
JOURNAL CLUB

Thermospheric Dynamics above Antarctica, Observed with Two Fabry-Perot Spectrometers

by

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ABSTRACT

FABRY-PEROT SPECTROMETERS have been routinely used for many years to estimate winds and temperatures at thermospheric heights, through observations of the 630.0 nm airglow line of atomic oxygen, which is emitted from an altitude of around 240 km, in the ionospheric F-region. At auroral latitudes, energy inputs are directly coupled to near-Earth space weather phenomena (such as substorms), and as such can be highly variable over short time and spatial scales. These variations can result in mesoscale structure appearing in the wind and temperature fields at thermospheric altitudes. This presentation will focus on results from two Fabry-Perot spectrometers operating in Antarctica. One, a narrow-field instrument located at Davis station (Inv. 74.6 S), has been in operation now for five years. The other is an all-sky, scanned imaging instrument located at Mawson (Inv. 70.5 S), some 635 km west of Davis. This instrument is now in its third season of operation. The locations of these two instruments allow for bi-static observations of common-volume regions between them, and the unambiguous determination of vertical winds in these common-volumes. By combining multiple vertical wind estimates between the two stations with the all-sky imaging capability of the Mawson spectrometer, we can study small scale features in both the horizontal and vertical wind field and their relation to auroral structures in the sky. A case study of this type is presented, along with climatological results from both Mawson and Davis.

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