International Cartographic Association
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Geospatial Metaphors in the Communication of Climate Change-Related Flooding Uncertainty

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Keywords: Geovisualisation, Uncertainty, Virtual Reality, Climate-Change, Visual Metaphors

Abstract:

Maps have long been used to depict change in the coastal zone (receding coastlines, property lost etc.), but associated uncertainty is not often depicted. Cartographers have developed a rich visual language of expressing spatial and attribute uncertainty in general (e.g., from colour (see Fig.1), texture, or fog). These visualisations often gain their power of communication through the action of visual metaphors. Such metaphors use some familiar phenomenon (fog) to explain something less tangible or understandable (uncertainty).

The spatial and attribute uncertainty associated with Climate Change-Related Flooding Hazard projections and their potential impact on properties and their financial value, is expansive both in scope and quantity. The large scope comes from the various scenarios, flooding algorithms, and damage functions (which relate flooding extent to property extent to make a call on whether financial loss has occurred), to name but a few sources that can affect projections. The STRAND project investigates this phenomenon, focusing on financial risk in New Zealand's coastal regions, and is the focus of the research here.

The research represented in this abstract has at least two long-term aims, reporting on a work in progress. One is an investigation of how various geovisualisation methods, including colour, fog and overlays can effectively communicate uncertainty to decision-makers, policymakers, and the public. We propose a new visual metaphor that is conceptually apt for uncertainty associated with flooding hazards: water itself and associated turbidity. Second is an examination of uncertainty visualisation in a contemporary digital environment that was not in an advanced-enough development state when many of these techniques were first presented in the 1990s. This environment is immersive virtual reality – VR – which promises expressive new contexts for these methods, particularly fog, and turbidity.

Figure 1: Flooding status in a VR environment using colour-saturation banding to communicate uncertainty.

https://doi.org/10.5194/ica-abs-7-4-2024