Geophysical Research Abstracts
Vol. 13, EGU2011-5151, 2011
EGU General Assembly 2011

Comparison of the global ocean tide models TPXO7.2, GOT00.2, NAO.99b, FES2004, and EOT10a in New Zealand

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We investigate a regional accuracy of the currently available global ocean tide models using the tide-gauge data. The ocean tide data from TPXO7.2, GOT00.2, NAO.99b, FES2004, and EOT10a models are used. The analysis is conducted along the coastline of New Zealand at 13 tide-gauge stations in Wellington, Bluff, Tauranga, Taranaki, Nelson, Chatham, Marsden Point, Jackson, Scott Base, Timaru, Lyttelton, Napier, and Dunedin. The comparison of the ocean tide time-series with the tide-gauge records at these stations is done over the study period of 1 year (2005) with 1 hour data sampling interval. The tide-gauge data are corrected for air-pressure variations, secular trend due to the sea level rise, and periodical signals due to ocean and atmospheric loading. The comparison reveals that the global ocean tide model TPXO7.2 provides the best results along the coastline of New Zealand. The best STD fit of TPXO7.2 ocean tide model with the tide-gauge data is 5.9 cm (with the mean of 7.9 cm) at the Marsden Point tide-gauge station located at the upper North Island. The largest differences are found at the Bluff tide-gauge station situated at the south of the South Island, where the STD of differences is 20.7 cm (with the mean of 35.4 cm). These discrepancies are mainly due to the errors in ocean tide phase, while the errors in amplitude are typically at the level of only a few centimetres.