Geophysical Research Abstracts
Vol. 20, EGU2018-9876, 2018
EGU General Assembly 2018

Forecast analysis of the "Eurydice" storm on November 15, 2017 associated with the deadly flash flood event over western Attica region, Greece

Panagiotis T. Nastos (1), Markos P. Mylonas (1), Ioannis T. Matsangouras (1,2), and Angelos Paralis (2)
(1) Laboratory of Climatology and Atmospheric Environment, Department of Geology and Geoenvironment, National and Kapodistrian University of Athens, University Campus GR-15784, Athens, Greece (nastos@geol.uoa.gr), (2) Hellenic National Meteorological Service, Hellinikon GR-16777, Athens, Greece (john_matsa@geol.uoa.gr)

Extreme hydro-meteorological phenomena are of high concern both by researchers and civil protection authorities. Global warming favors fury weather having catastrophic impacts especially on urban agglomerations within geomorphic low-lying areas. Flash floods are the most common and widespread of all weather-related natural disasters. Their genesis is triggered by the synergy of heavy rains and anthropogenic infrastructure blocking the excessive water which fills normally dry creeks or river beds. This is the case of the catastrophic flash flood that hit western Attica region, Greece on November 15, 2017, with 23 people dead, as well as extensive damage to homes, shops and logistics. Heavy rain, associated with the "Eurydice" storm at the western Greece, fell over the adjacent Mount Patera causing the overflowing of the streams of "Surras" and "Agia Aikaterini". On one hand, the excessive water and on the other hand the wrong urban planning and development along with the delayed implementation of anti-flood projects, are the main factors of this unprecedented tragedy.

The objective of our research is to perform and validate the model simulations of the "Eurydice" storm on November 15, 2017 by using the Weather Research and Forecasting (WRF-AR) mesoscale model to dynamically downscale the NCEP Global Forecasting System (GFS) forecast products from 0.25 degrees (∼27 km) to 1 km spatial horizontal resolution. The model configuration setup was aimed to construct the storm related parameters and also stability and thermodynamic parameters, which are mainly connected to the deadly flood event in western Attica region, Greece, selecting ETA Ferrier and Kain-Fritsch for Microphysics and Cumulus parameterizations schemes, respectively.

In the process, remote sensing data with high spatial and temporal resolution, derived from Hellenic National Meteorological Service (HNMS), was used to perform mesoscale analysis and WRF-AR model products verification. Radar data and products from HNMS LGAT (Athens) Doppler weather radar station (C-band), in terms of maximum reflectivity, surface rainfall, plain position indicator and constant altitude plan position indicator depicted very well the evolution of the parent storm associated with the flash flood event. Further, lightning data along with satellite images (IR, VIS and RGB composites) fulfill the mesoscale analysis.

The findings of the performed analysis shed light that the high spatial resolution forecasting by WRF-AR mesoscale model in urban environments is a dynamic approach to provide early warnings to the public, so that to protect and save human lives from weather-related natural disasters.