Inception of a global atlas of Holocene sea levels

Nicole Khan[1], Erica Ashe, Robert Kopp, Ben Horton, and the HOLSEA working group[*]
[1]University of Hong Kong
[*]A full list of authors appears at the end of the abstract

Determining the rates, mechanisms and geographic variability of sea-level change is a priority science question for the next decade of ocean research. To address these research priorities, the HOLocene SEA-level variability (HOLSEA) working group is developing the first standardized global synthesis of Holocene relative sea-level data to: (1) estimate the magnitudes and rates of global mean sea-level change during the Holocene; and (2) identify trends in spatial variability and decipher the processes responsible for geographic differences in relative sea-level change.

Here we present the efforts of the working group to compile the database, which includes over 12,000 sea-level index points and limiting data from a range of different indicators across seven continents from the Last Glacial Maximum to present. We follow a standard protocol that incorporates full consideration of vertical and temporal uncertainty for each sea-level index point, including uncertainties associated with the relationship of each indicator to past sea-level and the methods used to date each indicator. We highlight important challenges overcome to aggregate the standardized global synthesis, and discuss those that still remain. Finally. we apply a spatio-temporal empirical hierarchical statistical model to the database to estimate global sea-level variability and spatial patterns in relative sea level and its rates of change, and consider their driving mechanisms. Long-term, this effort will enhance predictions of 21st century sea-level rise, and provide a vital contribution to the assessment of natural hazards with respect to sea-level rise.

HOLSEA working group: Alessio Rovere Alisa Baranskaya Amila Sandaruwan Ratnayake Andrea Dutton Andrew Green Andrew Parnell Ane Garcia Artola Ben Horton Benoit Lecavalier Bob Kopp Byron Halavik Dorit Sivan Ed Garret Erica Ashe Fengling Yu Geoff Richards Graham Rush Holger Steffen Ian Shennan Jacky Austermann Juliet Sefton Kim Cohen Lauren Toth Lev Tarasov Long Wang Marc Hijma Mengyuan Wang Mike Bentley Miklos Kazmer Natasha Barlow Niamh Cahill Nicole Khan Pingping Huang Pippa Whitehouse Roland Gehrels Sarah Bradley Simon Engelhart Tanghua Li Tim Shaw Tor Tornqvist Volker Klemann Xiong, Haixian Yongqiang Zong