

## **Flood Scenarios description and interaction with pollution sources by means of satellite data**

It is becoming more and more evident the necessity of improving our ability in describing consistent risk scenarios caused by natural disasters (e.g., Floods). In the specific case of large floods, the related risk scenarios are influenced by complex interactions with the territory and by the spatial-temporal dynamics which they develop. In addition to the flooded area extension, it necessary to know its dynamic development and its interaction with other risks on the territory (e.g., pollution sources).

Satellite data, SAR data in particular, offer very detailed and timely delineation of the flooded areas. This data availability rose expectations on the ability of generating detailed risk scenarios on timescales that are proper of the emergency management, few hours at most.

The first part of the Ph.D. will be devoted to the analysis of the necessary simplifications to implement a set of equations able to interpret multiple wetting and drying front in complex topography, eventually originating a numeric model with high computational efficiency. In this sense specific attention will be on the numerical methods to be used even in a parallel computing environment.

The second part will address the integration with a 2D diffusion model of non reactive and reactive pollutant able to compute pollutant concentrations carried and deposited by the flooding front in the different environmental matrices.

A validation of the results is foreseen on different historical case studied where satellite data on flooded areas are available.