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# Towards worldwide height unification using ocean information

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**Abstract** This paper describes how we are contributing to worldwide height system unification (WHSU) by using ocean models together with sea level (tide gauge and altimeter) information, geodetic (GPS and levelling) data, and new geoid models based on information from the GRACE and GOCE gravity missions, to understand how mean sea level (MSL) varies from place to place along the coast. For the last two centuries, MSL has been used to define datums for national levelling systems. However, there are many problems with this. One consequence of WHSU will be the substitution of conventional datums as a reference for heights with the use of geoid, as the only true "level" or datum. This work is within a number of GOCE-related activities funded by the European Space Agency. The study is focused on the coastlines of North America and Europe where the various datasets are most copious.

**Key words** height unification; mean sea level; geodetic science; geoid models; national datums