

## Remembering Professor Dr. Hab. Aleksander Guterch

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The Western Carpathians are an important mountain range of the Alpine-type structure in Central Europe, which is also a common orographic phenomenon mainly in Slovakia, Poland, and partially in the Czech Republic. For the sake of completeness, it should be stated that research and interpretation of the development and structure of this orographic phenomenon would not be possible without knowledge of the inner Western Carpathians and their basins, which are part of the Pannonian basin. It extends mostly to the territory of Hungary, and, in the east, also partly to the territory of the present Ukraine. The dominant importance of the Carpathian Mountains for the knowledge of the geological development of Central Europe to the east of the Alps, and the Bohemian Massif to the south of the European Platform and to the north of the Dinarides and Balkanides follows from the above.

Thanks to this mountain range, a very long and fruitful history of joint geological research by Slovak, Polish, Czech, Hungarian, and Austrian geoscientists was written, extending from the times of the Austro–Hungarian Monarchy to the present day. Its important examples are thousands of reports, manuscripts and maps, hundreds of scientific publications and monographs. The obtained results were often of great benefit to the development and trend of knowledge of the geology of the world.

While thinking about Prof. Aleksander Guterch, but also Prof. Marek Grad (our last joint photo is in Fig. 1) and a whole range of geologists and geophysicists of the Polish Academy of Sciences (PAS), it should be emphasized that the breathtaking mountains of the Western Carpathians significantly contributed to their scientific knowledge and interests. The results of the geological and geophysical research of the University of Warsaw, the Jagiellonian University, the AGH University of Science and Technology, the Polish Geological Institute, the Slovak Academy of Sciences, the Comenius University, the State Geological Institute of Dionýz Štúr, the Eötvös Loránd University, the Eötvös Loránd Geofizikai Intézet (ELTE), the Magyar Állami Földtani Intézet (MÁFI) Budapest, the Vienna University, the Charles University, the Institute of Geophysics of the CAS, the Institute of Geology of the CAS, and others are also successfully included in these results.



Fig. 1. Our last joint photo (Aleksander Guterch in the center, Marek Grad on the right, and Miroslav Bielik on the left); it was taken at the premises of the Faculty of Physics, University of Warsaw, on February 19, 2020.

Professor Aleksander Guterch and Prof. Marek Grad have been the main initiators and coordinators of large-scale geophysical research in Central Europe since the 1990s, e.g., the POLONAISE'97, CELEBRATION 2000 (Central European Lithospheric Experiment Based on Refraction, June 2000), ALPS 2002, and SUDETES 2003. All these projects represent the most extensive geophysical research of deep structure in a continental environment on a global scale. The greatness of the leading personality of Aleksander Guterch lies in the formation of the intentions and goals of a whole set of projects with international participation conducted in the form of seismic transects passing through the eight countries from the Baltic to the Adriatic; in other words, from the European Platform, through the Alpine–Carpathian orogenic belt to the Dinarides–Balkanides. The logistics of the project preparations was based on the ideas of Aleksander Guterch and Marek Grad. With their help, the project was further elaborated in the individual states involved. However, in order to cope with demanding scientific tasks, it was necessary to extend the cooperation of Central European countries to include countries that could contribute not only materially but also by contributing intellectual knowledge and experience. These were countries such as Denmark, Finland, Turkey, the USA, and Canada, but also Italy, France, Germany, and Sweden.

It should be noted that this great plan was preceded by many years of geological and geophysical research, with the results published in numerous publications of several generations of scientists in all participating countries.

From the entire summary of results, the deep-seated relationship of the outer Western Carpathians to the European Platform and the deep-seated course of the Pieniny Klippen Belt should be mentioned at least. In the central and inner Western Carpathians, there are important lineaments, such as faults of a deeper reach – the Čertovica line, the Pohorelská line and the

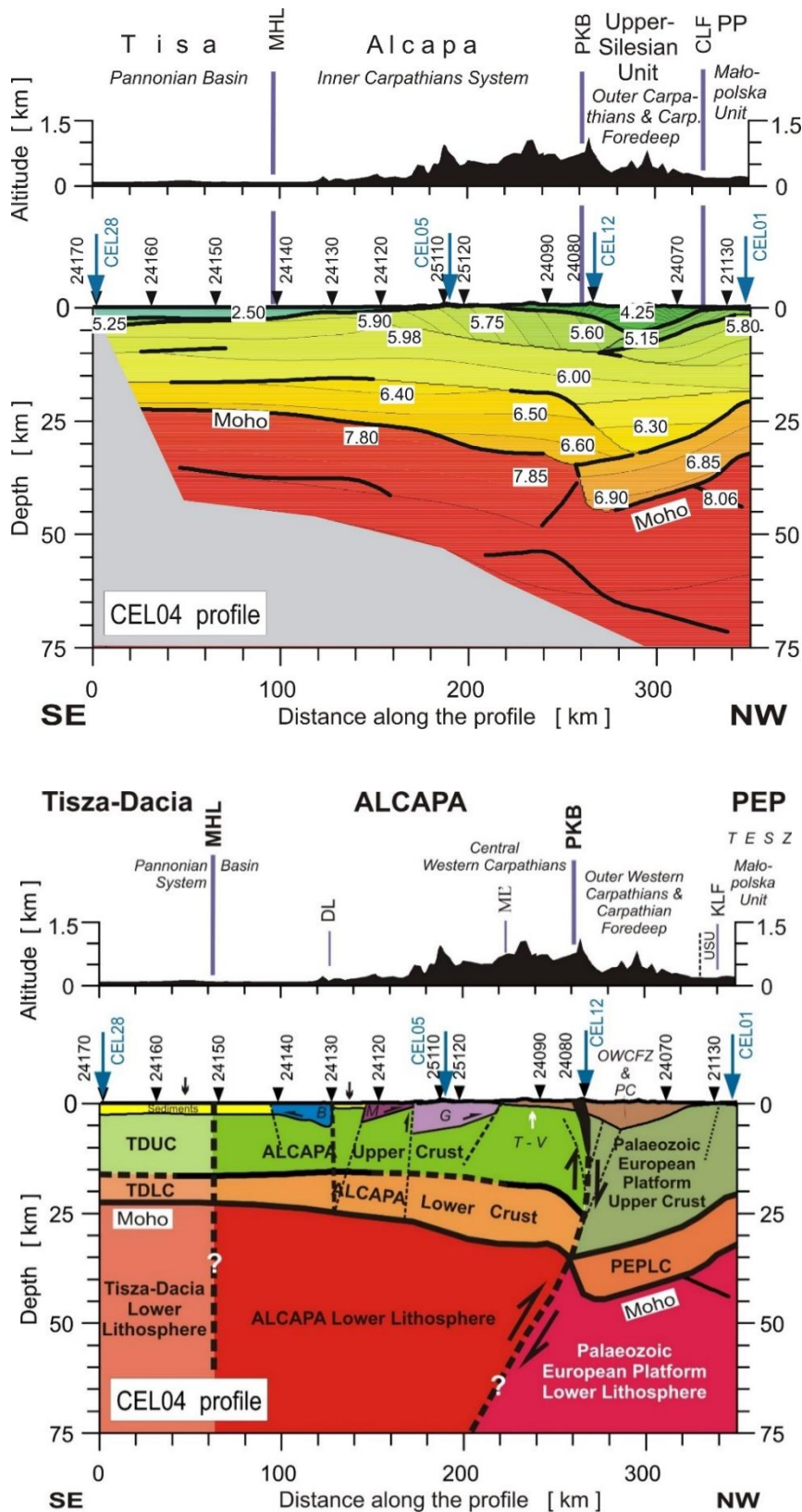


Fig. 2. The 2D model of seismic  $P$ -wave velocity along the profile CEL04 and its geological interpretation. Legend: PEP – Palaeozoic European Platform, PEPLC – Palaeozoic European Platform lower crust, TDUC – Tisza-Dacia upper crust, TDLC – Tisza-Dacia lower crust, PKB – Pieniny Klippen Belt lineament, MHL – Mid-Hungarian lineament, T-V – Tatoveporicum, DL – Darnó line, ML' – Margecany-Lubenik line;  $\nearrow$  – overthrusting,  $\nwarrow$  – undethrusting (Janik et al. 2011).

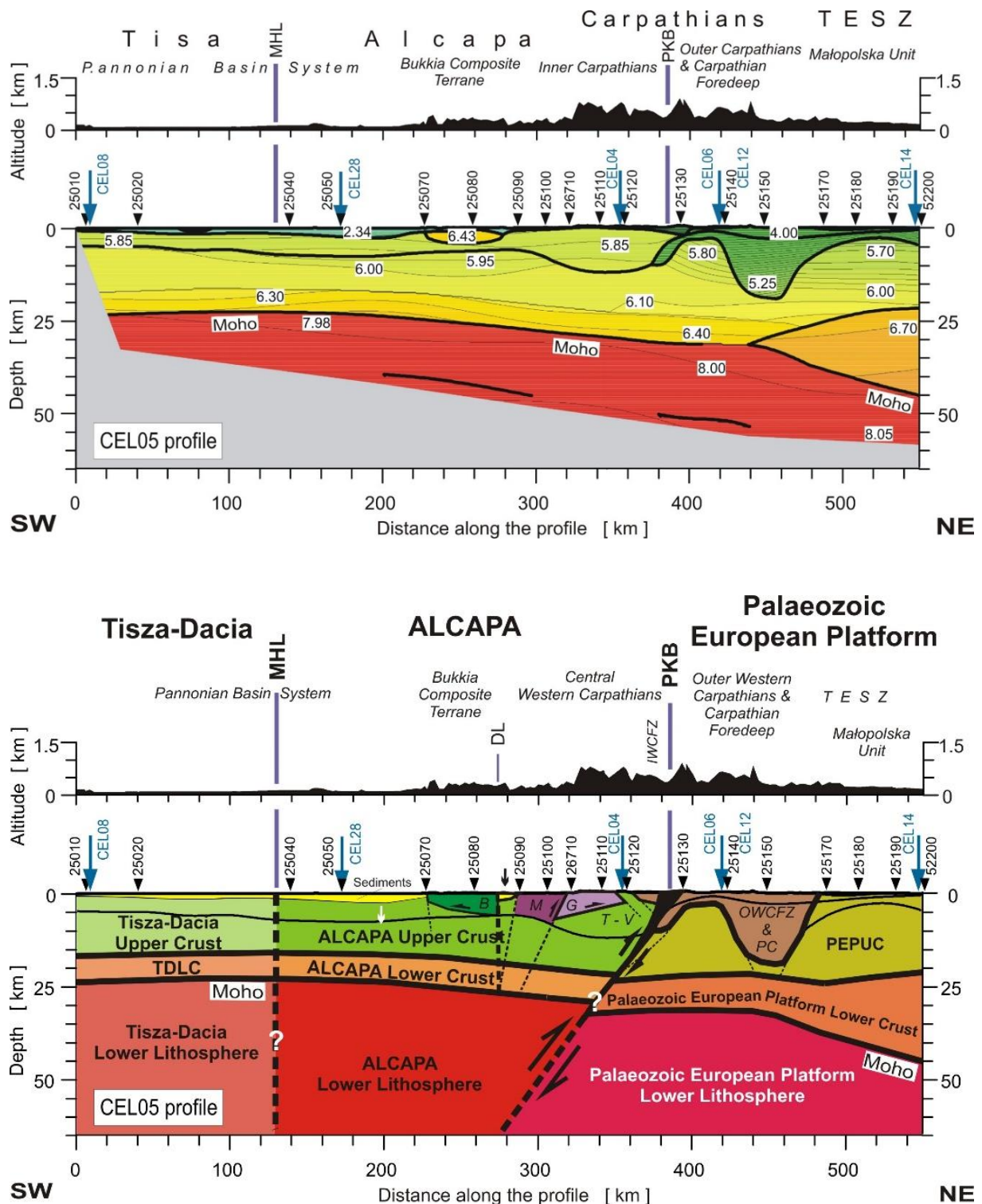


Fig. 3. The 2D model of seismic  $P$ -wave velocity along the profile CEL05 and its geological interpretation. Legend: PEPUC – Palaeozoic European Platform upper crust, TDLC – Tisza-Dacia lower crust, PKB – Pieniny Klippen Belt lineament, MHL – Mid-Hungarian lineament, IWCfZ – Inner Western Carpathian fault zone, OWCFZ&PC – Outer Western Carpathian fault zone, B – Bükkicum, M – Meiaticum, T-V – Tatoveporicum, DL – Darnó line;  $\nearrow$  – overthrusting,  $\nwarrow$  – undethrusting (Janik et al. 2011).

Muráňsky fault, but mainly the phenomena of the relationship of the innermost Gemic and Veporic units – the Ľubenická and Margecanská lines, as well as shallow faults: Štític, Hornád, Rožnava, and others. For the regional solution, especially transects CEL04, CEL05 (Figs. 2 and 3) brought a picture based on which we defined and interpreted the internal structure of the Gemicum, including the intrusive body of granites and the tectonic contact of the southern and northern Gemicum. These are: the basement of the Gemic unit and the significant suture of the so-called Darnó lines and the phenomenon of Meliaticum, and, in a less prominent image, also the remains of the upper slices of the napped structure of the Turnaicum and Silicicum. We published these results collectively in Grad et al. (2006), Janik et al. (2011), and others.

The significance of the realization and interpretation of seismic refraction transects across the Alpine units, specifically in the Western Carpathians, brought a new perspective on the structure of the Earth's crust, the depths of the MOHO discontinuity, important interfaces of the tectonic units of the inner, central, and outer Western Carpathians, the morphology and definition of the layers of the Tertiary fills in the inner Western Carpathians basins and their connection to sub-basins of the Pannonian basin system and their basements. From the point of view of the Alpine structural phenomena, it was extremely important for the Western Carpathians to determine both the horizontal and vertical positions and relationships of their main tectonic units. The results of the CELEBRATION 2000 project were gradually published in many scientific articles.

The CELEBRATION 2000 project also included a group of potential fields that compiled the gravity and magnetic map of the CELEBRATION 2000 region for the first time (Bielik et al. 2006).

For the knowledge gained from the CELEBRATION 2000 project, as well as the subsequent ALPS 2002 and SUDETES 2003 projects, huge thanks go to Prof. Aleksander Guterch and his colleague and friend Prof. Marek Grad. Without their exemplary and admirable activity, scientific vision, managerial work and logistics, such extensive work would never have been possible. Today, generations of geologists and geophysicists have inexhaustible and original sources of information about the deep-seated structure of Central Europe at their disposal.

For these excellent results and exemplary human qualities, great thanks and honour go to Prof. Aleksander Guterch.

Our Dear Aleksander – you will always live in our memories.

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