University of Hawaii Sea Level Center

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Project Summary

The University of Hawaii Sea Level Center (UHSLC) is a research group aimed at improving our understanding of global sea-level rise and regional sea level variability. Toward this goal, the UHSLC participates in the operation and maintenance of the global sea level observing system based on island and coastal tide gauge stations. UHSLC technicians work with international agencies, particularly in developing countries, to ensure that tide gauge stations are maintained in accordance with procedures specified by scientific oversight groups. The UHSLC also assembles and quality controls tide gauge data from the global network of stations. UHSLC researchers use tide gauge observations in studies of sea-level rise, regional sea-level variability, tides, extreme sea-level events, tsunamis, wave-driven setup, and vertical land movement contributions to relative sea level. Having sea level researchers, technicians, and data analysts working side by side ensures that the tide gauge climate record is maintained at the highest level.

The UHSLC focuses on the collection of high frequency measurements that are available in near-real time usually via the Global Telecommunications System (GTS). The center complements the Permanent Service for Mean Sea Level (PSMSL), which is the primary archive for historic monthly-averaged time series of sea level. Data are provided to the UHSLC from ~ 450 stations maintained by 65 international agencies. The UHSLC is a major contributor to the Intergovernmental Oceanographic Commission Global Sea Level Observing System (GLOSS), and participates in operational and scientific oversight through the GLOSS Group of Experts. The UHSLC is primarily concerned with the implementation of the GLOSS Core Network of stations, and the Global Climate Observing System (GCOS) sea level network, a subset of GLOSS designated as being of high importance for climate research. Without UHSLC participation, both the GLOSS and GCOS datasets would be severely compromised.

The UHSLC distributes near-real time and delayed mode data directly from its host web site, http://uhslc.soest.hawaii.edu. The center collaborates with NOAA's National Oceanographic Data Center (NODC) to maintain the Joint Archive for Sea Level (JASL), which is a research quality database of hourly sea level from an expanded set of global stations.

UHSLC datasets are used in conjunction with operational numerical models, for the calibration of satellite altimeter data (Figure 1), the production of oceanographic products, and research on interannual to decadal climate fluctuations and short-term extreme events (Mitchum et al., 2010). UHSLC station data are made available directly to the Pacific Tsunami Warning Center, the West Coast and Alaska Tsunami Warning Center, the Japanese Meteorological Agency for tsunami monitoring, and other national and international tsunami warning agencies. Over the years the UHSLC has provided tide gauge observations for various national and international research programs, including the North Pacific Experiment (NORPAX), the Tropical Ocean Global Atmospheres Experiment (TOGA), the World Ocean Circulation Experiment (WOCE),

the Global Ocean Data Assimilation Experiment (GODAE), and the Climate Variability and Predictability (CLIVAR) program.

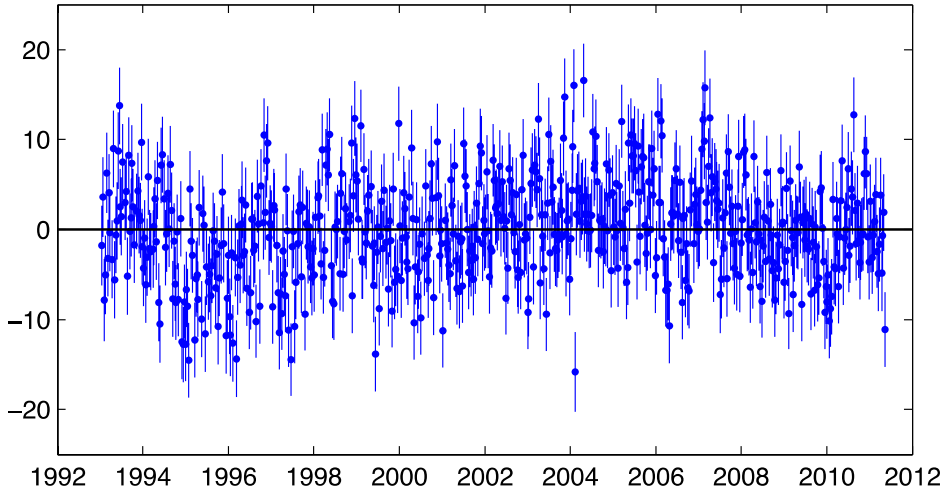

Figure 1. *An example of how the UHSLC Fast Delivery Dataset is used to check altimeter datasets for possible drift. This example uses the TOPEX/Poseidon, Jason-1 and Jason-2 merged altimeter dataset produced at the Goddard Space Flight Center (provided by Brian Beckley, NASA). Point-wise (10-day sampling) the standard deviation in the altimeter, tide gauge differences is typically 5-6 millimeters. Fitting a trend to this difference time series (not shown) yields a drift estimate that is not significantly different from zero, meaning that there is no evidence for any altimeter drift in this case. This type of analysis is routinely performed for multiple altimeter datasets produced by multiple groups (Figure provided by Gary Mitchum, University of South Florida).*