**Abstract:**

Several large data provided by tidal gauge is a combination of coastal tides and oceanic contributions. Both of these signals are complex and do not occur in isolation but rather in conjunction with each other. The variations need to be understood in order to study the complex interplay between the two components. The most common method used to extract the contributions is to use satellite altimetry data, which allows multi-temporal observation and subtraction of the oceanic signal. However, these methods have their own limitations and uncertainties. The aim of this study is to evaluate the effectiveness of these methods and to improve the understanding of the underlying processes.

**Authors information:**


**Experimental Setting and data collection:**

**BPG sites selection:**

- The area is intensively studied for its good background knowledge on past and present day deformation (Peltier et al. 1998, Calmant et al. 2003). Vertical movements at the location are known to be particularly true around the Pacific Ocean.

- The horizontal deformation is used to control any vertical movement that the Wusi site may undergo. An instrumental benchmark is a steel frame anchored on the shore on the Wusi tide gauge (Figure 2, Calmant et al., 2003). Several marine geodetic and geophysical surveys (lead by BGR in Stearns) are conducted on the site. The BPG sensors are installed on 2 pressure gauges have been continuously recording pressure measurements and shipboard GPS data over the submerged gauge. The BPG data are processed in kinematic mode (with TRACK modulus in the GAMIT/GLOBK package). The GPS data processing: GPS data are processed in kinematic mode with the TRACK modulus in the GAMIT/GLOBK package.

**Pressure gauge data:**

- The pressure gauges have been continuously recording pressure measurements and shipboard GPS data over the submerged gauge. The pressure gauges are a combination of pressure measurements and shipboard GPS data and from Topex-Poseidon data. Results: Mean water depth at Wusi site: 11.95 m (averaged depth since October 2000), when a significant event occurred on Santo and induced a 7.5° north-west movement at Wusi, see Figure 3.

**Ellipsoidal elevation of the seafloor at Wusi:**

- The ellipsoidal elevation of the seafloor is obtained from an adjustment of pressure measurements and shipboard GPS data over the submerged gauge. Adjustment and residual are shown Figure 8.

**Conclusion and perspectives:**

We were able to compare seismic absolute elevation using two sets of independent measurements. The long-term deformation related to water depth in the Pacific Ocean. We also thank the students from OSU for their constructive comments.

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We would like to thank Philippe Téchiné from LEGOS (Toulouse, France) for his help on tidal computations. We also thank the students from OSU for their constructive comments.

**In port calibration of the GPS antenna / water:**

In port calibration of the GPS antenna / water: the geometry and the background knowledge on past and present day deformation (Peltier et al. 1998, Calmant et al. 2003). The antenna elevation over the seabottom is measured by a combination of pressure measurements and shipboard GPS data over the submerged gauge. The elevation is derived by a combination of pressure measurements and shipboard GPS data over the submerged gauge. The elevation is derived.

**Ellipsoidal altitude of seafloor from Topex data and from BPG recording tied by GPS:**

Ellipsoidal altitude of seafloor from Topex data and from BPG recording tied by GPS: preliminary analysis. Topex-Poseidon data processing: Full and dry topographic corrections. Sea State Bias correction. Solid Earth tide correction. Polar tide correction. Due to the strong topography in the area, the geoid step is important and cannot be neglected. The vertical motion data that are not perfectly synchronized. For that reason, Topex data have been calibrated at 0.6 and then reprocessed at 1 Hz by averaging the consequent 10 values around a control location chosen to be along the track exactly on the West BPG land.

**Conclusion and perspectives:**

We were able to compare seismic absolute elevation using two sets of independent measurements. The long-term deformation related to water depth in the Pacific Ocean.