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SNOHATS: Subgrid-scale fluxes in stably stratified atmospheric flow over snow surfaces ELIE BOU-ZEID, MARC B. PARLANGE, HENDRIK HUWALD, Swiss Federal Institute of Technology - Lausanne, MARCELO CHAMECKI, CHARLES MENEVEAU, Johns Hopkins University - Baltimore — Stably stratified turbulence presents particular challenges both from an experimental and a modeling perspective. Many of the characteristics of stable flows complicate the formulation of effective models for unresolved, subgrid scale (SGS), turbulence in Large Eddy Simulation (LES). To address these concerns, a field study (SNOHATS) was held at the extensive "Plaine-Morte" glacier in the Swiss Alps (3000 m) from February to April 2006. Two horizontal arrays of vertically separated 3D sonic anemometers were deployed; this setup was specifically designed to measure subgrid scale fluxes (upwind uninterrupted fetch of 2 km) and then to assess the success of various models in reproducing these fluxes. We first study the influence of stratification on the spectra and co-spectra of velocity and temperature. Subsequently, the eddy-viscosity subgid scale model is assessed for LES of stably stratified wall-bounded flows. Specifically, we measure the Smagorinsky coefficient and the SGS turbulent Prandtl number by matching measured and modeled dissipation rates. Finally we present the dependence of these coefficients on stability, height above the ground, filter size, and strain rates.

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