



## **Assessment of impact of storms at large scale: the potential of coupling modelling and remote sensing observations.**

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Any statistical analysis can not ignore, as is known, the observation of phenomena as complete as possible. This paper focuses then on observation and understanding of the space-time dynamics of the hydro-meteorological phenomena causing severe socio-economic impacts.

Consider for example the recent flooding in Pakistan. Traditional techniques for assessment of damages, based on the quantification of the local intensity of events (peak discharges, cumulative rainfall, flood extent) do not allow to construct a complete scenario of damage, because they allow to represent single "scenes", frozen in time. The persistence and evolution over time of the flood instead play a key role in determining the socio-economic event.

A road, a factory or agricultural fields flooded for days or weeks can have impact on the economy of an entire region, even in areas not directly affected; impact that can be orders of magnitude higher than that of an event of that extension, but evolving very rapidly.

The observation of space-time dynamics of such phenomena allows the advancement of knowledge necessary for the correct determination of event scenarios and risk scenarios. The combination of dynamic hydraulic and/or hydro-meteorological models and satellite observations (used as forcing or to create the landscape that forms the boundary of the model) offers tremendous potential in this regard.

The paper presents some recent results of the pilot project Opera "civil protection from floods" of the Italian Space Agency about the monitoring of space-time dynamics and socio-economic impact of some recent floods in Italy (Veneto), Albania and Pakistan.