Geophysical Research Abstracts, Vol. 5, 13577, 2003

INVESTIGATION OF RETRIEVING ATMOSPHERIC INHOMOGENEITIES FROM LOW FREQUENCY STELLAR SCINTILLATION MEASUREMENTS

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Stellar occultation measurements made by the MSX/UVISI and EnviSat/GOMOS instruments, although fundamentally similar to solar occultation observations, pose a variety of different issues in instrumentation and interpretation of the resulting data. It is important to know the effects of star scintillation on the spectral measurements of stellar spectral in order to accurately retrieve the concentration of the absorbing species and estimate the retrieval accuracy. The UVISI instrument onboard the MSX spacecraft has provided a proof-of-concept demonstration of the viability of retrieving lower atmospheric ozone using stellar occulation technique. In this paper, we investigated the possibility of retrieving the atmospheric inhomogeneity parameters from the MSX/UVISI low frequency (˜4 Hz)stellar scintillation measurements. In general, low frequency measurements are not so informative as high frequency ones for studying the inhomogeneities. However, some information on characteristics of waves and turbulence in the atmosphere might still be derived if spectral correlation in stellar scintillation can be obtained. In this paper, we have calculated star scintillation dispersions and chromatic correlation coefficients in 350-900 nm spectral range. The calculations were performed for weak scintillations and two-component model of atmospheric inhomogeneities combining Kolmogorov isotropic turbulence and inhomogeneities produced by saturated inner gravity waves in stratosphere. The modelled and observed spectral correlation will be compared. The likelihood of inducing atmo-

spheric inhomogeneities from low-freqency stellar scintillation measurements such as those provided by MSX/UVISI will be discussed.