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Measuring Recovery to Build up Metrics of Resilience to Flash Floods Based on Pollutant Discharge Data: A Case Study in East China

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Building “disaster-resilient” rather than “disaster-resistant” cities/communities requires the development of response capabilities to natural disasters and subsequent recovery. This study devises a new method to measure resilience via recovery capability to validate indicators from social, economic, infrastructural, and environmental domains. The pollutant discharge data (waste-water and waste-gas discharge/emission data) of local power plants, sewage treatment plants and main factories were used to monitor recovery process of both people’s living and local industrial production as the waste water/gas is released irregularly during the short disaster-hit period. A time series analysis of such data was employed to detect the disturbance on these infrastructures from disasters and to assess community recovery capability. A recent record-breaking flash flood in Changzhou, a city in eastern-central China, was selected as a case study. We used ordinal logistic regression to identify leading proxies of flood resilience. A combination of six variables related to socioeconomic factors, infrastructure development and the environment, stood out and explained 61.4% of the variance in measured recovery capability. These findings substantiate the possibility of using recovery measurement based on pollutant discharge to validate resilience metrics, and contribute more solid evidences for policy-makers and urban planners to make corresponding measures for resilience enhancement.