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The Antalya October 2011 flash-flood: atmospheric model analysis and radar observations

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The Mediterranean region is very prone to catastrophic flash floods owing to the air-sea interaction over the relatively warm Mediterranean Sea and the complex topography. Various dynamical, thermo-dynamical and physical processes on all spatial and temporal scales may play significant roles in the formation and enhancement of severe weather events in the area. The storm of 9 October 2011 poured 231-mm precipitation in 6 hours over the Gulf of Antalya and caused a devastating flash flood.

The evolution of the event is examined by using atmospheric model analysis and remote sensing products, with the focus on possible synergistic effects between various meso-scale factors. Prominent synoptic and meso-scale ingredients conducive to devastating flash-flood events were present to more or less the same extent for the case studied. Results The immediate and direct inferences are that (i) upper level dynamical precursors to the west of the treat area; (ii) a strong low-level jet with equivalent potential temperature anomalies; physical mechanisms (i.e. orographic forcing and low-level convergence) leading to meso-scale uplifting; (iii) warmer than usual sea surface temperatures; (iv) the presence of a quasi-stationary synoptic-scale ridge to the east of the treat areas. Radar images from the Antalya weather radar station provide some early guidance on meso-scale features of the approaching precipitating system, while falls short to guide on intensity of the precipitation.

Quantitative precipitation forecasting (QPF) of the phenomenon is investigated by the meso-scale ensemble predictions system (MEPS) -which is tailored by combining Weather Research and Forecasting and various ensemble prediction techniques. Performance of QPF studies provide guidance for timing, location and amount 72-h in advance.