



## **A hydro-meteorological approach to the estimation of hurricane induced flash floods**

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This investigation applies a model cascade to the estimation of flash floods induced by the simultaneous incidence of two tropical storms in Mexico. The methodology is comprised of a Numerical Weather Prediction Model (NWP), a distributed rainfall-runoff model and a standard 2D hydrodynamic model. The event is selected as high quality field data (e.g. rain gauges; LiDAR derived topography; post-flood survey) and satellite imagery are available. Uncertainty in the meteorological model (Weather Research and Forecasting model) is evaluated through the use of a multi-physics ensemble technique, which considers twelve parameterization schemes to determine a given precipitation. The resulting precipitation fields are used as input in a distributed hydrological model, enabling the determination of different hydrographs associated to this event. Lastly, by means of a standard 2D hydrodynamic model, hydrographs are used as forcing conditions to study the propagation of the meteorological uncertainty to an estimated flooded area. Although the methodology does not consider all the uncertainties that may be involved in the determination of a flooded area, results are able to reproduce a similar area to what was registered by satellite imagery. Thus, it is reflected that such an approach favours the preventive action in the generation of flood management strategies, especially in those cases where there is a lack of instrumentation and not enough field data is available.