

EGU2020-13544, updated on 26 Sep 2020
<https://doi.org/10.5194/egusphere-egu2020-13544>
EGU General Assembly 2020
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Impact of sea level variations on hydrographic survey around Taiwan

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Taiwan is an island entirely surrounded by oceans, so living and economics are significantly influenced by the oceans. The electronic navigational chart system is extremely important for improving the safety of marine navigation and ocean depth is the essential data for electronic charts. Sea surface variations affected by ocean tide and sea level change are the main error sources in hydrographic surveys since the traditional tidal correction only using tide gauge stations, ignoring geographically non-uniform ocean tides and sea level anomalies around Taiwan. In this research, we evaluate two factors impacting the accuracy of hydrographic surveys, including ocean tides and seasonal sea level variations, using tide gauge records, satellite altimeter data and ocean tide models around Taiwan, and also analyze the accuracy of the ocean tide models around Taiwan. In addition, sea level anomalies are strongly influenced by climate changes in recent years. An understanding of seasonal sea level cycle and its spatial and temporal changes are importance because its temporal changes can result in the variation of the frequency and magnitude of coastal hazards. Therefore, we will apply the Ensemble Empirical Mode Decomposition to sea level data to assess the stability of the long-term seasonal sea level fluctuations with time.

How to cite: Lan, W.-H., Kuo, C.-Y., Lin, S.-F., and Lu, C.-H.: Impact of sea level variations on hydrographic survey around Taiwan, EGU General Assembly 2020, Online, 4–8 May 2020, EGU2020-13544, <https://doi.org/10.5194/egusphere-egu2020-13544>, 2020