Martin
Scharffenberg
Institut für Meereskunde, Centrum für Erdsystemforschung und Nachhaltigkeit (CEN), Universität Hamburg, Germany
Cimarron Wortham, Ocean Physics Department, Applied Physics Laboratory-University of Washington, Seattle, Washington, USA
Jörn Callies, MIT/WHOI Joint Program in Oceanography, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA
Poster
Satellite altimetry has proven to be one of the most useful oceanographic datasets, providing a continuous, near-global record of surface geostrophic currents, among other uses. One limitation of observations from a single satellite is the difficulty of estimating the full velocity field. The three-year Jason-1-TOPEX/POSEIDON tandem-mission, with two satellites flying parallel tracks, promised to overcome this limitation. Velocities estimated from the tandem-mission, however, suffer from three important limitations. First, as anticipated, the distance between the tracks limits the resolution and reduces the observed velocity variance. Second, there is a fundamental asymmetry between along- and across-track velocity spectra estimated from a tandem-mission, even given the same measurement resolution in the two directions (i.e. along-track sample spacing equal to track separation). The finite sample spacing acts as a low-pass filter in wavenumber for the across-track velocity. The same sample spacing, however, attenuates the along-track velocity at all wavelengths. Finally, the sampling pattern steepens spectral slopes a factor of k^-2 at wavelengths smaller than the track separation for both velocity components. We show that all these effects a direct consequence of the filtering implied by the sampling pattern.
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