

Fragility and loss functions for the risk assessment of residential and portfolio buildings: results of MARS project and other scientific contributions worldwide

Conveners: Sergio Lagomarsino, University of Genoa, Italy - sergio.lagomarsino@unige.it
Angelo Masi, University of Basilicata, Italy - angelo.masi@unibas.it

The Special Session is aimed to promote a critical review and comparison of different methods to derive fragility curves and loss functions to assess building vulnerability and risk at large scale. Indeed, many fragility functions are available in the literature but their proper selection and use still represent a critical issue. First of all, a difficult task is the appropriate assignment of curves to the specific regional building classes, related to the taxonomy and according to the available inventory. In addition, it is useful to define a common vulnerability metric, to check the compatibility and relative behavior of different building classes, defined in terms of structural material (e.g.: reinforced concrete, masonry etc.), number of stories, age of construction.

The MARS project (Seismic Risk and Damage Maps at National scale), has been funded by the Italian Civil Protection Department through the ReLUIIS consortium (Masi et al., 2021). Its mandate was to update and improve the 2018 version of the National Risk Assessment requested to all Member States by the European Commission. The project achieved relevant results on the residential building stock at national level, as well as on individual structures like school buildings and churches. Damage and losses have been evaluated thanks to the IRMA platform, developed by EUCENTRE (Borzi et al. 2021).

The Special Session will be the opportunity to present to the scientific community the original methodologies and models developed within the project, as well as future developments, in order to foster an open discussion on these topics. To this end, the session is open to other contributions for a wide and inspiring discussion.

Masi A., Lagomarsino S., Dolce M. et al. (2021) Towards the updated Italian seismic risk assessment: exposure and vulnerability modelling. *Bull Earthquake Eng* 19, 3253–3286. <https://doi.org/10.1007/s10518-021-01065-5>

Borzi B., Onida M., Faravelli M. et al. (2021) IRMA platform for the calculation of damages and risks of Italian residential buildings. *Bull Earthquake Eng* 19, 3033–3055. <https://doi.org/10.1007/s10518-020-00924-x>