

Session ID: TNM-7

Title

MULTI-DISCIPLINARY SIMULATIONS AND MONITORING FOR REGIONAL ASSESSMENT AND MANAGEMENT OF DISASTERS

Convenors

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Description

Emerging advanced computational simulations, sensing/monitoring techniques, and performance-based probabilistic approaches enable us to generate data usable for pre- and near-real-time assessment and management of earthquake-induced disasters. However, our knowledge domains have historically only simulated regional impacts siloed within disciplines, which limits our ability to characterize regional risk. Therefore, a convergent approach including both engineers and social scientists is needed to address and understand the interdependent effects of natural hazards on our communities. For instance, a business continuity plan for medical facilities requires an understanding of the dependency of the surge and operational capacity on staff, staff, structure, and systems in addition to the expected engineering demand parameters for medical structures. In addition, impacts and loss do not increase linearly with these engineering demand parameters, and shifts in failure modes or functionality failures of businesses may cause exponential increases in loss. In addition, on the regional scale, there are consequences from earthquake-induced disasters, such as fires and tsunamis. A lack of simulations on cascading disasters could lead to underestimates of earthquake impacts, misrepresenting the economic and social consequences needed for appropriate risk assessment and management. For cascading disaster events, the linear combination of simulations on loss, time of recovery, and economic impacts, verified individually for each disaster assuming certain return periods, need another round of validation and verification, as appropriate validation for multi-hazard events or cascading and interdependent effects is uncertain.

Thus, this session will represent the research studies by engineers and social scientists on multi-disciplinary approaches for regional impact analysis and knowledge-based community management that addresses the consequences of cascading disasters.

Invited Speakers

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Affiliations

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