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Methods and State-of-the-art technologies on the hydrometeorological extremes observations and forecasting: The flash-flood case of Mandra, Attikis

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Webinar: Participate using Microsoft Teams
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Abstract:

Severe hydrometeorological hazards such as floods, droughts, and thunderstorms are expected to increase in the future due to climate change. Due to the significant impacts of these phenomena, it is essential to develop new and advanced early warning systems for advance preparation of the population and local authorities (civil protection, government agencies, etc.). In very short time-periods (up to 6 h), small-scale phenomena can be described accurately by adopting a "nowcasting" approach, providing reliable short-term forecasts and warnings. To this end, a novel nowcasting system is presented in this study, combining a data assimilation system (LAPS), a large amount of observed data, including X-band dual-polarization (XPOL) radar precipitation measurements, the Chemical Hydrological Atmospheric Ocean wave System (CHAOS), and the WRF-Hydro model. The system is evaluated on a case study of the catastrophic flash flood event that occurred in the sub-urban area of Mandra in Western Attica, Greece, on 15 November 2017. The update of the simulations with assimilated radar data improved the initial precipitation description and led to an improved simulation of the evolution of the phenomenon. Comparison with flood data from the FloodHub Service showed that the nowcasting system could have provided reliable early warning of the flood event at least 1 hour in advance, giving vital time to the local authorities to mobilize and even prevent fatalities and injuries to the local population.

References

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