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On the spatial scalability of damage models: potentialities of the INSYDE model

Daniela Molinari (1), Annarita Scorzini (2), Francesco Dottori (3), Rui Figueiredo (4), and Mario L.V. Martina (4)

(1) Politecnico di Milano, Dipartimento di Ingegneria Civile e Ambientale, Milano, Italy (daniela.molinari@polimi.it), (2) Università degli Studi dell'Aquila, Dipartimento di Ingegneria Civile, Edile-Architettura e Ambientale, L'Aquila, Italy, (3) European Commission, Joint Research Centre, Ispra, Italy, (4) Scuola Universitaria Superiore IUSS Pavia, Pavia, Italy

Flood damage models have been traditionally implemented to be applied at either the local (i.e. micro) or the regional (i.e. meso) scale, depending on the specific objective of the analysis and available data for their derivation. As a consequence, it is often the case that estimations supplied at the two scales by different models are inconsistent with each other.
On the contrary, the INSYDE (In-depth Synthetic Model for Flood Damage Estimation) model (Nat. Hazards Earth Syst. Sci., 16, 1–15, 2016), being based on an expert-based synthetic approach, has been developed to be implemented at different spatial scales that is with different levels of information on hazard, exposure and vulnerability damage explicative variables.
In this work, we test the robustness of the model just with respect to its implementation at different spatial scales. By using detailed data collected after the flood that hit the town of Caldogno (North Italy) in 2010, we first apply the model at the local scale (i.e. at the scale of the individual building). Then, the damage assessment is performed at the meso scale (i.e. the scale of the municipality), using data available in regional and national public databases and implementing default values for those explicative variables for which information does not exist.
Results are significant also for the implementation of the model in different spatial contexts where typically different levels of information is available.