



Sea level oscillations over minute timescales: a global perspective

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Sea level oscillations occurring over minutes to a few hours are an important contributor to sea level extremes, and a knowledge on their behaviour is essential for proper quantification of coastal marine hazards. Tsunamis, meteotsunamis, infra-gravity waves and harbour oscillations may even dominate sea level extremes in certain areas and thus pose a great danger for humans and coastal infrastructure. Aside for tsunamis, which are, due to their enormous impact to the coastlines, a well-researched phenomena, the importance of other high-frequency oscillations to the sea level extremes is still underrated, as no systematic long-term measurements have been carried out at a minute timescales.

Recently, Intergovernmental Oceanographic Commission (IOC) established Sea Level Monitoring Facility portal (<http://www.ioc-sealevelmonitoring.org>), making 1-min sea level data publicly available for several hundred tide gauge sites in the World Ocean. Thereafter, a global assessment of oscillations over tsunami timescales become possible; however, the portal contains raw sea level data only, being unchecked for spikes, shifts, drifts and other malfunctions of instruments. We present a quality assessment of these data, estimates of sea level variances and contributions of high-frequency processes to the extremes throughout the World Ocean. This is accompanied with assessment of atmospheric conditions and processes which generate intense high-frequency oscillations.