 07 18.9 D
Sg eE 07 27.6

RAC Δ = 214.5km
P eZ 16 07 42.1
S eNE 08 07.1

OJC Δ = 296.1km
Pn eZ 16 07 48.0
Pg eZ 07 56.7
Sn eE 08 19.0
Sg eE 08 32.0

NIE Δ = 377.4km
P eZ 16 08 10.3
S eE 08 54.6

KWP Δ = 512.1km
P eZ 16 08 17.4
eZ 08 30.9

MAY 17

φ = 51.535°N, λ = 16.062°E
H = 04:40:26.0, M = 3.3

KSP Δ = 78.9km
Pg iZ 04 40 38.9 D
Sg iE 40 48.3

RAC Δ = 221.2km
P eZ 04 41 01.8
S eN 41 28.7

GKP Δ = 209.5km
Pn eZ 04 40 59.0
Pg eZ 41 05.1
S eE 41 28.2

OJC Δ = 301.7km
Pn eZ 04 41 07.3
Pg eZ 41 16.5
Sg eE 41 51.6

NIE Δ = 383.6km
Pn eZ 04 41 19.5
eZ 41 29.8
S eE 42 15.9

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KWP Δ = 517.2km
Pn eZ 04 41 34.0
eZ 41 50.4
S eE 43 03.4

MAY 21

φ = 51.504°N, λ = 16.091°E
H = 10:58:03.1, M = 4.1

KSP Δ = 75.1km
Pg iZ 10 58 15.4 D
Sg iE 58 24.3

RAC Δ = 217.3km
Pn eZ 10 58 35.2
eZ 58 39.2
Sn eE 58 59.1
eNE 59 05.5

GKP Δ = 212.0km
Pn eZ 10 58 36.0
Pg eZ 58 42.5
S eE 59 05.6

OJC Δ = 298.3km
Pn iZ 10 58 44.1 D
Pg iZ 58 52.7
Sn iN 59 16.9
Sg iN 59 28.1

NIE Δ = 379.9km
Pn eZ 10 58 56.3
eZ 59 06.5
S eN 59 50.8

KWP Δ = 514.0km
Pn eZ 10 59 13.0
eZ 59 27.1

SUW Δ = 555.2km
Pn eZ 10 59 17.5

MAY 23

φ = 51.448°N, λ = 16.174°E
H = 11:55:21.8, M = 2.9

KSP Δ = 68.0km
Pg iZ 11 55 33.0 D
Sg eE 55 40.8

OJC Δ = 290.3km
Pg eZ 11 56 11.4
Sg eE 56 45.6

NIE Δ = 371.6km
P eZ 11 56 25.6
S eE 57 08.6

MAY 23

φ = 51.446°N, λ = 16.172°E
H = 21:07:09.4, M = 2.8

KSP Δ = 67.8km
Pg iZ 21 07 20.5 D
Sg eE 07 28.7

RAC Δ = 208.7km
P eZ 21 07 44.1
S eNE 08 09.4

OJC Δ = 290.3km
Pg eZ 21 07 58.8
Sg eN 08 32.5

NIE Δ = 371.5km
P eZ 21 08 11.7
S eN 08 55.8

MAY 26

φ= 51.47°N, λ= 16.11°E
H = 16:29:37, M = 2.6

KSP Δ = 71km
Pg iZ 16 29 49.1 D
Sg iE 29 57.6

OJC Δ = 295km
Pg eZ 16 30 27.7
Sg eE 31 02.8

MAY 27

φ = 51.45°N, λ = 16.10°E
H = 16:13:40, M = 2.7

KSP Δ = 69km
Pg eZ 16 13 51.9
Sg eE 13 59.4

RAC Δ = 212km
P eZ 16 14 15.1
S eNE 14 39.8

OJC Δ = 295km
Pn eZ 16 14 21.1
Pg eZ 14 30.2
Sg eN 15 04.6

NIE Δ = 376km
P eZ 16 14 43.1
S eE 15 26.5

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JUN 2

φ = 51.445°N, λ = 16.172°E
H = 14:21:36.2, M = 2.5

```
KSP  Δ = 67.7km
      Pg iZ        14 21 47.3 D
      Sg eE           21 55.2

OJC  Δ = 290.3km
      Pg eZ        14 22 25.7
      Sg eN           22 59.7
```

JUN 4

φ = 51.445°N, λ = 16.170°E
H = 01:14:19.2, M = 2.3

```
KSP  Δ = 67.7km
      Pg iZ        01 14 30.3 D
      Sg eE           14 38.3
```

JUN 4

φ = 51.444°N, λ = 16.186°E
H = 03:11:12.2, M = 2.5

```
KSP  Δ = 67.5km
      Pg iZ        03 11 23.3 D
      Sg eE           11 31.8
```

JUN 8

φ = 51.539°N, λ = 16.019°E
H = 18:43:57.9, M = 2.6

```
KSP  Δ = 80.0km
      Pg eZ        18 44 11.0
      Sg eE           44 20.8

OJC  Δ = 304.5km
      Pg eZ        18 44 48.6
      Sg eE           45 24.6
```

JUN 10

φ = 51.537°N, λ = 16.031°E
H = 12:19:05.5, M = 2.9

```
KSP  Δ = 79.6km
      Pg eZ        12 19 18.5
      Sg iE           19 28.1

RAC  Δ = 222.8km
      P  eZ        12 19 43.0
      S  eNE          20 10.0

OJC  Δ = 303.7km
      Pg eZ        12 19 56.0
      Sg eE           20 32.4

NIE  Δ = 385.5km
      P eZ         12 20 09.9
      S eE            20 55.7
```

JUN 10

φ = 51.503°N, λ = 16.138°E
H = 23:55:57.1, M = 3.6

```
KSP  Δ = 74.4km
      Pg iZ        23 56 09.3 D
      Sg eE           56 18.5

RAC  Δ = 214.9km
      Pn eZ        23 56 28.7
         eZ           56 32.4
      S  eNE          56 58.7

GKP  Δ = 210.9km
      Pn eZ        23 56 29.9
      Pg eZ           56 33.9
      S  eE           56 58.8

OJC  Δ = 295.3km
      Pn eZ        23 56 37.7
      Pg eZ           56 45.7
      Sn eN           57 09.2
      Sg eN           57 21.2

NIE  Δ = 377.2km
      Pn eZ        23 56 49.7
         eZ           57 00.1
      S  eN           57 44.3

KWP  Δ = 511.0km
      Pn eZ        23 57 05.7
         eZ           57 20.6

SUW  Δ = 552.5km
      Pn eZ        23 57 11.1
      Sn eNE          58 07.1
```

JUN 11

φ = 51.485°N, λ = 16.095°E
H = 21:56:55.1, M = 3.1

```
KSP  Δ = 73.0km
      Pg iZ        21 57 07.1 D
      Sg eE           57 16.2

RAC  Δ = 215.6km
      Pn eZ        21 57 27.2
         eZ           57 30.9
      S  eNE          57 56.6
```

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GKP Δ = 213.8km
Pn eZ 21 57 29.0
S eE 57 58.8

OJC Δ = 297.1km
Pg eZ 21 57 44.6
Sg eN 58 19.9

NIE Δ = 378.4km
P eZ 21 57 58.3
S eE 58 42.9

KWP Δ = 513.0km
P eZ 21 58 19.1

JUN 17

φ = 51.454°N, λ = 16.083°E
H = 17:52:17.9, M = 2.4

KSP Δ = 69.7km
Pg iZ 17 52 29.3 D
Sg iE 52 37.8

OJC Δ = 296.3km
Pg eZ 17 53 07.5
Sg eN 53 44.0

JUN 20

φ = 51.470°N, λ = 16.105°E
H = 15:59:32.5, M = 2.7

KSP Δ = 71.2km
Pg iZ 15 59 44.2 D
Sg iE 59 52.6

OJC Δ = 295.7km
Pg eZ 16 00 22.9
Sg eE 00 57.7

JUN 22

φ = 51.535°N, λ = 16.063°E
H = 21:26:02.0, M = 2.7

KSP Δ = 78.9km
Pg eZ 21 26 14.9
Sg eE 26 24.3

OJC Δ = 301.6km
Pg eZ 21 26 52.6
Sg eN 27 28.0

NIE Δ = 383.5km
P eZ 21 27 06.1
S eN 27 51.4

JUN 24

φ = 51.535°N, λ = 16.091°E
H = 14:52:39.9, M = 2.6

KSP Δ = 78.5km
Pg eZ 14 52 52.8
Sg eE 53 02.2

OJC Δ = 299.9km
Pg eZ 14 53 30.4
Sg eE 54 05.7

JUN 24

φ = 51.502°N, λ = 16.091°E
H = 15:39:49.9, M = 2.9

KSP Δ = 74.9km
Pg iZ 15 40 02.2 D
Sg eE 40 11.2

RAC Δ = 217.1km
P eZ 15 40 25.8
S eNE 40 50.2

OJC Δ = 298.2km
Pg eZ 15 40 39.5
Sg eN 41 14.9

NIE Δ = 379.8km
P eZ 15 40 53.3
S eN 41 38.3

JUL 3

φ = 51.511°N, λ = 16.109°E
H = 03:31:51.1, M = 2.6

KSP Δ = 75.7km
Pg eZ 03 32 03.5
Sg eE 32 12.6

OJC Δ = 297.6km
Pg eZ 03 32 40.4
Sg eN 33 16.3

JUL 4

φ = 51.503°N, λ = 16.090°E
H = 16:09:02.7, M = 3.3

KSP Δ = 75.0km
Pg iZ 16 09 15.0 D
Sg eE 09 24.1

RAC Δ = 217.2km
P eZ 16 09 38.0
S eNE 10 03.8

```
OJC  Δ  = 298.3km
      Pn eZ        16 09 43.6
      Pg iZ           09 52.4
      Sg iE           10 28.3

NIE  Δ  = 379.9km
      Pn eZ        16 09 56.0
         eZ           10 05.9
      Sg eN           10 51.1

KWP  Δ  = 514.1km
      P  eZ        16 10 26.6
      S  eNE          11 32.2
```

JUL 7

φ = 51.472°N, λ = 16.109°E
H = 03:58:44.0, M = 2.7

```
KSP  Δ  = 71.4km
      Pg iZ        03 58 55.7 D
      Sg eE           59 04.3

OJC  Δ  = 295.6km
      Pn eZ        03 59 24.9
      Pg eZ           59 33.1
      Sg eN        04 00 09.0

NIE  Δ  = 376.8km
      P  eZ        03 59 45.5
      S  eE        04 00 30.2
```

JUL 9

φ = 51.485°N, λ = 16.095°E
H = 11:16:45.2, M = 3.0

```
KSP  Δ  = 73.0km
      Pg iZ        11 16 57.2 D
      Sg eE           17 05.7

RAC  Δ  = 215.6km
      P  eZ        11 17 21.5
      S  eNE          17 46.4

GKP  Δ  = 213.8km
      P  eZ        11 17 26.2

OJC  Δ  = 297.1km
      Pn eZ        11 17 26.2
      Pg eZ           17 34.8
      Sn eN           17 56.1
      Sg eN           18 10.0

NIE  Δ  = 378.4km
      P  eZ        11 17 48.2
      S  eE           18 32.8

KWP  Δ  = 513.0km
      P  eZ        11 18 09.0
```

JUL 11

φ = 51.448°N, λ = 16.175°E
H = 13:24:44.1, M = 2.9

```
KSP  Δ  = 68.0km
      Pg iZ        13 24 55.2 D
      Sg eE           25 02.1

RAC  Δ  = 208.7km
      P  eZ        13 25 18.5
      S  eNE          25 44.4

OJC  Δ  = 290.3km
      Pn eZ        13 25 24.0
      Pg eZ           25 32.2
      Sg eE           26 06.5

NIE  Δ  = 371.5km
      P  eZ        13 25 46.1
      S  eE           26 30.8

KWP  Δ  = 506.3km
      P  eZ        13 26 06.9
      S  eNE          27 16.3
```

JUL 13

φ = 51.454°N, λ = 16.096°E
H = 06:49:16.3, M = 2.9

```
KSP  Δ  = 69.6km
      Pg eZ        06 49 27.7
      Sg eE           49 35.4

OJC  Δ  = 295.5km
      Pn eZ        06 49 59.0
      Pg eZ           50 07.2
      Sn eE           50 27.0
      Sg eN           50 41.5

NIE  Δ  = 376.4km
      P  eZ        06 50 18.2
      S  eE           51 03.8
```

JUL 13

φ = 51.479°N, λ = 16.116°E
H = 22:20:37.0, M = 2.9

```
KSP  Δ  = 72.0km
      Pg iZ        22 20 48.8 D
      Sg eE           20 57.3
```

RAC Δ = 214.1km
P eZ 22 21 12.6
S eNE 21 37.8

GKP Δ = 213.9km
P eZ 22 21 18.0
S eE 21 40.6

OJC Δ = 295.5km
Pg eZ 22 21 27.4
Sg eE 22 02.1

NIE Δ = 376.9km
P eZ 22 21 39.9
S eE 22 24.4

KWP Δ = 511.4km
P eZ 22 22 00.7

JUL 14

φ = 51.47°N, λ = 16.10°E
H = 15:56:18, M = 3.7

KSP Δ = 71km
Pg iZ 15 56 29.8 D
Sg eE 56 38.7

RAC Δ = 214km
Pn eZ 15 56 49.7
Sn eNE 57 13.0

GKP Δ = 215km
Pn eZ 15 56 51.8
S eE 57 20.7

OJC Δ = 296km
Pn eZ 15 56 59.0
Pg iZ 57 07.7
Sg eN 57 42.7

NIE Δ = 377km
P eZ 15 57 19.8
S eE 58 05.3

KWP Δ = 512km
Pn eZ 15 57 28.3

JUL 14

φ = 51.472°N, λ = 16.107°E
H = 16:39:10.7, M = 2.6

KSP Δ = 71.4km
Pg iZ 16 39 22.4 D
Sg iE 39 30.9

OJC Δ = 295.7km
Pg eZ 16 40 01.0
Sg eN 40 35.4

NIE Δ = 376.9km
P eZ 16 40 12.5
S eN 40 57.1

JUL 15

φ = 51.404°N, λ = 16.208°E
H = 06:42:05.7, M = 2.9

KSP Δ = 62.9km
Pg iZ 06 42 16.0 D
Sg eE 42 23.4

OJC Δ = 286.0km
Pg eZ 06 42 53.5
Sg eN 43 28.1

JUL 16

φ = 51.469°N, λ = 16.107°E
H = 10:22:50.6, M = 3.0

KSP Δ = 71.1km
Pg iZ 10 23 02.2 D
Sg iE 23 10.9

RAC Δ = 213.7km
P eZ 10 23 25.8
S eNE 23 52.1

OJC Δ = 295.5km
Pg eZ 10 23 40.2
Sg eN 24 15.0

NIE Δ = 376.7km
P eZ 10 23 53.8
S eN 24 37.6

JUL 17

φ = 51.453°N, λ = 16.081°E
H = 11:56:32.1, M = 2.6

KSP Δ = 69.7km
Pg iZ 11 56 43.5 D
Sg eE 56 52.0

OJC Δ = 296.4km
Pg eZ 11 57 21.5
Sg eN 57 56.3

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JUL 17

φ = 51.475°N, λ = 16.105°E
H = 23:36:40.5, M = 3.2

KSP Δ = 71.7km
Pg iZ 23 36 52.3 D
Sg eE 37 00.9

RAC Δ = 214.3km
P eZ 23 37 15.6
S eNE 37 40.1

GKP Δ = 214.6km
P eZ 23 37 17.4
S eE 37 43.6

OJC Δ = 296.0km
Pn eZ 23 37 21.5
Pg eZ 37 30.7
Sn eE 37 52.2
Sg eN 38 05.5

NIE Δ = 377.2km
P eZ 23 37 43.6
S eN 38 28.1

KWP Δ = 512.0km
Pn eZ 23 37 48.8

JUL 22

φ = 51.449°N, λ = 16.174°E
H = 09:38:02.9, M = 2.7

KSP Δ = 68.1km
Pg eZ 09 38 14.1
Sg eE 38 22.2

OJC Δ = 290.4km
Pg eZ 09 38 51.1
Sg eE 39 25.6

JUL 22

φ = 51.539°N, λ = 16.019°E
H = 12:55:03.7, M = 2.5

KSP Δ = 80.0km
Pg iZ 12 55 16.8
Sg eE 55 26.5

OJC Δ = 304.5km
Pg eZ 12 55 54.3
Sg eE 56 30.5

JUL 25

φ = 51.486°N, λ = 16.094°E
H = 14:30:14.5, M = 2.7

KSP Δ = 73.1km
Pg iZ 14 30 26.5 D
Sg eE 30 35.5

OJC Δ = 297.2km
Pg eZ 14 31 04.3
Sg eN 31 39.4

JUL 26

φ = 51.448°N, λ = 16.175°E
H = 03:57:26.8, M = 2.8

KSP Δ = 68.0km
Pg iZ 03 57 37.9 D
Sg eE 57 46.1

OJC Δ = 290.3km
Pg eZ 03 58 15.0
Sg eE 58 49.2

NIE Δ = 371.5km
P eZ 03 58 30.5
S eN 59 13.8

JUL 28

φ = 51.490°N, λ = 16.055°E
H = 15:43:56.3, M = 3.5

KSP Δ = 74.1km
Pg iZ 15 44 08.4 D
Sg iE 44 17.6

RAC Δ = 217.9km
Pn eZ 15 44 27.9
Pg eZ 44 31.8
Sg eNE 44 57.4

GKP Δ = 214.3km
Pn eZ 15 44 29.7
Pg eZ 44 33.0
S eE 44 56.9

OJC Δ = 299.8km
Pn eZ 15 44 37.5
Pg eZ 44 46.1
Sn eE 45 08.7
Sg eE 45 21.3

NIE Δ = 381.0km
P eZ 15 44 59.5
S eN 45 44.5

```
KWP  Δ  = 515.8km
      Pn eZ        15 45 05.2
         eZ           45 23.7
```

JUL 29

φ = 51.478°N, λ = 16.105°E
H = 07:33:12.4, M = 3.2

```
KSP  Δ  = 72.1km
      Pg eZ        07 33 24.2
      Sg eE           33 33.0

RAC  Δ  = 214.5km
      P  eZ        07 33 47.9
      S  eNE          34 13.7

GKP  Δ  = 214.3km
      Pn eZ        07 33 45.9
      Pg eZ           33 49.1
      S  eE           34 14.9

OJC  Δ  = 296.1km
      Pn eZ        07 33 52.9
      Pg eZ           34 02.2
      Sn eE           34 24.0
      Sg eN           34 37.2

NIE  Δ  = 377.4km
      P  eZ        07 34 16.3
      S  eN           35 01.5
```

JUL 29

φ = 51.516°N, λ = 16.115°E
H = 15:37:06.2, M = 3.1

```
KSP  Δ  = 76.1km
      Pg iZ        15 37 18.7 D
      Sg eE           37 27.7

RAC  Δ  = 217.1km
      P  eZ        15 37 42.4
      S  eNE          38 07.9

GKP  Δ  = 210.1km
      P  eZ        15 37 46.6
      S  eE           38 11.5

OJC  Δ  = 297.4km
      Pg eZ        15 37 56.2
      Sg eE           38 30.9
```

AUG 1

φ = 51.504°N, λ = 16.089°E
H = 15:50:13.1, M = 3.3

```
KSP  Δ  = 75.1km
      Pg iZ        15 50 25.4 D
      Sg eE           50 34.4

RAC  Δ  = 217.4km
      P  eZ        15 50 49.2
      S  eNE          51 15.4

GKP  Δ  = 212.0km
      P  eZ        15 50 53.8
      S  eE           51 18.8

OJC  Δ  = 298.4km
      Pn eZ        15 50 52.9
      Pg eZ           51 02.7
      Sg eN           51 37.1

NIE  Δ  = 380.0km
      Pn eZ        15 51 06.4
         eZ           51 16.3
      S  eN           52 01.5
```

AUG 2

φ = 51.448°N, λ = 16.175°E
H = 21:33:51.6, M = 3.1

```
KSP  Δ  = 68.0km
      Pg iZ        21 34 02.8 D
      Sg eE           34 11.1

RAC  Δ  = 208.7km
      P  eZ        21 34 26.8
      S  eNE          34 52.0

GKP  Δ  = 215.8km
      Pn eZ        21 34 25.3
      Pg eZ           34 32.4
      S  eE           34 53.5

OJC  Δ  = 290.2km
      Pn eZ        21 34 32.2
      Pg eZ           34 40.0
      Sg eE           35 14.2

NIE  Δ  = 371.5km
      P  eZ        21 34 53.6
      S  eNE          35 37.7

KWP  Δ  = 506.3km
      Pn eZ        21 34 59.9
         eZ           35 13.9
      S  eNE          36 23.6
```

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AUG 3

φ = 51.473°N, λ = 16.140°E
H = 03:44:43.2, M = 3.5

KSP	Δ = 71.1km		
	Pg	eZ	03 44 54.9
	Sg	eE	45 03.1
GKP	Δ = 214.0km		
	Pn	eZ	03 45 17.0
	Sg	eE	45 46.2
RAC	Δ = 212.4km		
	P	eZ	03 45 19.2
	S	eNE	45 44.7
OJC	Δ = 293.7km		
	Pn	eZ	03 45 24.0
	Pg	eZ	45 33.1
	Sg	eE	46 07.5
NIE	Δ = 375.1km		
	Pn	eZ	03 45 36.7
		eZ	45 46.5
	S	eE	46 31.0
KWP	Δ = 509.6km		
	Pn	eZ	03 45 52.6
		eZ	46 11.9
	S	eNE	47 14.3
SUW	Δ = 554.3km		
	Pn	eZ	03 45 57.8
		eZ	46 16.7
	S	eNE	46 50.8

AUG 3

φ = 51.536°N, λ = 16.063°E
H = 16:39:57.3, M = 2.9

KSP	Δ = 79.0km		
	Pg	eZ	16 40 10.2
	Sg	eE	40 19.4
RAC	Δ = 221.2km		
	P	eZ	16 40 34.7
	S	eNE	41 00.1
OJC	Δ = 301.7km		
	Pn	eZ	16 40 38.8
	Pg	eZ	40 47.7
	Sg	eZN	41 23.7
NIE	Δ = 383.6km		
	P	eZ	16 41 01.3
	S	eN	41 47.0

AUG 3

φ = 51.445°N, λ = 16.132°E
H = 18:30:21.3, M = 2.7

KSP	Δ = 68.1km		
	Pg	iZ	18 30 32.5 D
	Sg	eN	30 40.1
RAC	Δ = 210.6km		
	P	eZ	18 30 57.6
	S	eNE	31 23.3
OJC	Δ = 292.8km		
	Pg	eZ	18 31 09.3
	Sg	eE	31 44.3

AUG 4

φ = 51.443°N, λ = 16.131°E
H = 16:19:14.6, M = 2.7

KSP	Δ = 67.9km		
	Pg	iZ	16 19 25.7 D
	Sg	eE	19 33.4
OJC	Δ = 292.7km		
	Pg	eZ	16 20 02.5
	Sg	eE	20 37.6

AUG 5

φ = 51.534°N, λ = 16.056°E
H = 01:38:21.6, M = 3.0

KSP	Δ = 78.9km		
	Pg	iZ	01 38 34.5 D
	Sg	eE	38 43.8
RAC	Δ = 221.4km		
	P	eZ	01 38 58.3
	S	eNE	39 24.1
GKP	Δ = 209.7km		
	P	eZ	01 39 00.3
	S	eE	39 23.5
OJC	Δ = 302.0km		
	Pn	eZ	01 39 03.1
	Pg	eZ	39 11.5
	Sg	eE	39 47.2
NIE	Δ = 383.9km		
	P	eZ	01 39 25.8
	S	eN	40 11.0
KWP	Δ = 517.5km		
	P	eZ	01 39 50.6
	S	eNE	40 55.0

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AUG 5

φ = 51.484°N, λ = 16.094°E
H = 15:40:33.1, M = 2.6

KSP Δ = 72.9km
Pg iZ 15 40 45.0 D
Sg eE 40 53.7

RAC Δ = 215.5km
P eZ 15 41 09.1
S eNE 41 36.6

OJC Δ = 297.1km
Pg eZ 15 41 22.8
Sg eE 41 58.1

AUG 12

φ = 51.535°N, λ = 16.063°E
H = 04:26:30.4, M = 2.6

KSP Δ = 78.9km
Pg eZ 04 26 43.3
Sg eE 26 52.7

OJC Δ = 301.6km
Pg eZ 04 27 21.3
Sg eE 27 57.0

AUG 18

φ = 51.492°N, λ = 16.094°E
H = 17:45:08.3, M = 3.5

KSP Δ = 73.7km
Pg iZ 17 45 20.4 D
Sg eE 45 29.3

RAC Δ = 216.2km
P eZ 17 45 44.4
S eNE 46 09.8

GKP Δ = 213.1km
P eZ 17 45 49.2
S eE 46 10.4
Sg eE 46 13.6

OJC Δ = 297.5km
Pn eZ 17 45 49.6
Pg eZ 45 57.7
Sg eE 46 33.4

NIE Δ = 379.0km
Pn eZ 17 46 01.7
eZ 46 11.6
S eE 46 56.0

KWP Δ = 513.4km
Pn eZ 17 46 17.4
eZ 46 32.2
S eE 47 44.7

AUG 18

φ = 51.474°N, λ = 16.138°E
H = 23:09:16.2, M = 2.7

KSP Δ = 71.2km
Pg iZ 23 09 27.9 D
Sg eE 09 35.4

RAC Δ = 212.6km
P eZ 23 09 50.9
S eNE 10 17.3

OJC Δ = 293.9km
Pg eZ 23 10 05.0
Sg eE 10 40.5

NIE Δ = 375.3km
P eZ 23 10 18.8
S eNE 11 04.3

AUG 22

φ = 51.47°N, λ = 16.10°E
H = 16:05:17, M = 2.6

KSP Δ = 71km
Pg iZ 16 05 28.5 D
Sg eE 05 37.2

AUG 24

φ = 51.515°N, λ = 16.109°E
H = 05:17:29.5, M = 2.5

KSP Δ = 76.1km
Pg eZ 05 17 42.0
Sg eE 17 51.2

OJC Δ = 297.8km
Pg eZ 05 18 19.7
Sg eN 18 54.3

AUG 25

φ = 51.448°N, λ = 16.191°E
H = 18:27:28.4, M = 2.7

KSP Δ = 67.9km
Pg eZ 18 27 39.5
Sg eE 27 47.8

OJC Δ = 289.3km
Pg eZ 18 28 16.3
Sg eN 28 51.3

AUG 26

φ = 51.502°N, λ = 16.089°E
H = 16:14:33.4, M = 3.4

KSP Δ = 74.9km
Pg iZ 16 14 45.7 D
Sg eE 14 54.5

RAC Δ = 217.2km
Pn eZ 16 15 05.4
eZ 15 08.9
S eNE 15 34.5

GKP Δ = 212.2km
Pn eZ 16 15 06.7
Pg eZ 15 12.2
S eE 15 35.8

OJC Δ = 298.3km
Pn eZ 16 15 14.4
Pg eZ 15 22.8
Sg eN 15 57.4

NIE Δ = 379.9km
Pn eZ 16 15 26.5
eZ 15 35.4
S eE 16 19.1

KWP Δ = 514.1km
Pn eZ 16 15 42.4
eZ 15 57.4
S eNE 17 03.1

AUG 30

φ = 51.485°N, λ = 16.094°E
H = 16:04:53.2, M = 2.5

KSP Δ = 73.0km
Pg iZ 16 05 05.2 D
Sg eE 05 13.9

OJC Δ = 297.2km
Pg eZ 16 05 42.9
Sg eE 06 18.4

AUG 31

φ = 51.480°N, λ = 16.121°E
H = 11:44:23.9, M = 3.5

KSP Δ = 72.1km
Pg eZ 11 44 35.7
Sg eE 44 44.4

GKP Δ = 213.7km
Pn eZ 11 44 57.5
Pg eZ 45 05.1
S eE 45 27.1

RAC Δ = 213.9km
P eZ 11 44 59.9
S eNE 45 25.1

OJC Δ = 295.2km
Pn eZ 11 45 05.1
Pg eZ 45 13.6
Sg eN 45 48.9

NIE Δ = 376.6km
P eZ 11 45 27.8
S eNE 46 12.1

KWP Δ = 511.1km
P eZ 11 45 47.6
S eNE 46 54.2

SEP 1

φ = 51.485°N, λ = 16.095°E
H = 06:41:10.8, M = 2.7

KSP Δ = 73.0km
Pg iZ 06 41 22.8 D
Sg eE 41 31.5

OJC Δ = 297.1km
Pg eZ 06 42 00.6
Sg eN 42 36.7

NIE Δ = 378.4km
P eZ 06 42 13.9
S eE 42 59.3

SEP 1

φ = 51.540°N, λ = 16.059°E
H = 14:04:24.4, M = 2.6

KSP Δ = 79.5km
Pg eZ 14 04 37.4
Sg eE 04 46.8

OJC Δ = 302.1km
Pg eZ 14 05 14.9
Sg eNZ 05 50.8

SEP 1

φ = 51.480°N, λ = 16.116°E
H = 17:42:57.5, M = 2.5

KSP Δ = 72.1km
Pg iZ 17 43 09.3 D
Sg eE 43 17.8

OJC Δ = 295.5km
Pg eZ 17 43 45.9
Sg eN 44 20.5

SEP 4

φ = 51.487°N, λ = 16.095°E
H = 16:11:26.1, M = 2.7

KSP Δ = 73.2km
Pg iZ 16 11 38.1 D
Sg eE 11 47.4

OJC Δ = 297.2km
Pg eZ 16 12 16.4
Sg eN 12 52.1

SEP 5

φ = 51.445°N, λ = 16.173°E
H = 16:31:01.4, M = 2.6

KSP Δ = 67.7km
Pg iZ 16 31 12.5 D
Sg eE 31 20.2

OJC Δ = 290.2km
Pg eZ 16 31 50.3
Sg eN 32 24.7

SEP 7

φ = 51.444°N, λ = 16.121°E
H = 03:43:42.3, M = 2.8

KSP Δ = 68.1km
Pg iZ 03 43 53.5 D
Sg eN 44 00.8

RAC Δ = 211.0km
P eZ 03 44 17.3
S eNE 44 41.5

OJC Δ = 293.4km
Pn eZ 03 44 23.5
Pg eZ 44 32.2
Sg eN 45 06.5

NIE Δ = 374.3km
P eZ 03 44 40.7
S eE 45 25.8

SEP 8

φ = 51.444°N, λ = 16.193°E
H = 11:21:00.2, M = 2.5

KSP Δ = 67.4km
Pg eZ 11 21 11.2
Sg eE 21 18.8

OJC Δ = 288.9km
Pg eZ 11 21 49.7
Sg eE 22 24.1

SEP 11

φ = 51.442°N, λ = 16.130°E
H = 08:25:24.9, M = 3.0

KSP Δ = 67.8km
Pg iZ 08 25 36.0 D
Sg eE 25 43.8

OJC Δ = 292.8km
Pg eZ 08 26 13.7
Sg eN 26 48.4

NIE Δ = 373.7km
P eZ 08 26 28.6
S eN 27 13.6

SEP 11

φ = 51.515°N, λ = 16.113°E
H = 09:43:10.0, M = 3.2

KSP Δ = 76.0km
Pg iZ 09 43 22.5 D
Sg eE 43 32.0

RAC Δ = 217.1km
P eZ 09 43 44.2
S eNE 44 10.7

OJC Δ = 297.5km
Pn eZ 09 43 50.9
Pg eZ 43 59.4
Sg eE 44 34.5

NIE Δ = 379.4km
P eZ 09 44 13.5
S eE 44 57.1

KWP Δ = 513.1km
P eZ 09 44 33.9

SEP 12

φ = 51.443°N, λ = 16.129°E
H = 21:18:01.7, M = 3.4

KSP Δ = 67.9km
Pg iZ 21 18 12.8 D
Sg iE 18 20.6

RAC Δ = 210.6km
Pn eZ 21 18 33.4
eZ 18 36.8
S eNE 19 02.2

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```
GKP  Δ  = 217.4km
      Pn eZ        21 18 35.7
      S  eE           19 06.4

OJC  Δ  = 292.9km
      Pn eZ        21 18 42.3
      Pg iZ           18 50.6
      Sg eN           19 25.0

NIE  Δ  = 373.8km
      Pn eZ        21 18 54.2
         eZ           19 04.2
      S  eN           19 49.1

KWP  Δ  = 509.1km
      Pn eZ        21 19 10.4
         eZ           19 24.6
      S  eNE          20 32.7

SUW  Δ  = 556.8km
      Pn eZ        21 19 16.4
```

SEP 13

φ = 51.516°N, λ = 16.116°E
H = 04:16:33.0, M = 3.1

```
KSP  Δ  = 76.1km
      Pg iZ        04 16 45.5 D
      Sg iE           16 54.5

RAC  Δ  = 217.0km
      Pn eZ        04 17 04.6
         eZ           17 08.3
      S  eNE          17 34.9

OJC  Δ  = 297.4km
      Pg eZ        04 17 23.0
      Sg eE           17 57.8

NIE  Δ  = 379.3km
      P  eZ        04 17 35.1
      S  eN           18 19.4
```

SEP 14

φ = 51.456°N, λ = 16.102°E
H = 09:03:49.0, M = 2.9

```
KSP  Δ  = 69.7km
      Pg iZ        09 04 00.4 D
      Sg eE           04 08.8

OJC  Δ  = 295.2km
      Pg eZ        09 04 38.7
      Sg eN           05 13.5

NIE  Δ  = 376.2km
      P  eZ        09 04 51.3
      S  eN           05 36.1
```

SEP 25

φ = 51.537°N, λ = 16.061°E
H = 16:00:46.7, M = 3.4

```
KSP  Δ  = 79.1km
      Pg iZ        16 00 59.7 D
      Sg iE           01 09.2

RAC  Δ  = 221.4km
      Pn eZ        16 01 19.4
         eZ           01 23.2
      S  eNE          01 49.4

GKP  Δ  = 209.3km
      P  eZ        16 01 25.7
      S  eE           01 48.5

OJC  Δ  = 301.8km
      Pn eZ        16 01 28.2
      Pg eZ           01 36.2
      Sg eE           02 12.5

NIE  Δ  = 383.8km
      P  eZ        16 01 50.8
      S  eE           02 36.8

KWP  Δ  = 517.3km
      Pn eZ        16 02 11.3
      Sg eNE          03 24.3
```

SEP 25

φ = 51.450°N, λ = 16.175°E
H = 16:44:59.3, M = 3.2

```
KSP  Δ  = 68.2km
      Pg iZ        16 45 10.5 D
      Sg eE           45 18.4

RAC  Δ  = 208.9km
      P  eZ        16 45 35.9
      S  eNE          46 01.4
GKP  Δ  = 215.6km
      P  eZ        16 45 42.1
      Sn eE           46 04.6

OJC  Δ  = 290.3km
      Pg eZ        16 45 48.6
      Sg eE           46 23.1

NIE  Δ  = 371.6km
      P  eZ        16 46 03.4
      S  eN           46 48.0

KWP  Δ  = 506.4km
      P  eZ        16 46 23.8
      S  eNE          47 33.2
```

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SEP 25

φ = 51.446°N, λ = 16.172°E
H = 17:01:02.5, M = 2.5

```
KSP  Δ = 67.8km
      Pg iZ        17 01 13.6 D
      Sg eE           01 21.3

OJC  Δ = 290.3km
      Pg eZ        17 01 50.6
      Sg eN           02 25.3
```

SEP 25

φ = 51.537°N, λ = 16.058°E
H = 17:15:04.1, M = 2.7

```
KSP  Δ = 79.2km
      Pg iZ        17 15 17.1 D
      Sg iE           15 26.6

OJC  Δ = 302.0km
      Pg eZ        17 15 54.8
      Sg eE           16 30.5
```

SEP 27

φ = 51.451°N, λ = 16.173°E
H = 23:09:56.2, M = 2.6

```
KSP  Δ = 68.4km
      Pg eZ        23 10 07.4
      Sg eE           10 15.6

OJC  Δ = 290.5km
      Pg eZ        23 10 44.9
      Sg eN           11 19.3
```

SEP 28

φ= 51.44°N, λ= 16.13°E
H = 19:38:49, M = 2.7

```
KSP  Δ = 68km
      Pg iZ        19 39 00.5 D
      Sg eE           39 07.9

OJC  Δ = 293km
      Pn eZ        19 39 31.5
      Pg eZ           39 38.4
      Sg eE           40 12.3

NIE  Δ = 373km
      P  eZ        19 39 50.3
      S  eE           40 34.4
```

OCT 3

φ = 51.539°N, λ = 16.020°E
H = 02:28:22.5, M = 2.6

```
KSP  Δ = 80.0km
      Pg iZ        02 28 35.6 D
      Sg eE           28 45.3

GKP  Δ = 210.2km
      P  eZ        02 29 03.3

OJC  Δ = 304.5km
      Pn eZ        02 29 04.4
      Pg eZ           29 13.2
      Sg eEN          29 49.1

NIE  Δ = 386.2km
      P  eZ        02 29 26.8
      S  eE           30 11.8
```

OCT 3

φ = 51.447°N, λ = 16.164°E
H = 06:26:08.5, M = 2.7

```
KSP  Δ = 68.0km
      Pg iZ        06 26 19.6 D
      Sg eE           26 27.6

OJC  Δ = 290.9km
      Pg eZ        06 26 57.4
      Sg eN           27 31.6
```

OCT 3

φ = 51.487°N, λ = 16.099°E
H = 16:08:35.0, M = 2.7

```
KSP  Δ = 73.1km
      Pg eZ        16 08 47.0
      Sg eE           08 55.7

OJC  Δ = 296.9km
      Pg eZ        16 09 25.1
      Sg eE           10 00.1

NIE  Δ = 378.4km
      P  eZ        16 09 38.1
      S  eE           10 22.5
```

OCT 7

φ = 51.503°N, λ = 16.091°E
H = 15:41:28.2, M = 2.6

```
KSP  Δ = 75.0km
      Pg iZ        15 41 40.5 D
      Sg eE           41 49.6
```

```
OJC  Δ  = 298.2km
      Pg eZ        15 42 17.8
      Sg eN           42 52.1

NIE  Δ  = 379.9km
      P  eZ        15 42 31.8
      S  eE           43 17.6
```

OCT 8

φ = 51.516°N, λ = 16.109°E
H = 02:52:41.1, M = 2.7

```
KSP  Δ  = 76.2km
      Pg eZ        02 52 53.6
      Sg eE           53 02.8

RAC  Δ  = 217.4km
      P  eZ        02 53 16.9
      S  eNE          53 42.9

OJC  Δ  = 297.8km
      Pg eZ        02 53 30.4
      Sg eN           54 05.9

NIE  Δ  = 379.7km
      P  eZ        02 53 45.3
      S  eE           54 30.8
```

OCT 8

φ = 51.450°N, λ = 16.176°E
H = 14:51:18.7, M = 3.0

```
KSP  Δ  = 68.2km
      Pg iZ        14 51 29.9 C
      Sg eE           51 37.8

RAC  Δ  = 208.8km
      P  eZ        14 51 53.5
      S  eNE          52 18.1

GKP  Δ  = 215.6km
      P  eZ        14 51 56.2
      S  eE           52 26.0

OJC  Δ  = 290.3km
      Pg eZ        14 52 07.0
      Sg eE           52 41.0

NIE  Δ  = 371.6km
      P  eZ        14 52 22.5
      S  eN           53 05.6
```

OCT 10

φ = 51.491°N, λ = 16.087°E
H = 03:47:32.6, M = 3.0

```
KSP  Δ  = 73.7km
      Pg iZ        03 47 44.7 D
      Sg eE           47 53.6

RAC  Δ  = 216.4km
      P  eZ        03 48 08.6
      S  eNE          48 34.4

OJC  Δ  = 297.9km
      Pg eZ        03 48 22.3
      Sg eN           48 57.4

NIE  Δ  = 379.3km
      P  eZ        03 48 35.9
      S  eN           49 22.1

KWP  Δ  = 513.8km
      P  eZ        03 48 56.7
      S  eNE          50 09.4
```

OCT 11

φ = 51.469°N, λ = 16.106°E
H = 08:28:33.4, M = 2.5

```
KSP  Δ  = 71.1km
      Pg iZ        08 28 45.1 D
      Sg iE           28 53.6
```

OCT 12

φ = 51.582°N, λ = 15.994°E
H = 04:28:37.0, M = 3.0

```
KSP  Δ  = 85.1km
      Pg eZ        04 28 50.9
      Sg eE           29 01.1

GKP  Δ  = 206.5km
      P  eZ        04 29 15.4
      S  eE           29 38.0

OJC  Δ  = 308.3km
      Pn eZ        04 29 20.3
      Pg eZ           29 28.5
      Sn eN           29 51.5
      Sg eN           30 04.3

NIE  Δ  = 390.5km
      P  eZ        04 29 41.8
      S  eE           30 27.6

KWP  Δ  = 523.5km
      P  eZ        04 30 02.3
      S  eNE          31 16.4
```

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OCT 12

φ = 51.47°N, λ = 16.11°E
H = 15:55:51, M = 2.9

KSP Δ = 71km
Pg iZ 15 56 03.2
Sg eE 56 11.7

OJC Δ = 295km
Pn eZ 15 56 34.0
Pg eZ 56 42.1
Sg eE 57 16.9

NIE Δ = 377km
P eZ 15 56 54.5
S eE 57 40.5

OCT 13

φ = 51.47°N, λ = 16.11°E
H = 15:55:22, M = 3.0

KSP Δ = 71km
Pg eZ 15 55 33.6
Sg eE 55 42.2

OJC Δ = 295km
Pg eZ 15 56 11.2
Sg eN 56 46.5

NIE Δ = 377km
P eZ 15 56 24.9
S eE 57 09.2

OCT 14

φ = 51.457°N, λ = 16.100°E
H = 07:41:08.0, M = 3.6

KSP Δ = 69.9km
Pg iZ 07 41 19.4 D
Sg eE 41 27.2

RAC Δ = 213.1km
P eZ 07 41 43.5
S eNE 42 08.5

GKP Δ = 216.6km
Pn eZ 07 41 42.0
S eNE 42 11.8

OJC Δ = 295.4km
Pn eZ 07 41 48.9
Pg eZ 41 57.8
Sn eE 42 19.6
Sg eE 42 33.0

NIE Δ = 376.3km
P eZ 07 42 10.7
S eE 42 54.4

OCT 16

φ = 51.536°N, λ = 16.032°E
H = 21:38:11.9, M = 2.4

KSP Δ = 79.4km
Pg eZ 21 38 24.9
Sg eE 38 34.3

OJC Δ = 303.6km
Pg eZ 21 39 04.2
Sg eE 39 39.0

OCT 18

φ = 51.514°N, λ = 16.110°E
H = 15:42:56.7, M = 2.5

KSP Δ = 75.9km
Pg eZ 15 43 09.1
Sg eE 43 18.5

OJC Δ = 297.6km
Pg eZ 15 43 46.8
Sg eN 44 21.7

OCT 23

φ = 51.54°N, λ = 16.03°E
H = 08:23:48, M = 2.7

KSP Δ = 80km
Pg eZ 08 24 01.5
Sg eE 24 10.9

OJC Δ = 304km
Pg eZ 08 24 39.3
Sg eN 25 14.9

OCT 26

φ = 51.451°N, λ = 16.175°E
H = 03:46:33.6, M = 2.5

KSP Δ = 68.3km
Pg iZ 03 46 44.8 C
Sg eE 46 53.1

OJC Δ = 290.4km
Pg eZ 03 47 22.0
Sg eN 47 56.4

OCT 29

φ = 51.456°N, λ = 16.081°E
H = 21:12:56.2, M = 2.6

KSP Δ = 70.0km
Pg iZ 21 13 07.7 D
Sg eE 13 16.2

OJC Δ = 296.5km
Pg eZ 21 13 44.6
Sg eN 14 20.5

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OCT 31

φ = 51.445°N, λ = 16.173°E
H = 03:09:40.8, M = 3.3

KSP Δ = 67.7km
Pg iZ 03 09 51.9 D
Sg eE 10 00.0

RAC Δ = 208.6km
Pn eZ 03 10 11.8
P eZ 10 15.5
S eNE 10 38.3

GKP Δ = 216.2km
Pn eZ 03 10 14.1
S eNE 10 45.3

OJC Δ = 290.2km
Pn eZ 03 10 20.9
Pg eZ 10 29.6
Sg eN 11 04.4

NIE Δ = 371.4km
P eZ 03 10 44.5
S eN 11 27.8

KWP Δ = 506.3km
Pn eZ 03 10 49.2
Sn eNE 11 48.9

NOV 1

φ = 51.40°N, λ = 16.18°E
H = 12:32:09, M = 2.7

KSP Δ = 63km
Pg iZ 12 32 19.2 D
Sg eE 32 26.5

OJC Δ = 288km
Pg eZ 12 32 57.4
Sg eE 33 32.2

NOV 3

φ = 51.457°N, λ = 16.082°E
H = 07:37:11.0, M = 3.1

KSP Δ = 70.1km
Pg iZ 07 37 22.5 D
Sg eE 37 30.2

RAC Δ = 214.0km
P eZ 07 37 46.8
S eNE 38 10.3

OJC Δ = 296.5km
Pn eZ 07 37 52.0
Pg eZ 38 00.6
Sg eN 38 35.4

NIE Δ = 377.4km
P eZ 07 38 13.6
S eE 38 58.5

NOV 4

φ = 51.527°N, λ = 16.073°E
H = 12:58:05.5, M = 2.9

KSP Δ = 77.9km
Pg iZ 12 58 18.3 D
Sg eE 58 27.5

RAC Δ = 220.0km
P eZ 12 58 42.3
S eNE 59 07.6

OJC Δ = 300.6km
Pg eZ 12 58 55.9
Sg eN 59 31.1

NIE Δ = 382.4km
P eZ 12 59 09.5
S eE 59 53.9

NOV 4

φ = 51.47°N, λ = 16.09°E
H = 17:09:31, M = 2.8

KSP Δ = 71km
Pg iZ 17 09 43.0 D
Sg eE 09 51.9

RAC Δ = 215km
P eZ 17 10 06.9
S eNE 10 31.3

NOV 4

φ = 51.485°N, λ = 16.101°E
H = 17:10:02.9, M = 2.8

KSP Δ = 72.9km
Pg eZ 17 10 14.8
Sg eE 10 23.6

OJC Δ = 296.7km
Pg eZ 17 10 52.4
Sg eE 11 27.8

NOV 6

φ = 51.527°N, λ = 16.077°E
H = 18:32:41.9, M = 2.9

KSP Δ = 77.8km
Pg iZ 18 32 54.7 D
Sg eE 33 03.7

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RAC Δ = 219.8km
P eZ 18 33 17.8
S eNE 33 44.4

OJC Δ = 300.4km
Pg eZ 18 33 31.7
Sg eN 34 07.3

NIE Δ = 382.2km
P eZ 18 33 45.6
S eE 34 30.3

NOV 8

φ = 51.48°N, λ = 16.04°E
H = 16:51:58, M = 2.6

KSP Δ = 73km
Pg iZ 16 52 10.0 D
Sg eE 52 18.6

OJC Δ = 300km
Pg eZ 16 52 49.3
Sg eN 53 24.3

NOV 10

φ = 51.456°N, λ = 16.080°E
H = 09:40:37.6, M = 2.5

KSP Δ = 70.0km
Pg eZ 09 40 49.1
Sg eE 40 57.7

NOV 14

φ = 51.478°N, λ = 16.104°E
H = 02:06:17.9, M = 2.4

KSP Δ = 72.1km
Pg iZ 02 06 29.7 D
Sg eE 06 37.9

OJC Δ = 296.2km
Pg eZ 02 07 08.1
Sg eN 07 43.7

NOV 14

φ = 51.444°N, λ = 16.173°E
H = 05:01:27.1, M = 2.7

KSP Δ = 67.6km
Pg iZ 05 01 38.2 D
Sg eE 01 46.4

OJC Δ = 290.2km
Pg eZ 05 02 14.3
Sg eN 02 49.3

NOV 18

φ = 51.539°N, λ = 16.021°E
H = 00:08:40.7, M = 2.6

KSP Δ = 80.0km
Pg eZ 00 08 53.8
Sg eE 09 03.6

OJC Δ = 304.4km
Pg eZ 00 09 31.8
Sg eE 10 07.4

NIE Δ = 386.1km
P eZ 00 09 45.0
S eE 10 30.5

NOV 19

φ = 51.460°N, λ = 16.082°E
H = 06:45:29.6, M = 2.8

KSP Δ = 70.4km
Pg eZ 06 45 41.1
Sg eE 45 49.6

RAC Δ = 214.2km
P eZ 06 46 05.0
S eNE 46 30.2

OJC Δ = 296.7km
Pg eZ 06 46 18.1
Sg eN 46 54.0

NIE Δ = 377.6km
P eZ 06 46 31.7
S eE 47 16.4

NOV 20

φ = 51.448°N, λ = 16.191°E
H = 15:00:33.3, M = 2.6

KSP Δ = 67.9km
Pg eZ 15 00 44.4
Sg eE 00 52.6

OJC Δ = 289.3km
Pg eZ 15 01 22.5
Sg eNE 01 57.6

NOV 22

φ = 51.488°N, λ = 16.088°E
H = 17:11:00.1, M = 2.5

KSP Δ = 73.4km
Pg iZ 17 11 12.1 D
Sg eE 11 20.8

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OJC Δ = 297.7km
Pg eZ 17 11 49.8
Sg eN 12 25.0

NOV 24

φ = 51.46°N, λ = 16.08°E
H = 01:56:43, M = 2.8

RAC Δ = 214km
P eZ 01 57 16.6
S eNE 57 40.8

OJC Δ = 297km
Pn eZ 01 57 22.6
Pg eZ 57 30.0
Sg eN 58 06.0

NIE Δ = 378km
P eZ 01 57 44.1
S eN 58 29.3

NOV 30

φ = 51.552°N, λ = 16.101°E
H = 11:12:34.3, M = 3.0

KSP Δ = 80.2km
Pg iZ 11 12 47.5 D
Sg eE 12 56.9

RAC Δ = 220.7km
P eZ 11 13 11.4
S eNE 13 36.3

GKP Δ = 206.7km
P eZ 11 13 12.8
S eNE 13 35.2

OJC Δ = 300.2km
Pg eZ 11 13 24.0
Sg eEN 13 59.8

NIE Δ = 382.5km
P eZ 11 13 37.7
S eE 14 22.5

DEC 1

φ = 51.451°N, λ = 16.174°E
H = 19:19:59.1, M = 2.6

KSP Δ = 68.3km
Pg eZ 19 20 10.3
Sg eE 20 18.8

DEC 1

φ = 51.443°N, λ = 16.187°E
H = 23:03:06.4, M = 2.6

KSP Δ = 67.4km
Pg iZ 23 03 17.4 D
Sg eE 03 25.3

OJC Δ = 289.3km
Pg eZ 23 03 53.4
Sg eE 04 28.4

NIE Δ = 370.5km
P eZ 23 04 08.3
S eN 04 53.0

DEC 2

φ = 51.516°N, λ = 16.115°E
H = 13:32:26.6, M = 3.1

KSP Δ = 76.1km
Pg iZ 13 32 39.1 D
Sg eE 32 48.6

RAC Δ = 217.1km
P eZ 13 33 02.8
S eNE 33 29.2

GKP Δ = 210.1km
P eZ 13 33 05.7
S eE 33 28.8

OJC Δ = 297.4km
Pg eZ 13 33 16.7
Sg eN 33 52.2

NIE Δ = 379.4km
P eZ 13 33 29.3
S eE 34 13.8

KWP Δ = 513.0km
P eZ 13 33 50.1
S eNE 35 00.0

DEC 6

φ = 51.445°N, λ = 16.168°E
H = 07:18:33.7, M = 2.9

KSP Δ = 67.7km
Pg iZ 07 18 44.8 D
Sg eE 18 52.1

OJC Δ = 290.5km
Pg eZ 07 19 22.4
Sg eN 19 57.5

```
NIE  Δ  = 371.7km
      P  eZ        07 19 37.7
      S  eN           20 21.8
```

DEC 9

φ = 51.473°N, λ = 16.139°E
H = 20:11:11.5, M = 3.3

```
KSP  Δ  = 71.1km
      Pg iZ        20 11 23.2 D
      Sg eE           11 30.7

RAC  Δ  = 212.5km
      Pn eZ        20 11 43.2
         eZ           11 46.4
      S  eEN          12 11.6

GKP  Δ  = 214.0km
      Pn eZ        20 11 45.1
         eZ           11 52.6
      Sg eE           12 15.2

OJC  Δ  = 293.7km
      Pn eZ        20 11 52.0
      Pg eZ           12 00.4
      Sn eN           12 24.3
      Sg eE           12 35.7

NIE  Δ  = 375.2km
      Pn eZ        20 12 04.4
         eZ           12 14.2
      S  eN           12 59.0

KWP  Δ  = 509.7km
      Pn eZ        20 12 20.1
         eZ           12 35.2
      S  eNE          13 45.4
SUW  Δ  = 554.3km
      Pn eZ        20 12 25.9
         eZ           12 51.0
      S  eNE          13 46.9
```

DEC 12

φ = 51.514°N, λ = 16.112°E
H = 16:44:40.9, M = 3.2

```
KSP  Δ  = 75.9km
      Pg iZ        16 44 53.4 D
      Sg eE           45 02.4

RAC  Δ  = 217.1km
      P  eZ        16 45 17.0
      Sg eNE          45 41.7

GKP  Δ  = 210.4km
      Pg eZ        16 45 19.6
      S  eNE          45 49.0

OJC  Δ  = 297.5km
      Pg eZ        16 45 31.2
      Sg eE           46 05.7

NIE  Δ  = 379.4km
      P  eZ        16 45 44.2
      S  eE           46 30.2
```

DEC 14

φ = 51.501°N, λ = 16.032°E
H = 12:21:24.2, M = 2.6

```
KSP  Δ  = 75.7km
      Pg eZ        12 21 36.6
      Sg eE           21 45.6
```

DEC 15

φ = 51.477°N, λ = 16.105°E
H = 16:47:17.9, M = 2.5

```
KSP  Δ  = 72.0km
      Pg eZ        16 47 29.7
      Sg eE           47 38.0
```

DEC 15

φ= 51.54°N, λ= 16.06°E
H = 16:48:00, M = 3.3

```
KSP  Δ  = 79km
      Pg iZ        16 48 13.2 D
      Sg eE           48 22.7

RAC  Δ  = 222km
      P  eZ        16 48 37.2
      S  eNE          49 02.1
GKP  Δ  = 209km
      P  eZ        16 48 39.3
      S  eNE          49 01.6

OJC  Δ  = 302km
      Pn eZ        16 48 43.1
      Pg eZ           48 50.9
      Sn eE           49 12.8
      Sg eE           49 25.9

NIE  Δ  = 384km
      P  eZ        16 49 04.4
      S  eE           49 50.4

KWP  Δ  = 517km
      P  eZ        16 49 24.9
```

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DEC 16

φ = 51.510°N, λ = 16.059°E
H = 04:54:44.9, M = 2.7

KSP Δ = 76.2km
Pg iZ 04 54 57.4 D
Sg eE 55 05.9

OJC Δ = 300.6km
Pg eZ 04 55 34.9
Sg eN 56 10.5

NIE Δ = 382.1km
P eZ 04 55 48.5
S eN 56 31.6

DEC 16

φ = 51.501°N, λ = 16.088°E
H = 05:00:50.7, M = 2.6

KSP Δ = 74.8km
Pg iZ 05 01 03.0 D
Sg eE 01 11.9

OJC Δ = 298.3km
Pg eZ 05 01 41.1
Sg eN 02 16.7

NIE Δ = 379.9km
P eZ 05 01 53.0
S eE 02 37.8

DEC 20

φ = 51.47°N, λ = 16.14°E
H = 05:03:40, M = 2.7

KSP Δ = 71km
Pg iZ 05 03 51.8 D
Sg eE 03 59.3

GKP Δ = 214km
P eZ 05 04 21.4

OJC Δ = 293km
Pg eZ 05 04 29.3
Sg eE 05 04.2

KWP Δ = 509km
P eZ 05 05 03.6
S eNE 06 22.5

DEC 20

φ = 51.467°N, λ = 16.139°E
H = 05:18:20.4, M = 2.6

KSP Δ = 70.5km
Pg eZ 05 18 32.0
Sg eE 18 40.5

OJC Δ = 293.5km
Pn eZ 05 19 01.1
Pg eZ 19 10.2
Sg eNZ 19 45.2

DEC 22

φ = 51.537°N, λ = 16.031°E
H = 04:52:30.6, M = 2.8

KSP Δ = 79.6km
Pg iZ 04 52 43.6 D
Sg iE 52 53.1

GKP Δ = 210.1km
Pg eZ 04 53 09.4
S eE 53 32.4

OJC Δ = 303.7km
Pg eZ 04 53 22.1
Sg eN 53 57.0

NIE Δ = 385.5km
P eZ 04 53 34.7
S eE 54 19.6

DEC 29

φ = 51.450°N, λ = 16.177°E
H = 04:39:41.9, M = 2.7

KSP Δ = 68.2km
Pg eZ 04 39 53.1
Sg eE 40 01.3

OJC Δ = 290.2km
Pg eZ 04 40 30.4
Sg eN 41 05.3

Western Carpathians 2006

JUN 25

φ = 49.26°N±0.061, λ = 20.01°E±0.087
H = 01:12:26.1±0.73, M = 3.2 (NIE)
h = 5 ± 2.6km,

```
NIE  Δ = 28.3km
       Pg  eZ       01 12 31.2 d
       Sg  eEZ         12 35.9

OJC  Δ = 108.1km
       Pg  eZ       01 12 46.1
       Sg  eNE         13 01.2

RAC  Δ = 160.3km
       Pg  eZ       01 12 55.8
       Sg  eNE         13 17.3

KWP  Δ = 200.4km
       Pn  eZ       01 12 59.5
       SmS eNE         13 25.6

KSP  Δ = 319.9km
      (Pn) eZ       01 13 17.3
  (PmPPmP) eZ          13 22.6
     (SmS) eZ          13 58.6
```

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Polish Local Seismic Network: Warsaw Data Analysis Center – SUW, KWP, WAR, GKP, KSP Activity Report 2006

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1. Introduction

The Activity Report of 2006 is the first annual report after it has been decided to discontinue publishing the complete Polish national seismological bulletin. The annual report is prepared and is made available in the internet on web pages of the Department of Seismology and Physics of the Earth's Interior, Institute of Geophysics, PAS. However, the web-available version has been simplified and is limited to the data centrally analyzed at the datacenter in Warsaw, namely **SUW**, **KWP**, **WAR**, **GKP** and **KSP**. Results of the analysis, all obtained on one computer system using the same set of programs can be easily parsed into the form of a report. Regarding **KSP**, the web available version covers only bigger of the local events. **KSP** is performing on-site detailed analysis of all data, including the weakest signals, and this local data is not included. **RAC** and **OJC** perform analysis of their own data on-site, the duties of **OJC** cover also the data analysis for **NIE**.

The web-available event and phase report bases on the earlier schemes, although it is limited to the data analyzed in Warsaw. As previously, the event locations are taken from U.S. National Earthquake Information Center's (NEIC) Preliminary Determination of Epicenters (PDEs). Some of the reported world events have not been noted in station bulletins but generally events of magnitude above 5.5 were noted at least on some of the stations while those of magnitude 6.0 or more should be noted on all except for eventual station outages, signal overlapping or occasional signal disruption due to any external cause.

2. General Information

The year 2006 lacked very spectacular seismic events and there have not been major earthquake catastrophes causing thousands of victims. There have been two big earth-

quakes – magnitude 7.8 on May 3 and magnitude 8.0 on Nov. 15, but the first quake was out at sea near Tonga Islands while the second one was at sparsely populated Kuril Islands. The second quake has caused a tsunami but the wave did not reach devastating size. There have not been natural earthquakes in Poland, at least not of the size that could be felt.

On January 24, **SUW** station has recorded a signal accompanied by a single felt report from the town of Siemiatycze, about 180 km away. No other station in Poland has recorded the event. Attempt to query Byelorussian stations have not resulted in any response except of Byelorussian newspaper "Belarus Segodnya" that claimed (on Feb. 3, 2006) that Poland is accusing Byelorussia of performing an illegal blast, suggesting the blast could have been nuclear and suggesting that Poland blames Byelorussia of causing a construction catastrophe of the exhibition hall in Katowice.

On June 25, a small earthquake (Mw = 3.2 measured at **NIE**) has taken place in the Tatra Mountains. There have not been any felt reports, partly because apparently the hypocenter was shallow and in an area with no population except for three mountain chalets and a forestry. Most importantly – the quake happened at 3:12 AM local time and there is no information of the event having been felt.

On November 23, a magnitude 4.8 earthquake has taken place in the Ukrainian Zakarpatska Oblast, near the town of Berehove, less than 100 km of the Polish border. Inquiry in the southeastern region of Poland has not brought any information on the quake having been felt.

There have been a number of seismic events induced by mining, of which the Lubin event of May 21 was the largest. The National Earthquake Information Center (NEIC) of U.S. Geological Survey has assigned it mb = 4.8. This seems artificially elevated as the Mw magnitudes obtained for this event at Polish stations were 4.1 at **KSP** and **RAC**, 3.9 at **OJC** and **NIE**. The Czech seismic network has reported this event with 4.1 magnitude, Slovak network has assigned it 4.4 value.

Over the whole year 2006, continuous data were transmitted into Warsaw over modem lines or internet from **SUW**, **KWP**, **WAR**, **GKP**, **KSP**, **OJC** and also short period data from **NIE**. **RAC** was incorporated into the common data transmission system with its short period channels only effective early December 2006. Data archival is carried out in Warsaw in an on-line form in respect to **SUW**, **KWP**, **WAR**, **GKP**, **KSP** and off-line in respect to other station data excluding **RAC**. **RAC** performs its data archival on site. The archived broadband data are made public available.

The broadband data are also made readily available by internet for other parties with whom the Institute of Geophysics, Polish Academy of Sciences, cooperates, namely the GeoForschungs-Zentrum Potsdam and ORFEUS-KNMI (The Netherlands). Since these institutions have agreements with the Euro-Mediterranean Seismological Centre (EMSC) and the National Earthquake Information Service of the U.S. Geological Survey for sharing their databases, the data have been used by these institutions to provide preliminary determination of earthquake parameters of seismic events from the whole world. Apart from the international centers, several national data centers, namely of Germany, Czech Republic, Austria and Slovakia have also started retrieving PLSN data, offering data from their national networks in return.

PLSN has arranged receiving on-line data from 14 foreign stations: 5 in Slovakia, 4 in Czech Republic, 2 in Germany and 1 in Hungary, Estonia and Denmark, thus opening capabilities for ready location and elaboration of regional earthquakes.

Considerable effort in 2006 was devoted to repairs. **GKP** was brought back to normal functioning in February while **KSP** has undergone cabling exchange in November-December. **SUW** and **KWP** have obtained their real-time data transmission links by means of GPRS (over mobile phone network Plus-GSM). The GPRS transmission has proven fairly reliable, however there occur outages of the system and formerly used station dialup by modem was to be kept up as a backup method, especially in case of **KWP** where the outages are more frequent. In December **SUW** has experienced breakdown of its Seiscomp communication module that resulted in the lack of data transmission for a week.

The incorporation into the Polish Seismological Network of **HSP** seismic station at Hornsund polar base, Svalbard, was announced in the previous report of 2005. However, this incorporation has not proceeded past the formal stage. As of practice, routine operations of the station has not been changed, the station data arrives in its own specific format and with several months delay just as it used to when the station belonged to the Polar Department of Institute of Geophysics PAS. The reason for this is that the changes are undesirable when a totally new broadband station deployment is planned for **HSP**. The new deployment will change the station's routine still another way.

Quality-control daily 24-hour seismograms are produced at the Institute site in Warsaw. Most of these daily plots exist only virtually, i.e. on computer – as the files are bulky while they may be regenerated anytime from digital data.

Institute of Geophysics, Polish Academy of Sciences, is a member of the European-Mediterranean Seismological Centre (EMSC). Thus, the Polish Seismological Network has become a part of the VEBSN initiative, standing for Virtual European Broadband Seismological Network, maintained by joint effort of EMSC and ORFEUS members and coordinated by ORFEUS and EMSC datacenters. Within VEBSN initiative ready earthquake alerts are being produced for all events above 5.5 magnitude worldwide and above magnitude 4.5 within Europe.

Institute of Geophysics is also a member of the International Seismological Centre (ISC) that takes care of preparation of the final seismological bulletin. Cooperation with the ISC has also resulted in the ISC offering temporary position (2005-2008) to Przemysław Kowalski of the Institute of Geophysics PAS. As all Polish seismic stations report to the ISC, full bulletin information including observations at all Polish seismic stations is available from the International Seismological Centre at Thatcham, U.K. (ISC), *http://www.isc.ac.uk*.

3. Station Locations and Instrumentation

In 2006 there have been no new developments and the Polish Seismological Network of the Institute of Geophysics, Polish Academy of Sciences, has not changed in respect to the year 2005. The network consisted of eight sites, six of them broadband,

one long-and-short period, and the short period site at **NIE**. The station data are shown in the table below. The broadband data is recorded continuously at 20 Hz at all the stations running broadband, unless mentioned otherwise. The MK-6 stations and Quanterras have 24 bit AD converters, the MK-5 have 16 bit converters and MK-2 have 12 bit with 4 bits automatic gain ranging. Short period digital recording is always run in trigger mode, at 80 Hz sampling rate at SUW and KWP, at 100 Hz at other stations. Timing is based on GPS receivers in case of **SUW** and **KWP**. Other stations synchronize the time with DCF radio signal. All timing synchronization is performed automatically by computer systems.

Table 1

Seismic stations in Poland belonging to the Institute of Geophysics, Polish Academy of Sciences

Code:	Name:	Lat (N)	Lon (E)	Elev (m)	BB sensor	Acq. sys.	SP system
SUW	Suwałki	54.0125	23.1808	152	STS-2	Quanterra	None*)
KWP	Kalwaria Pacławska	49.6314	22.7075	448	STS-2	Quanterra	None*)
WAR	Warszawa	52.2417	21.0236	110	STS-2	MK-6	None
GKP	Górka Klasztorna	53.2697	17.2367	115	STS-2	MK-6	None**)
KSP	Książ	50.8428	16.2931	353	STS-2	MK-6	GS-13 MK-2
OJC	Ojców	50.2195	19.7984	391	STS-2	MK-6	GS-13 MK-2
RAC***)	Racibórz	50.0833	18.1942	209	–	–	SM-3 MK-5
NIE****)	Niedzica	49.4189	20.3131	649	–	–	SM-3 MK-6

*) 80 Hz stream triggered available in circular 48-hour buffer; not analyzed unless there is an event of special interest.

**) 100 Hz data is retrieved from station daily and archived, analyzed only if local event is found on continuous 20 Hz data streams.

***) Observatory runs also long period recording on KIRNOS-SKD instruments.

****) Short period station.

4. Digital Data Archives

The archives of digital data of Polish broadband stations is kept in miniseed form of which it is possible to produce full SEED. Other formats are available by means of format converters such as *codeco* or *ms2sac* which are public-domain available in the internet. The method of distribution of the data changes, originally in 2006 it was an

autodrm service at *autodrm@igf.edu.pl*; since 2008 this has been replaced by a wwwdrm interface. Data from **RAC** are available by request to the observatory staff (email, telephone or letter). For other station data one is asked to inquire at the Department of Seismology and Physics of Interior of the Earth's, Institute of Geophysics, PAS, for the current method of data dissemination and limits on the data availability. **RAC** data is available exclusively in miniseed as the calibrations for this station have a format incompatible for conversion. **OJC** and **NIE** data may be also obtained from **OJC** observatory staff (em*: nlkozlak@cyf-kr.edu.pl*). The data volumes gathered in 2006 are given in Table 2.

Table 2

Data volumes gathered from stations of Polish Seismological Network in 2006

Station	Continuous data at 20 Hz	Detected data at 100 Hz
SUW	2.9 GB	0.4 GB*)
KWP	2.9 GB	1.1 GB*)
WAR	4.2 GB	0**)
GKP	3.8 GB	3.1 GB
KSP	3.4 GB	1.4 GB
OJC	1.2 GB	2.0 GB
NIE	0***)	2.5 GB
RAC	2.2 GB****)	0.2 GB*****)
total	**20.6 GB**	**10.7 GB**

*) At 80 Hz sampling rate.

**) Due to high urban noise detected data stream at WAR was turned off.

***) Continuous short period data from NIE are of little value and were not archived.

****) Available at RAC observatory.

*****) In *mss* (not *mseed*) format; available at RAC observatory.

We endorse using the Seismic Wave Interpretation Programme (***SWIP***) of dr. Jan Wiszniowski (e-mail: jwisz@igf.edu.pl) available for free download from ftp://ftp.igf.edu.pl/pub/inni/jwisz (non-commercial license). The program is capable of reading data in various formats including the old *mss* data and exporting it to ASCII and a few other formats. ***SWIP*** works in a Windows environment. It is known to work on computers with minimum configuration of MS-Windows-98, 128 MB RAM and 300 MHz clock but the modern versions of the program are tested only on MS-Windows-XP, not less than 256 MB RAM and 700 MHz clock. SWIP uses about 10 MB for its executables and configuration files.

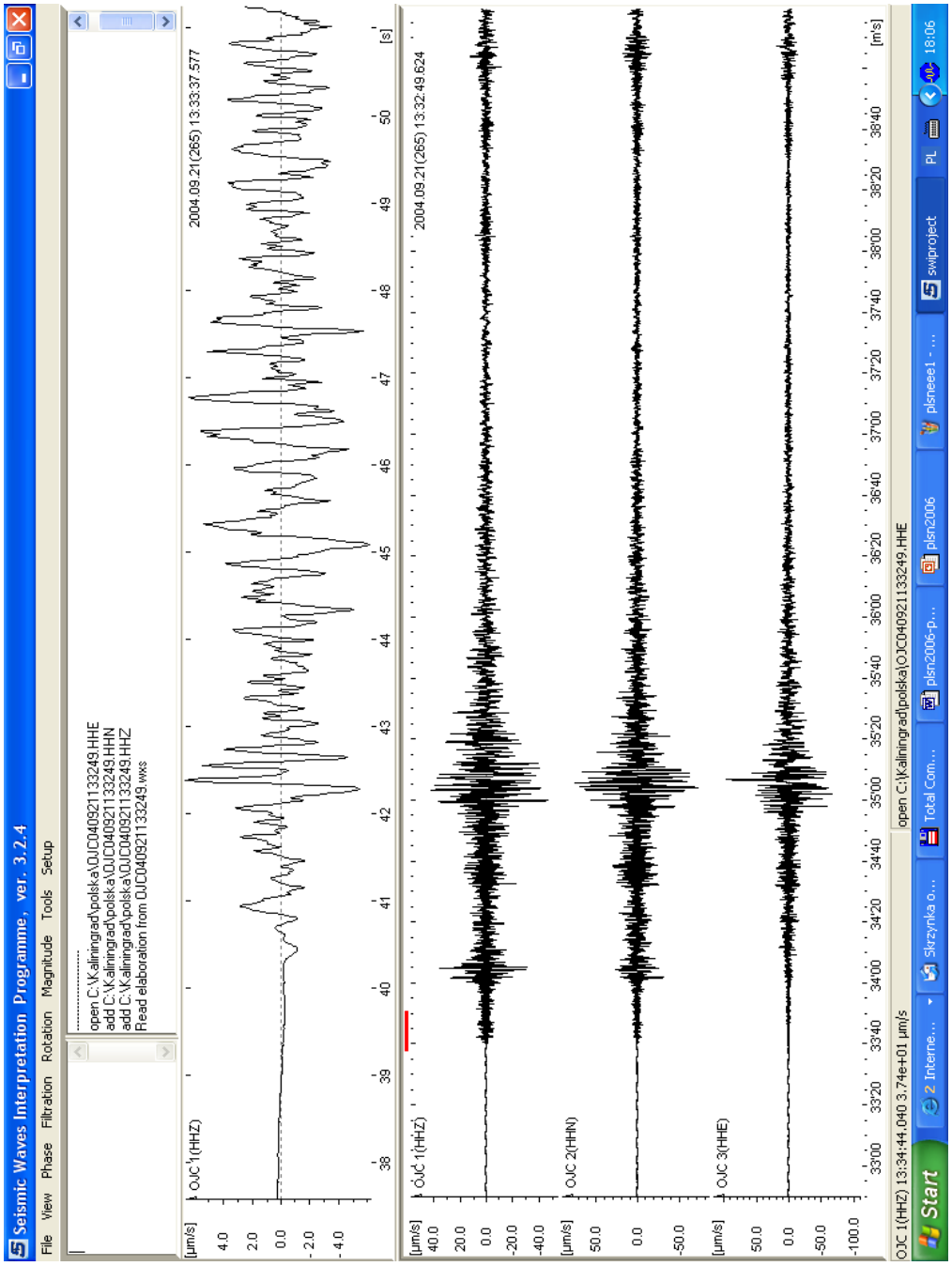

Fig. 1. SWIP programme main window.

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