The Future of the World's Sandy Beaches Under a Changing Climate

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The world’s coastline consists of more than 30% of sandy beaches, many of which are already eroding. Climate change is expected to put more pressure on sandy shorelines, not only because of rising seas, but also from changing weather patterns, affecting the characteristics of marine storms. Here we discuss projections of coastline dynamics along the world’s sandy beaches in view of climate change. Using Bruun’s rule combined with new global wave projections and a dataset on beach slopes, we find that sea level rise will result in median retreat around -28 m and -35 m under RCP4.5 and RCP8.5, respectively, by the year 2050. The shoreline retreat is projected to climb to around -63 m and -105 m, respectively, by the end of the century. The impact of episodic erosion during storm events will most likely become more severe as sandy beaches will shrink, however, changes in the intensity and characteristics of storms seem to leave an noticeable footprint only in few locations worldwide. Ambient change, extrapolated from historical behaviour, is expected to contribute significantly to future sandy beach erosion. However, ambient change can also drive accretion, as is the case along a big part of East Asia. The present findings imply that many sandy beaches worldwide will experience retreat of more than 100 m, i.e. they are very likely to vanish, especially in the absence of accommodating space. The socio-economic implications to tourism, quality of life and the economy can be devastating, especially in small, tourism dependent communities.

References: