

# On the Deviation of Tide Measured from Multiple Gauges

Peter T.Y. Shih, Hui-Jung Wang and Jiu-Fu Huang (Chinese Taipei)

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## SUMMARY

The measurement technology of tide has been through a long evolution path. From the tide poles which was applied prior to the invention of self-recording gauges around 1830, and the float gauges which was the main type of instrument for 150 years, the most common gauges at present include those based on pressure sensors, acoustic sensors, and RADAR sensors. At the tide station established nearby the national Height Origin located in Keelung, Taiwan, these three types of gauge were all deployed. This tide station, located inside the campus of National Museum of Marine Science and Technology, has two major functions, namely, public education and potentially serving as the reference tide station of the Height Origin. In this writing, the comparison of tide heights observed from these three different type of gauges are reported. While the trend of these tide measurements looks very similar, the individual observation at the same time epoch differs. And, the Mean Sea Level derived from the three gauges differs as well. These indicate that there are not just random components, but also systematic deviations. From the tide observed from 2015 to 2018, the MSL deviation is about +0.012 m for the pressure sensor, -0.013 m for the RADAR sensor, as compared to the acoustic sensor. Besides the potential deviation resulting from the physical measurements, sensor calibration may be a critical issue.

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