ID: W2899624635

TITLE: Adaptation to sea level rise on low coral islands: Lessons from recent events

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ABSTRACT:

In the past two decades there have been fears that many low-lying atoll islands around the world could disappear as a consequence of climate change and sea level rise, leading to mass migration and threatening the existence of several island nations. Here we show how sea level rise does not inevitably lead to coastal areas becoming uninhabitable, and that humans have an innate and often underestimated capacity to adapt to changes in their environment. To do so we showcase three instances of human- and earthquake-induced land subsidence that have taken place in the 21st century, where the coastal/island areas are still inhabited despite the challenge of living with higher water levels: the Tohoku coastline following the 2011 Tohoku Earthquake Tsunami (subsidence ?0.4?1.0 m), the present day situation of coastal areas in Jakarta due to ground water extraction (>5.0 m), and the islands of Tubigon, Bohol in central Philippines after the 2013 Bohol Earthquake (?1.0 m). Humans are able to adapt and arrive at solutions even when confronted with cases of rapid rises in water levels, and thus it is likely that in the future vulnerable coastlines will be engineered and largely remain at present day locations, particularly in densely populated areas. If anything, around densely populated areas it is more likely that humans will continue to encroach on the sea rather than the reverse. We caution, however, that small islands are not homogeneous, and many are unlikely to respond to rising sea levels in the manner that atolls do (in fact, many might just resort to build at higher elevations). Where engineering and other adaptation responses become necessary, the financial and human resource requirements may well be beyond capacity of some small islands, which could lead to impoverishment and associated challenges in many communities.

SOURCE: Ocean & coastal management

PDF URL: None

CITED BY COUNT: 39

PUBLICATION YEAR: 2019

TYPE: article

CONCEPTS: ['Atoll', 'Subsidence', 'Sea level', 'Geography', 'Climate change', 'Oceanography', 'Coral reef', 'Coral', 'Ground subsidence', 'Reef', 'Geology', 'Physical geography', 'Structural basin', 'Paleontology', 'Mining engineering']