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AN EVALUATION OF ABSTRACTION AND REALISM ON THE PERCEPTION OF HAZARDS AND RISKS

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An important factor in the design of any map or geovisualization is the selection of an appropriate level of abstraction or realism to represent geographic data in cartographic form. Such a consideration is particularly important in the context of hazard and risk mapping, since these maps and geovisualizations may be utilized for planning, public policy, or decision-making purposes. Recent technological developments in geovisualization such as three-dimensional (3-D) rendering software, virtual reality and immersive environments, 3-D stereoscopic displays, and digital globes have provided cartographers with additional options for elevating the level of realism utilized for representation of hazards and risks. Yet, hazard/risk mapping is often characterized by various types of uncertainty (e.g., uncertainty associated with hazard/risk forecasting, data quality issues for volunteered geographic information, etc.). An important challenge is the development of maps and geovisualizations that communicate the critical issues associated with hazards and risks to the appropriate audience for the desired map use task while taking into consideration the various levels of uncertainty inherent to hazard/risk maps. In the context of a hazard with a high level of certainty, enhanced realism (or low level of abstraction) in the map or geovisualization may be advantageous to convey an elevated level of danger to map users. However, in the context of a risk, where the likelihood of a particular hazard occurring is subject to various uncertainties, a high level of realism may yield unintended results. In these cases, a hypothetical risk may be portrayed as overly realistic, in a manner that falsely suggests that a hazard event has already occurred.

User-centered studies of the effects of varying levels of abstraction and realism are necessary for understanding how users estimate levels of hazard or risk from maps and geovisualizations. In this poster, we present results from a study of the role of levels of realism and abstraction on perception of risk level in the realm of hazard/risk mapping. Specifically, we focus our examination on the effectiveness of large-scale maps and geovisualizations utilizing sea level rise resulting from climate change as a case study. Using qualitative methods for data collected from domain novices, we compare and contrast risk estimation of sea level rise inundation utilizing three types of displays: standard map format (low level of realism), map combined with high resolution imagery (medium level realism), and 3-D renderings (high level of realism). We relate project results to other studies related to the role of realism on risk estimation or data uncertainty, as well as the literature on considerations for hazard/risk mapping in general.