



MOUSE: compact asymmetric bi-static sodar for profiling CT2 and CV2 turbulence parameters

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This research is associated with interpretation of turbulent transfer processes to the ultra stable polar surface, and implications for ice-core analysis relating to climate change.

A new SODAR has been designed to measure temperature and velocity structure parameters at resolutions approaching 1 m within the lowest 50 m of the Antarctic atmospheric boundary layer. The Meteorological Observations of the Ultra Stable Environment (MOUSE) instrument transmits a short acoustic pulse vertically. The acoustic echoes from turbulent inhomogeneities are recorded by two receivers which are close to one side of the transmitter and are at different distances from the transmitter. The transmitter and two receivers face vertically and reception is through overlap of finite angular width beams which are carefully calibrated. Since the scattering angle is different for each receiver, two independent estimates of the angle-weighted combination of the turbulence structure functions CT2 and CV2 are obtained at each scattering height. This allows estimation of CT2 and CV2 from the scattering volume at each height step, from which estimates can readily be made of profiles of turbulent fluxes near the surface.