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Spatial-temporal dynamics of positive social resilience to flood hazards

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Concerns are rising that the earth system may reach some critical tipping points in the coming decades. Though, growing evidence also supports the potential of positive social tipping points that could propel transformative changes towards global sustainability. The recently approved ERC Starting Grant “StoRes” (Spatial-Temporal Dynamics of Flood Resilience) proposed a systematic analysis on unique cases of flood resilience, which is expected to demonstrate such a positive perspective over various spatial and temporal scales.

The ERC project focuses on the historical Tea Horse Road area (THR), a mountainous region of the Southeast Tibetan Plateau with well-documented history going back over 600 years. The study first sets up a theoretical framework on the multi-spatial-temporal features of flood resilience at the THR region, which covers the spatial differences (household, community, city and region) over the past 600 years regarding the governance, technology, society, and culture perspectives of flood resilience. A set of quantitative proxy data, historical archives, literature re-analysis, statistical data, observation data and field survey data are integrated into both the empirical study in the case areas and the agent-based modelling across the cases. Preliminary results indicated that, various strong and smart social regulations (governance, institutions, plans, management, motivations, orders, donations, dedication, etc.) enabled a wise development of many water conservancy projects that consequently enhanced the resilience of local communities to hydrological hazards.

The study aims to further 1) establish a theoretical understanding of the spatial-temporal scales of flood resilience; 2) investigate the spatial patterns and temporal evolution of flood resilience at the THR cases; 3) model the spatial-temporal dynamics of flood resilience using agent-based models; 4) transfer and generalize the research findings of the THR cases to the Mekong River basin and beyond. By doing so, the project will present pioneering work to shape the emerging research field of flood resilience, offering new and multi-dimensional knowledge on the dynamic nature of flood-society relations, and providing crucial missing links to understand how flood resilience develops within complex human-environment contexts.