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Treatment of the permanent tide in the Global Geodetic Observing System

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Different fields of geodesy contributing to the Global Geodetic Observing System use different conventions in the treatment of the permanent tide. The International Terrestrial Reference Frame is in the (conventional) tide-free system, the new International Height Reference Frame is in the mean-tide system, Earth geopotential models from satellite gravity missions are available both in the zero-tide and in the tide-free systems, and terrestrial gravity results are produced in the zero-tide system. Care is therefore needed when results of different techniques are combined in a single product. I discuss the conventions in each field and provide formulas for moving between the systems, consistent with the International Earth Rotation Service Processing Standards on one hand, and with legacy data produced with other standards on the other.