Geophysical Research Abstracts
Vol. 14, EGU2012-3077, 2012
EGU General Assembly 2012

Past sea level reconstruction over the Arctic Ocean since the mid-1950s

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We investigate the regional variability in sea level in the Arctic Ocean region over the past 50 years using an EOF-based 2-dimensional past sea level reconstruction based on the 36 long tide gauge records available in this region (essentially along the Norwegian and Russian coasts) and sea level grids from satellite altimetry. For the latter, we used the reprocessed multisatellite altimetry data over the Arctic from Prandi et al. (2012). The reconstruction has been validated in several ways. Because in the reconstruction, we used all long, high quality tide gauge records available in the region, none were left for validation of the reconstruction. Thus, we removed one by one each tide gauge record, and then performed 36 new reconstructions over the 50-year time span with only 35 tide gauge time series and compared at the left tide gauge site reconstructed and observed sea level. We also compared over the altimetry era (since 1993) the reconstructed trends with the observed, altimetry-based trends. Finally we compared the reconstructed spatial trend patterns with outputs from different ocean circulation models over different time spans.