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Reconstruction of Meteorological Environment Leading to the Deadliest Polish Severe Weather Outbreak of July 4th 1928, Using Archival Data and 20th Century Reanalysis

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On July 4th 1928, one of the most impactful severe weather events in Polish history formed ahead of an advancing cold atmospheric front, causing over 60 fatalities, hundreds of injuries and massive destruction over large part of the country. Dozens of highly populated European cities, including Berlin, Poznań, Warsaw and Katowice, as well as hundreds of smaller towns and villages were significantly affected during the day. Most of the damage and human casualties were caused by hurricane force wind associated with thunderstorm's downdrafts. At least one tornado is suspected to have occurred and other damaging weather phenomena, such as large hail, dust storms and lightning induced wildfires were also reported. In order to recreate the weather environment leading to the "birth" of such an intense storm, ensembles of NOAA-CIRES-DOE Twentieth Century Reanalysis (20CR) were utilized and compared with archival data from Polish and German meteorological stations operating at that time. Dozens of press reports, covering the disaster and it's consequences, were gathered from Polish digital libraries' datasets to fully understand the timeline, scale and characteristics of this highly unusual and catastrophic weather event. The overall purpose of the research is to find comparisons between this historic case and recent severe weather outbreaks, assess the reliability of historical reanalyses in representation of mesoscale phenomena and to perform a high-resolution simulation using WRF-ARW model, based on downscaled versions of the most representative ensembles of the reanalysis.