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Infrastructure resilience forecasting: A holistic resilience assessment framework

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Abstract:

In view of the increased frequency and intensity of climate change-induced infrastructure failures there is an urgent need to adapt infrastructure to ensure continuous and reliable service provision. The UK's vulnerability to climate change is becoming increasingly evident as the replacement and upgrading of economic infrastructure are progressing with a considerably slower pace. Hence, a holistic resilience assessment framework, that addresses the vulnerabilities of infrastructure to the hazards of climate exacerbated shocks and informs adaptation planning, is needed.

Inviting feedback from the conference, this paper investigates the challenges involved in establishing a place-based holistic resilience assessment framework, exploring the scope of infrastructure to be included, the need for a benchmark reference point, the indicators and metrics to be utilised, and outcome-driven forecasting output. The paper outlines the development and high-level exploratory testing of a novel framework designed to avoid abstraction and enable place-based resilience forecasting that will inform adaptation processes whilst preventing infrastructure overcapitalisation, resource overconsumption, or maladaptation

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Main highlights:

- Climate change is exposing weak points in the UK's infrastructure systems through more frequent droughts, intense storms, sea level rise, higher temperatures, and heavier rainfall.
- A gap in the literature is identified whereby resilience is discussed without a clear baseline for normal service or any measurement of the buffer needed to protect systems from climate stresses.
- A draft place-based holistic Resilience Assessment Framework is proposed and tested at high level.
- Feedback from the conference on the draft Resilience Assessment Framework described here is sought as the study moves from conceptual stage to practically applicable tool.

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