5.13 A HYDROMETEORLOGICAL ANALYSIS OF AN EXTREME FLASH FLOOD EVENT IN THE URBAN AREA OF WEST ATTICA, GREECE

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Urban areas often experience high precipitation rates and heights associated with extreme flash food events. Numerical models are employed to predict these adverse phenomena. Nevertheless, flood prediction in urban areas is still an open scientific issue and remains a challenge. A sophisticated approach is the combination of atmospheric-hydrological modeling methods with surface precipitation observations. This approach is becoming more attractive to the scientific community since they are fully coupled in a single advanced observation-modelling system. This study aims to provide a hydrometeorological analysis to an extreme flash flood event took place in the sub-urban area of Mandra, Attica, Greece. A three-day (1416 November 2017) wave of hazardous weather with intense precipitation rates persisted around the Mt. Pateras in the sub-urban town of Mandra, resulting to tremendous flooding with landslides, extensive damages and a total of 23 fatalities. The area is highly urbanized with complex terrain effect. This case study has been simulated by the non-hydrostatic WRF-ARW atmospheric model coupled with an advanced hydrological module (WRF-Hydro) able to offer improved simulation of land surface hydrology and energy states and fluxes at a fairly high spatial resolution using a variety of physics-based and conceptual approaches. The WRF-Hydro simulated this case study under three different precipitation forcings. The first was based on WRF-ARW hindcasts (WRF-Hydro), the second one was based on XPOL and C-Band radar estimates (XPOL-Hydro) and the third on core GMP/IMERG estimated precipitation rates (GMP/IMERG-Hydro). The initial precipitation forcings are evaluated against surface raingauge and disdrometer observations close to the area of interest. Preliminary results indicate that XPOL-Hydro outperforms the WRF-Hydro and the GMP/IMERG-Hydro in terms of water level and surface runoff estimations.