



Reconciling altimetry-based global mean sea level trends from different processing groups over the Jason-1 and Jason-2 operating periods

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Satellite altimetry-based global mean sea level (GMSL) trends from different processing groups agree well over the whole altimetry era (1993-2012) (amounting \sim 3.1 mm/yr) but show significant differences on shorter time spans (up to >0.8 mm/yr over 2005-2010). Here we investigate the causes for such large trend differences, in particular the processing methodology adopted by the different groups. For that purpose, we use the GLORYS2V1 version of the high-resolution MERCATOR ocean circulation model, with data assimilation and produce synthetic sea surface height (SSH) data by interpolating the model grids at the time and location of "true" along-track satellite altimetry measurements, focusing on the Jason-1 operating period (i.e. 2002-2009). These synthetic SSH data are then treated as "true" altimetry measurements, allowing us to test the different averaging methods classically used by the processing groups: along-track averaging versus gridding before averaging. We also test the effect of considering or not shallow depths (<120 m). Finally we discuss the effect of the correction standards applied on Jason-1 data during AVISO and CU processing on the GMSL trend over 2005-2010. This leads us to propose a "new" improved GMSL trend over 2005-2010 (based on combined Jason-1 and Jason-2 data and accounting for processing method and wet tropospheric errors), amounting 2.5 ± 0.4 mm/yr.