

Atmospheric Electricity: Papers on Thunderstorm and Cloud Electricity

PREFACE

Problems of thunderstorm and cloud electricity still remain in the mainstream of research of atmospheric physics researchers. Hence, in this special issue of *Publications of the Institute of Geophysics, Polish Academy of Sciences*, devoted to problems of atmospheric electricity, we present a set of six articles in which we publish some recent results on this subject, obtained by us and our co-workers. The article by Barański and Guzikowski shows how detections of cloud-to-ground lightning sources obtained from the Local Lightning and Detection Network (LLDN) operated in the Warsaw region can be supplemented by computer simulations of radar reflectivity, as well as dynamic and electric field structure of the considered thunderclouds in the WRF and WRF_ELEC models we used. In another article, Odzimek et al. describe meteorological and atmospheric electricity datasets and the methodology of analysing the atmospheric electric data from the Polish Atmospheric Electricity Observation Network used for the purpose of research studies on the electricity of Nimbostratus and Stratus clouds. Next, a series of three articles by Odzimek et al. summarise optical observations of sprite lightning Poland, made in Gliwice and Świdler over 2011–2015. Finally, the article by Parfiniewicz et al. presents a new idea of using the virtual Fujita scale [VFS] number approach to assessment of lightning discharges development and severity for the derecho episode in Poland on 11 August 2017. It should be noted that for the first time the lightning detection data from the PERUN remote sensing system in Poland were successfully applied for the determination of the whole trace of a Mesoscale Convection System (MCS) with the derecho incident. This MCS was organised in the form of a very extended supercell. We have tracked the time development of such supercell with high spatial and temporal accuracy that would be impossible to obtain by using the routine radar data only.

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