4–8 November 2019, Kraków, Poland
ECSS2019-152

A 10-year climatology of Mesoscale Convective Systems in Poland based on radar and lightning data

Artur Surowiecki (1) and Mateusz Taszarek (2)

(1) Department of Climatology, University of Warsaw, Poland (artur.surowiecki@uw.edu.pl), (2) Adam Mickiewicz University, Department of Climatology, Poznań, Poland (mateusz.taszarek@amu.edu.pl)

According to estimates based on lightning data and SYNOP observations, approximately 150 days with thunderstorms occur each year in Poland. All variety of convective modes can occur in Poland: from weak isolated cells, through mesocyclones, multicell clusters and up to long-lived squall lines called derechoes. Big storm complexes consisting of a multiple convective cells (at least 100 km long in a major axis) and the duration of at least 3 hours are called Mesoscale Convective Systems (MCS). Their exact frequency over Poland remains unknown as no such study has been ever performed before for this part of Europe. In this study we investigate climatological aspects of MCSs in years 2008-2017. In order to identify MCS we use radar data obtained from the Institute of Meteorology and Water Management (POLRAD network) and lightning data from EUCLID network. It is worth to highlight that our analysis is one of the first attempt to present a radar-based climatological aspects of convective storms not only in Poland but also in Europe. Preliminary results indicate that each year approximately 70-80 MCSs (30-40 days with MCSs) occur in Poland, most frequently in July and late afternoon hours. The occurrence of these systems is characterized by a high spatial variability in the individual years. In the majority of cases MCSs propagate into N, NE and E directions. In the diurnal cycle they start to form most often around 1400 UTC and fade at 1900 UTC. In some cases long-lived MCSs can move through the majority of Poland and live for more than 10 hours, producing a large number of cloud-to-ground lightning and severe weather.