



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.