

## **Links between mesopause temperatures and ground-based narrow band VLF amplitudes**

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The Upper Mesosphere-Lower Thermosphere (UMLT) region of the atmosphere is known to vary on many temporal and spatial scales. However, this region of the atmosphere is very difficult to measure and monitor continuously. In this study we demonstrate an intriguing connection between mesopause temperatures and the intensity of Very Low Frequencies (VLF) narrowband (NB) signals reflected off the lower ionosphere. The temperature data used are from the SABER instrument on-board the TIMED satellite, while the VLF data are obtained from various ground-based receiving systems. The results of the analysis show a high anti-correlation between temperature and VLF amplitude. It is shown that the variability of the UMLT temperatures and VLF amplitudes can be explained by global seasonal solar irradiance changes (~72% of the variability), while the remaining variability has its origins from other sources (~28%). High resolution mesopause temperature estimates might be achieved in the future by combining VLF NB observations and calculated solar irradiance variability (as a function of hour, day, and location, i.e., latitude).