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An improved absolute calibration of satellite altimeters using a globally distributed network of GPS-corrected tide gauges

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In the general context of creating and maintaining a long term operational sea level observation system, we focused on monitoring drifts in satellite altimetric measurements. We have used in-situ sea level data to estimate biases by comparing altimetric sea level height with adjacent calibrated tide gauge sea level expressed both in a geocentric frame. The resulting drifts between altimetric data and in-situ tide gauges measurements have been assessed on Jason-1, TOPEX/Poseidon, Envisat and Geosat Follow-On thanks to approximately 200 tide gauges from the GLOSS/CLIVAR "fast" sea level database. The basic idea is that differences between tide gauges and altimetry should not have any drifts or biases over long time scales. Results have been obtained after applying tide gauge and altimetric corrections like non parametric sea state bias correction. Data have also been selected in accordance with Mitchum's criterions (2000). Compared to the previous succeeded studies using the same calibration approach (Mitchum, 2000 and Woodworth et al, 2002), the new contribution of our study consists in the use of ULR GPS velocities presented at AGU, San Francisco (Letetrel et al, 2007) to correct tide gauge sea level measurements from crustal drift. Our GPS solution has been carefully investigated and has shown positive results in terms of noise in the GPS position time series compared to the literature. Our works show the reduction of trend biases for all satellite missions and a significative slope for Envisat bias. The global correlation existing between our results and those extracted from the online report of the University of Colorado, Sea level change (http://sealevel.colorado.edu./calibration.php) and published in Leuliette et al, 2004,

confirms the quality of our analysis.