

How reduce current uncertainties in closure of the global mean sea level budget over the altimetry era?

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Sea level is one of the best indicators of climate change. Study of the sea level budget, i.e., comparison between the observed sea level and the sum of components (ocean thermal expansion, glacier and ice sheet melting and land water storage change) informs on missing or poorly known contributions such as the deep ocean warming not sampled by existing observing systems, or still uncertain changes in water storage on land due to human activities. Recent investigations on the global mean sea level budget report closure within 0.3-0.4 mm/yr over the altimetry era. This value appears today as a threshold difficult to overcome. In this presentation, we examine the current uncertainties affecting all terms of the budget, including the altimetry-based sea level record. We highlight a number of remaining sources of errors that prevent better closure of the budget. Among them, imperfect knowledge of the Terrestrial Reference Frame (affecting altimetry-based sea level and GRACE-based ocean mass), of the GIA (Glacial Isostatic Adjustment) correction applied to altimetry and GRACE space gravimetry, and of the net land water storage contribution, as well as gaps in Argo coverage, e.g., in the Indonesian seas and in the Arctic, are more specifically addressed.