SIERRA ROTORS IOP 8: COMPARISON OF MODEL SIMULATIONS AND WIND PROFILER OBSERVATIONS

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Abstract: The Special Observation Period of the Sierra Rotors experiment, an exploratory first phase of the Terrain-induced Rotor Experiment, took place in March and April 2004 in Owens Valley in the southern Sierra Nevada in California to study terrain-induced rotors. Rotors are intense horizontal vortices with strong turbulence that can pose severe aeronautical hazards. The eastern slopes of the southern Sierra Nevada make up the tallest, steepest, quasi-linear topographic barrier in the contiguous United States, and are well-known for generating large-amplitude Sierra Waves and attendant rotors over Owens Valley. The core of the ground-based instrumentation in the Sierra Rotors experiment in Owens Valley consisted of the DRI network of automatic weather stations supplemented with an NCAR/EOL mobile Integrated Sounding Systems (MISS) and a fixed Integrated Sounding System (ISS) with Multiple Antenna Profiler (MAPR). The strongest wave and rotor event of the Sierra Rotors experiment was documented during IOP 8 on 24-27 March 2004. During this event, the rotor-induced surface wind reversal (easterly flow) of 4 m/s in the central portion of the valley was observed simultaneously with the strong downslope winds of more than 30 m/s on the Sierra lee slopes. High temporal and altitude resolution vertical velocity measurements by wind profilers showed cases of persistence over time as well as great variability in measured velocity during this strong wave and rotor event. Persistent features were also observed in the wind profiler Doppler spectra, which are related to velocity variance, i.e., turbulence. In this presentation, results from the high-resolution model simulation of this event (horizontal grid spacing of 333 m) with the Coupled Ocean/Atmosphere Modeling Prediction System (COAMPS) will be compared with high temporal and altitude resolution vertical velocity and turbulence measurements by wind profilers.