

Surface wind validation: Effects of coherent structures observed in airborne Doppler Lidar

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Abstract

The merged NOAA/DOD polar orbiting satellite program at the Integrated Program Office (IPO) has launched a risk-reduction satellite sensor, WindSAT, that will use passive microwave remote sensing techniques to retrieve surface wind vectors over the ocean. As part of a Cal/Val program in support of WindSAT, the IPO supported the development and deployment of an airborne Doppler Lidar wind sensor on the NRL Twin Otter aircraft. Two seasons of field data off the coast of Monterey, CA have been acquired. We present data from a day in which PBL roll vortices are prevalent and dominate the line-of-sight winds. The observations are compared to a nonlinear theoretical model of PBL rolls that predicts the scale and magnitude with good agreement. Using this model, we show that for the given conditions, the rolls induce local variations in the 10 m Neutral equivalent mean surface wind on the order of ± 1.5 m/s.