

Exploring Spatial Mismatches Between Public Risk Perception and Flood Exposure to Sea-Level Rise in China's Coastal Provinces

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Abstract

Sea-level rise (SLR) presents growing environmental and socioeconomic challenges to China's densely populated coastal regions. While scientific assessments have identified areas facing substantial flood exposure, public awareness of these risks may not always align with actual vulnerability. This study examines the spatial relationship between public risk perception and flood exposure across ten coastal provinces and municipalities in China. Approximately 300 Weibo comments related to sea-level rise, flooding, and storm surges were collected and analyzed using Alibaba Cloud's natural language processing model to quantify public risk perception through weighted sentiment scores. Flood exposure was estimated by integrating NASA sea-level rise projections, Global Storm Surge Reconstruction datasets, and population distribution data using Google Earth Engine. Provinces were classified according to median thresholds of public risk perception and flood exposure to identify areas where perceived and actual risks were either aligned or mismatched. The analysis identified two notable cases of perception–exposure mismatch. Guangdong exhibited relatively low public risk perception despite high flood exposure, whereas Liaoning demonstrated comparatively higher public risk perception despite lower flood exposure. These findings demonstrate the potential of integrating social media sentiment analysis with geospatial flood assessment to identify perception gaps and support more targeted climate communication and adaptation planning.

Keywords: Climate communication; China; Environmental awareness; Risk perception; Sea-level rise