Dispersion Measurements of Whistler Mode Signals Observed in the Venus Ionosphere with the Venus Express Magnetometer. C. T. Russell[1] R. J. Strangeway[1] H. Leinweber[1] H. Y. Wei[1] J. T. M. Daniels[1] and T. L. Zhang[2], [1] University of California, Institute of Geophysics and Planetary Physics, Los Angeles, California 90095-1567, USA, [2]Space Research Institute, Austrian Academy of Science, Graz, Austria

Introduction: The magnetometer on the Venus Express mission can sample at 128 Hz allowing the detection of whistler mode signals in the Venus ionosphere. Strong ~1nT peak to peak signals are observed at lowest altitudes. These signals are right-handed nearly circularly polarized as expected from lightning [1]. Their occurrence is controlled by the direction of the ionospheric magnetic field, occurring only when the magnetic field dips into the atmosphere [2]. These have EM energy fluxes similar to signals due to lightning on Earth [3]. An example of the signal is shown in Figure 1. They last only on the order of 100 ms making dispersion analysis difficult. However, studies of the strongest longest lasting signals show the descending frequency tones expected for lightning. Figure 2 shows successive overlapped spectra that illustrate that the signal decreases in frequency with time. The dispersion seen is indicative of a signal generation region only about 300 km distant as would be expected if the signal were created by a lightning discharge. These signals were processed from the outboard sensors only by strongly filtering the lower frequency band to eliminate interfering tones at lower frequencies. Recently we have improved the low frequency noise rejection and can now analyze a much broader frequency range. These results will be ready for discussion at the time of the meeting.

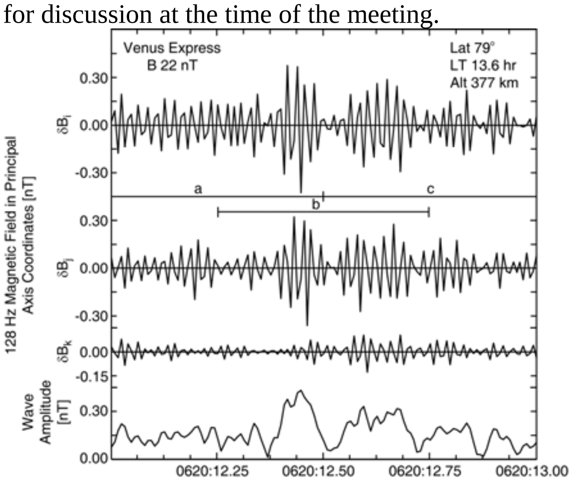

Figure 1. Time series of the magnetic field seen on the outboard sensors of the Venus Express magnetometer filtered in the band 42 to 60 Hz. Signals are in the principal axis system. Bottom trace is the wave amplitude in this frequency band.

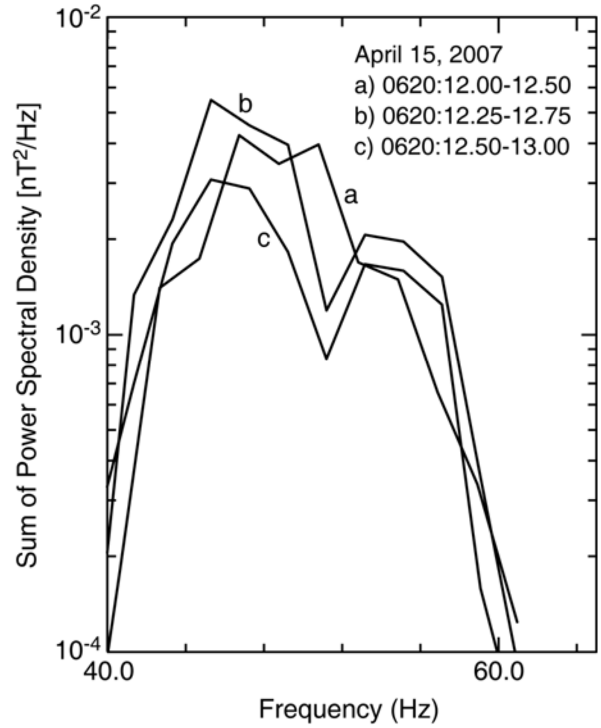

Figure 2. Successive power spectra summed over the three sensors for the intervals shown in Figure 1. The successive spectra show a peak frequency that decreases with time

References:

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[3] C.T. Russell, R.J. Strangeway, J.T.M. Daniels, T.L. Zhang, H.Y. Wei (2011), *Planet.Space Sci.*, 59, 965-973, doi:10.1016/j.pss.2010.02.010.