A Hydrometeorological Approach for Probabilistic Flood Forecast

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We propose a new methodology for evaluating predictive cumulative distributionfunctions (CDF) of ground effects for flood forecasting in mountainous environments. Themethodology is based on the proper nesting of models suitable for probabilisticmeteorological forecast, downscaling of rainfall, and hydrological modeling in order toprovide a probabilistic prediction of ground effects of heavy rainfall events. Differentways of nesting are defined as function of the ratio between three typical scales: scales atwhich rainfall processes are satisfactory represented by meteorological models, scales ofthe hydrological processes, and scales of the social response. Two different examples ofthe application of the methodology for different hydrological scales are presented. Predictive CDFs are evaluated, and the motivations that lead to a different paths for CDFsderivation are highlighted.