

Title: Investigating planetary wave and seasonal variability in mesospheric temperature at mid- and low-latitudes

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The Utah State University Mesospheric Temperature Mapper (MTM) is a high performance CCD imaging system developed as part of the US CEDAR program. This imager sequentially measures the nocturnal OH (6, 2) band intensity and rotational temperature (peak altitude $\sim 87\text{km}$) and the O₂ (0, 1) Atmospheric band intensity and temperature (peak altitude $\sim 94\text{km}$) with a precision of 1-2 K in 3 minutes. The MTM is capable of autonomous operation and since 1998, long-term seasonal measurements were obtained from the mid-latitude Starfire Optical Range (SOR) facility (35°N), NM (duration 14 months). Subsequently the imager was relocated to the low-latitude (21°N) at USAF AEOS facility at Maui, Hawaii and long-term measurements were obtained as part of the Maui-MALT program (2001-2005). Over 500 nights of quality data have been obtained to date. These measurements constitute an important dataset for seasonal studies and were obtained in coordination with the University of Illinois Na wind/temperature lidar which operated on a campaign basis from both of these facilities. Together these two datasets have been used to investigate the occurrence and signatures of planetary waves and to compare seasonal variability in mesospheric temperature at mid- and low-latitudes.