Numerical Simulation of Alias Contamination in Altimeter Sea Level Measurements: Two Geophysical Cases

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Abstract

It is becoming well known that alias effects associated with ocean tides could be a major source of systematic error in altimeter sea level measurements, as a result of asynoptic sampling and imperfect tide models. However, it has been pointed out that signals of non-tidal origin may also contribute a significant part to the observed aliasing (Chen and Ezraty, 1996). In this paper, numerical simulations are performed to demonstrate the full aliasing potential associated with altimeter observations of seasonal sea level variability and annual Rossby waves. Our results indicate that ignorance of non-tidal aliasing may lead to the possibilities of underestimating the total alias effects and misinterpreting or overlooking existing geophysical phenomena. Therefore, it is argued that an entire aliasing picture should be kept in mind when satellite altimeter data are analyzed.