PATTERNS OF COHERENT CLIMATE SIGNALS IN EUROPEAN SEA LEVEL TIME SERIES DURING THE PAST 200 YEARS

S. Jevrejeva (1), P. Woodworth (1), J. Moore (2), A. Grinsted (2)
(1) Proudman Oceanographic Laboratory, Birkenhead, UK, sveta@pol.ac.uk; (2) Arctic Centre, University of Lapland, Rovaniemi, Finland

European tide gauge records back to 1800 have been used to examine the variability in time series of sea level using advanced statistical techniques including the singular spectrum analysis (MC-SSA) and wavelet transform (WT).

Results from our study show for most of the time series the main contribution to variance is associated with accelerating long-term secular trends that describe 39-52% of sea level variability. We relate these changes to the rise of mean sea level (which is about 1-2 mm yr⁻¹), due to the mass and volume increase of World Ocean. Four dominant oscillations with periods 2.3, 3.5, 5.2 and 7.8 years explain from 12 to 17% of the total variance; crosswavelet power and wavelet coherence confirm the linkages of those signals to the changes in atmospheric circulation. We discuss also considerable contribution from 12-30 year oscillations, related to possible changes in the thermohaline circulation in Atlantic Ocean.