



Abstract View

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Wavenumber Spectra of Pacific Winds Measured by the Seasat Scatterometer

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ABSTRACT

Vector winds measured by the Seasat-A Satellite Scatterometer (SASS) are analyzed to determine the spatial structure of oceanic surface winds over wavelengths from 200 to 2200 km. The analysis is performed in four latitudinal bands in the Pacific Ocean. Sampling characteristics of SASS preclude the possibility of determining full two-dimensional spectra; the analysis is therefore limited to one-dimensional (along the satellite ground track) spectra of vector wind components and kinetic energy.

The salient features of the results are summarized as follows. (i) For each of the four geographic regions, the spectra of meridional and zonal wind components and of kinetic energy are consistent with a power-law dependence on wavenumber for midlatitude regions in both the Northern and Southern hemispheres the wave-number dependence of kinetic energy is $k^{-2.2}$, while for tropical regions in both hemisphere it is $k^{-1.9}$. (ii) For each individual region, the spectral dependence on wavenumber is nearly the same for both velocity components and for kinetic energy. (iii) Comparisons of zonal and meridional component spectra indicate that midlatitude winds may be isotropic, while tropical winds may be significantly anisotropic. (iv) The coherence between wind components is small everywhere.

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