A rainfall–runoff model and a French–Italian X-band radar network for flood forecasting in the southern Alps

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Abstract The aim of the CRISTAL project (Gestion des CRues par l’Integration des Systèmes Transfrontaliers de prévision et de prévention des bassins versants Alpins) is to develop an operational flood forecasting system for catchments located in the French Southern Alps and Italian Piedmont, based on rainfall data from two dual-polarisation X-band radars. The study deals with the calibration and initialization of the rainfall–runoff model on gauged French catchments (45–461 km² in area) on the Siagne, Paillon and Roya rivers. The GRD conceptual rainfall–runoff model is calibrated in order to reproduce measured flow. The model initialization consists of establishing a calculation rule to define the value of the daily production parameter in relation to known variables (such as previous rainfall or evapotranspiration). Hydrological simulations of recent events measured by X-band radars are presented and compared with rain gauge and water-level records.

Key words flood forecasting; X-band radar; rainfall–runoff model; calibration; initialization; French–Italian border