



Application of a Flood Nowcasting Chain to Small and Very Small Basins in North-western Italy

Garvin Cummings (1), Nicola Rebora (2), and Francesco Silvestro (2)

(1) Hydrometeorological Service, Ministry of Agriculture, Georgetown, Guyana (garvincummings@yahoo.com), (2) CIMA Research Foundation, CIMA Research Foundation, Savona, Italy (nicola.rebora@cimafoundation.org)

The forecasting of precipitation events and flash floods are critical for civil protection. In recent years, the Liguria Region of Italy has been affected by several flash floods that have caused significant losses in the form of damage to property, infrastructure and the environment; loss of livelihoods; and the loss of human life. The temporal and spatial resolution of weather radar data as the input for nowcasting models has shown significant promise in improving forecasts in recent years. The objective of this work is to develop and evaluate a radar-based probabilistic flood nowcasting chain for the small and very small basins in Liguria with the use of a spectral-based nonlinear stochastic precipitation nowcasting model (PhaSt) and the conceptual Nash rainfall-runoff model. The procedure included the computation of the antecedent moisture condition using daily rainfall starting 40 days prior to an event. The rainfall-runoff model was forced using rainfall scenarios which consisted of merged radar and rain gauge data from the beginning of the event to the time of nowcast. The results were evaluated by comparing two types of nowcasted hydrographs with a reference hydrograph using several statistics commonly applied in hydrological studies. The first type of nowcasted hydrographs were solely by using observed rainfall data while the second was based on the observed rainfall data and the PhaSt nowcast. The evaluation statistics computed showed that the inclusion of the PhaSt precipitation nowcast in the flood nowcasting chain produced results that were superior to those produced when the flood nowcast was based solely on observed rainfall data.

Key words: flash flood; small basins; probabilistic nowcasting; radar data; PhaSt; Nash model