



A gradient analysis of human settlement patterns and the potential sea level rise impact

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Human settlements located in river deltas are highly sensitive to increasing risks of global sea-level rise, climate extremes, intensive human activities, and dramatic urbanization processes. We use different geo-spatial datasets on settlement structures, socioeconomic data, and sea level rise projections to evaluate the potential sea level rise impact across multiple scales of coastal zones in different megacity regions. The focus is on quantifying the spatial gradient behaviour of the potential sea level rise impact. The proposed gradient metric compares the areal extent of human settlement to spatial variations across multiple coastal zones. It can also be used as an indicator for environmental protection by comparing the spatial heterogeneities of human activities exposed to extreme weather at megacities scale. The results are crucial for quantifying the spatial interactions between coastal physiographic characteristics and human settlement patterns and the extent to which human may be exposed to climatic changes. Our research highlights the potential benefit of global geo-spatial products in measuring the impact of climate changes and natural hazards on human settlements' sustainability along the coastal areas.