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Poster
As part of a project led by D. Stammer for assessing the qualities, relative merits, etc. of a dozen or more global tidal models (Stammer et al., Richman et al., this conference), harmonic constants of tidal currents derived from recent tidal models are compared to harmonic constants estimated from acoustic tomography. Data from four acoustic tomography arrays deployed for various experiments over the past 30 years in the North Pacific and North Atlantic are used. As a measurement technique employing reciprocal acoustic signals that cycle throughout the water column and traverse O(500-km) distances, acoustic tomography offers a high-precision measurement of barotropic currents, tidal currents in particular. Baroclinic tidal currents negligibly influence these measurements. Previous comparisons of tidal current harmonic constants to tidal models have shown that tomography can accurately measure the harmonic constants of at least the eight largest tidal constituents. While some of the tidal models are constrained by observations, and some are hydrodynamic, so that tidal currents are inherently a part of the tidal solution, none of the tidal models are constrained by measurements of tidal currents. The new comparisons between measured and model tidal harmonic constants are generally favorable, with most models being "about" right. In some regions, small systematic differences between measured and modeled harmonic constants (amplitude and phase) suggest some aspect of the tidal models may be improved (missing or deficient physics), but the reasons for those differences are unknown at this time. In any case, insofar as these "spot" comparisons can determine, predictions of tidal currents derived from many of the modern global tidal models appear to be reasonably accurate, in the open ocean at least.
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