



Differences between Changes in Extreme and Mean Sea Levels and Planning Allowances for Coastal Protection for the Extremes of the Future

Philip Woodworth (1), John Hunter (2), Charls Antony (3), and Alakkat Unnikrishnan (3)

(1) National Oceanography Centre Liverpool, PSMSL, Liverpool, United Kingdom (plw@noc.ac.uk), (2) Antarctic Climate & Ecosystems Cooperative Research Centre, Private Bag 80, Hobart, Tasmania 7001, Australia (jrh@johnroberthunter.org), (3) CSIR - National Institute of Oceanography, Dona Paula, Goa, 403004, India (cantony@nio.org;unni@nio.org)

Previous studies of changes in extreme sea levels around the world during the past few decades have shown that they largely parallel those in mean sea levels, although with some exceptions at individual stations or in particular regions. In the present study, we have used a much larger data set of high-frequency sea level data from a global set of tide gauges in order to investigate the reasons for the exceptions in greater detail, including the role of the major modes of climate variability. The global data set is called GESLA-2 (Global Extreme Sea Level Analysis Version 2) which contains major improvements over the earlier GESLA-1 version (Menendez and Woodworth, JGR 2010) A special study of extreme sea levels is performed using data from India which, for various reasons, are not included in GESLA-2. In addition, the much larger temporal and spatial coverage of GESLA-2 is used to further update the coastal 'allowances' for future sea level rise presented by Hunter et al. (Ocean Engineering 2013), and updated in the IPCC AR5, in which guidelines are given for raising coastal defences for a given scenario of future sea level rise at stations where the climatology of extreme sea levels is known.