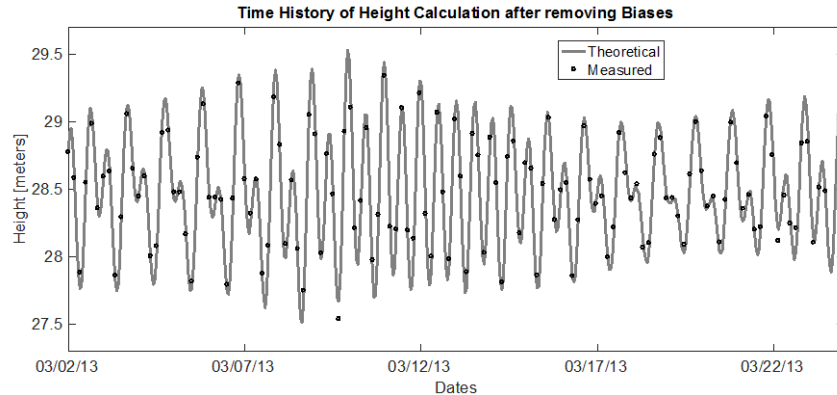
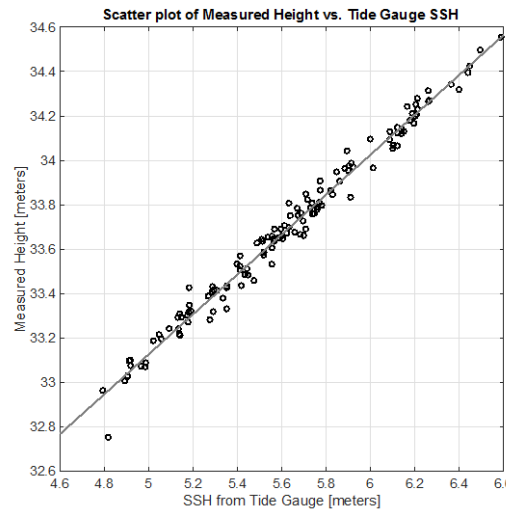


# Precision of Ku-band Reflected Signals of Opportunity Altimetry (Rashmi Shah)

## Sea Surface Height



Time history of computed height plotted along with the expected height computed from the tide gauge SSH values (top). Scatter plot of computed height and the SSH measured by the tide gauge located at Platform Harvest (bottom). The correlation coefficient was found to be 0.99. The standard deviation between the altimetric retrievals and tide gauge measurement was found to be 6.8 cm and the bias was found to be 5.2 m.



**Problem:** Retrieving sea surface height (SSH) using a Ku-band (12.224 GHz) reflected signals of opportunity (SoOp) delay measurements.

**Finding:** Sea Surface Height was retrieved by measuring the delay of the waveform using a parabolic fit in a least-squares approach. The retrieval was done with 23 days of data collected at Platform Harvest from a single channel of Ku-Band Direct Broadcast satellite. The standard deviation in the estimation of height was found to be 6.8 cm (similar to as predicted from theory). It was also shown that the error in the estimation of height can be reduced to 3.5 cm by utilizing the full bandwidth (all the channels) of the SoOp used.

**Significance:** A proof-of-concept experiment and validation of an error model for bistatic altimetry using SoOp showed that high precision altimetric measurements can be made using digital communication signals.

Shah, R. & Garrison, J. (2017). Precision of Ku-band Reflected Signals of Opportunity Altimetry . IEEE Geoscience and Remote Sensing Letters, *Accepted and in final press.*