



Basin management and geomorphologic-montecarlo models of the hydrologic response

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Geomorphologic – MonteCarlo models of the hydrologic response are reviewed and discussed with specific reference to HEPEx goals and the the management of a river basin in Northern Italy. Excerpta from extensive hydrologic results obtained through the application of an accurate and robust mathematical model of the hydrologic response to evaluate the efficiency of hydraulic works regarding flood protection and hydropower operations (or any other natural or artificial intervention) are presented and discussed. The model reproduces stochastic and real hydrographs in a proper theoretical framework, and thereby the return period of peak flowrates, flood volumes and of any other feature of engineering interest, including the actual shape of the hydrograph. Arbitrary patterns of rainfall in space and time are accounted for. The detailed geomorphic features of the basin are recovered through manipulation of digital elevation models while the land cover analysis and runoff production schemes are based on data from remote sensing and image processing. We address return periods of floods under different land-use scenarios, provide a framework for the possible, maximally effective protection obtainable from gate operations. The results of the coupling of such geomorphological model with a suitable prediction meteorological model are shown and the implication in risk management and prevention discussed.