



## **Rainstorm hazard problem-solving spatial-time scale invariant process model designing**

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Multiple Damaging Hydrological Event (MDHE) are rapidly developing worldwide disasters with affects urban settlements and ecosystems. During these events, heavy and/or prolonged rainfall triggers landslides, floods, and intense erosion phenomena which induce severe damage and victims on wide areas.

Based on the interpretation of rainstorm-MDHE interplay, the approach deriving from previous works was adapted at this stage to generate a model with a strong logical component to a Revised Rainstorms Hazard Index (RRHI), where rainstorm-pulsing force and resistance state are combined.

In this context, landscape response was achieved by individual formative events, while specific sequence event, that can affect landscape within a recognisable effect as a sequence, was only encountered in an approximate and qualitative way.

A retrospective validation experiment of rainstorm hazard modeling-control runs for different precipitation durations – among 1 to 48 hours – and the quantization of hydrological hazard are given to be compared with MDHE in two test-sites in Campania and Calabria Region during 1997–2008 period. For these test sites, the complete series of historical effects caused by MDHEs occurred in a 10-year study period has been gathered and used to validate the results of the rainfall model.

Perspectives for real-time application in emergency planning are ultimately given to be studied in future researches.