

Devoted records  
between ocean and  
land origin thereby



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devoted to the use of GPS derived rate of vertical land movement to decouple the source of tide gauge records between ocean and land origin thereby estimating long-term regional or global mean sea level rise (Mazzotti et al.

2003; Sella et al. 2007; Snay, 2007; Mazzotti et al. 2007 ; Mazzotti et al.

2008 ; Woppeleman et al. 2007; 2009; 2014; Bouin and Woppeleman, 2010; Santamaría-Gómez et al., 2012; King et al., 2012; Burgette et al., 2013; Watson et al., 2015; Karegar et al.

2016; Woppeleman and Marcos, 2016; Hamlington et al. 2016; Frederikse et al, 2017). The accuracy of GPS derived vertical land movement estimates has been increasing as the time span of the GPS observations is extending. This partly introduces to the differences of the vertical land movements estimate for the same station used in the aforementioned literatures owing to the time difference the analysis had used. Besides, the reference frame (ITRF) is also upgraded as more data and models are becoming available and increases the accuracy of the reference frame itself. The absolute vertical land motion is a geocentric motion with respect to the Earth's centre of mass using a well defined terrestrial reference frame, similar to that measured from space by a satellite altimeter technique.

Most importantly, the rate of vertical land movement estimate relies from different set of analysis centre solutions, in doing so, contribute in the difference between estimates of each individual solutions. After the two Carter Reports 1989; 1994 and the International GNSS Service

(IGS) Workshop in 1997, the IGS established the Tide Gauge Benchmark

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Monitoring (TIGA) Pilot Project which later evolved to the IGS TIGA Working Group Schone et al., 2009. The Pilot Project and WG would study the use of GNSS measurements at or close to tide gauges in support of the sea level community. This study, for the first time will provide a combination of many global GPS solutions under the auspices of the TIGA Working Group (WG), that results in a spatially comprehensive map of VLM near or close to tide gauge benchmarks.

To achieve this objective, three TIGA Analysis Centers (TACs) contributed re-processed global GPS network solutions to TIGAWG, employing the latest bias models and processing strategies in accordance with the second re-processing campaign (repro2) of the IGS. These solutions include those of the British Isles continuous GNSS Facility – University of Luxembourg consortium (BLT), the German Research Centre for Geosciences (GFZ) Potsdam, the University of La Rochelle (ULR). The three TIGA global solutions were combined and aligned to ITRF2008 using Combination and Analysis of Terrestrial Reference Frame (CATREF) software Altamimi et al. 2011. This combination provides global daily solutions by applying a minimum constraint approach on seven – parameter Helmert transformation parameters between ITRF2008 and a subset of the selected core stations daily network solution.