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Updated tide gauge records for specifying mean sea level estimates along the Estonian coast

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Networks of automatic pressure measurement based tide gauges (TG) is managed by the Estonian Environmental Agency and Department of Marine Systems of TalTech. During the recent reconstruction of Estonian high-precision levelling network the local TG ties were re-measured. Estonia adopted EVRS (European Vertical Reference System) based height system in 2018 - EH2000. This datum change caused the previous heights (belonging to the obsolete 1977 Baltic Height System, BHS77) to increase from 14cm to 25cm along Estonian coast in a north-westerly direction. Accordingly, the tide gauge records has to be corrected. This study analyses corrected time series of 22 TG-s along the Estonian shoreline of the four years (2014-17) period. Statistical analysis reveals improvements in the consistency of the TG time-series. The standard deviation of the mean sea level in EH2000 has decreased about 35%, the main cause of decrease lies in the fact that new adjustment in EVRS system is more consistent with actual values, i.e. taking into account as well effects from glacial isostatic adjustment. Records of some Finnish tide gauges (located at the northern shores of Gulf of Finland) are used for verifying the study results. New, corrected data can be used for various regional and interdisciplinary studies, e.g., confirming the land uplift values along shorelines.