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Resilience Modelling in Hazards and Disasters – A Practical View

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There are practical links between disaster risk management, climate change adaptation and sustainable development leading to reduction of disaster risk and re-enforcing resilience as a new development paradigm. There has been a noticeable change in the approaches to management of disasters, moving from disaster vulnerability to disaster resilience; the latter viewed as a more proactive and positive expression of community engagement with disaster risk management. Multiple case studies reveal links between attributes of resilience and the capacity of complex systems to absorb disturbance while still being able to maintain a certain level of functioning. Use of resilience as an appropriate matrix for investigation arises from the integral consideration of overlap between: (a) physical environment (built and natural); (b) social dynamics; (c) metabolic flows; and (d) governance networks. This paper provides an original systems framework for quantification of resilience. The framework is based on the definition of resilience as the ability of physical and social systems to absorb disturbance while still being able to continue functioning. The disturbance spatial and temporal characteristics depend on the direct interaction between impacts of disturbance (social, health, economic, and other) and adaptive capacity of the system to absorb disturbance.
The methodology reported here can be implemented by various industries/companies/organizations: (i) to quantify and compare different hazard response strategies; and/or (ii) to compare the performance of different industries/companies/organizations under similar hazard conditions. The implementation of the methodology is illustrated using dynamic resilience framework to compare various adaptation strategies of an urban system to the consequences of natural disasters.