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HIGH-LATITUDE MESOSPHERIC BORE EVENT OBSERVED OVER ANTARCTICA

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All-sky CCD observations of mesospheric gravity waves have been made from Halley Station Antarctica (75.5 S, 26.7 W) as part of a collaborative research program between British Antarctic Survey, U.K. and Utah State University, USA. A primary goal of this investigation is the determination of the characteristics and sources of short-period (< 1 hour) gravity waves observed during the Antarctic winter in the absence of local tropospheric convection. This report describes an unusual "mesospheric bore" event that was observed near-simultaneously in three nightglow emissions: the OH (~87 km), O_2(0,1) (~94 km) and Na (589.2 nm) (~90 km), over a period of ~ 3 hours on the 27-28 May, 2001. Mesospheric bores are rare wave events that have previously only been reported at low- and mid latitudes. This Antarctic event is particularly interesting for several reasons, (1) it initially appeared as a single, high contrast, linear front, accompanied by a sharp enhancement in intensity in all three emissions, (2) a number of trailing wave crests were observed to form with a large growth rate of 6.6 waves/hr, (3) the wave pattern exhibited unusual dynamics with significant variability in the observed phase speed and a reduction in the horizontal wavelength by ~50% over a 1-hr period, and (4) the primary direction of motion of the event was due southwards towards central Antarctica suggesting long range wave propagation from distant tropospheric sources. The evolution and characteristics of this remarkable wave event will be presented and contrasted with prior measurements at equatorial and mid-latitudes, including a discussion of its possible origin.