EGU22-12689
https://doi.org/10.5194/egusphere-egu22-12689
EGU General Assembly 2022

Improving past and future relative sea-level constraints for the Norwegian coast

Thomas R. Lakeman[1], F. Chantel Nixon[2], Anders Romundset[1], Matthew J.R. Simpson[3], John Inge Svendsen[4], Kristian Vasskog[5], Stein Bondevik[6], Glenn Milne[7], and Lev Tarasov[8]

[1]Geological Survey of Norway, Trondheim, Norway (thomas.lakeman@ngu.no)
[2]Norwegian University of Science and Technology, Trondheim, Norway
[3]Geodetic Institute, Norwegian Mapping Authority (Kartverket), Oslo, Norway
[4]Department of Earth Science, University of Bergen, Bergen, Norway
[5]Department of Geography, University of Bergen, Bergen, Norway
[6]Department of Environmental Sciences, Western Norway University of Applied Sciences, Sogndal, Norway
[7]Department of Earth and Environmental Sciences, University of Ottawa, Ottawa, Canada
[8]Department of Physics and Physical Oceanography, Memorial University, St. John's, Canada

New research aims to improve relative sea-level (RSL) projections for the Norwegian coast. The main objectives are to: i) collect observations of past RSL changes, ranging from the end of the last ice age to the last century, ii) develop a high-quality database of post-glacial sea-level index points (SLIPs) for the Norwegian coast, and to iii) improve our understanding of past and future vertical land motion using glacial isostatic adjustment (GIA) modelling. To now, our collection of new empirical data has focussed on three significant, but enigmatic RSL histories that are not adequately reproduced in existing GIA models: very recent stillstands and transgressions documented by historical tide gauge records, rapid transgressions during the early- to mid-Holocene Tapes period, and abrupt transgressions during the latest Pleistocene Younger Dryas chronozone. Ongoing field sampling is focussed on developing high-resolution RSL trends from salt marshes, isolation basins, and raised beaches, using multiple biostratigraphic and geochemical proxies (i.e. micropaleontology, macrofossils, x-ray fluorescence, C/N) and dating techniques (i.e. Pb-210, Cs-137, C-14, tephrochronology, geochemical markers). Results from various localities spanning the Norwegian coast provide robust constraints for the timing and rate of RSL change during the Younger Dryas and Tapes chronozones. Additional results providing new estimates of very recent RSL trends in southwest Norway are presented by Holthuis et al. (*Late Holocene sea-level change and storms in southwestern Norway based on new data from intertidal basins and salt marshes*; Session CL5.2.2). These new and emerging constraints are being integrated into a post-glacial RSL database that incorporates high-quality data from the entire Norwegian coastline. Over 1000 SLIPs have been assembled from published studies. These existing data were updated using current radiocarbon calibration curves, high-resolution digital elevation models, new field observations, and new quantitative estimates of relevant uncertainties. Ongoing GIA modelling is utilizing the new RSL database, a glaciological model that freely simulates ice sheet changes, as well as geodetic and ice margin chronology constraints, to

develop rigorous uncertainty estimates for present and future GIA along the Norwegian coast.