WHISTLER MODE SIGNALS AT L=1.9 CONJUGATE TO A RUSSIAN ALPHA TRANSMITTER: STATISTICS AND MODELING

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The Russian 'Alpha' transmitters broadcast alternating pulses between 11-15 kHz, nominally used for navigation. A fraction of the VLF energy escapes into the magnetosphere, is guided by ducts, amplified by interaction with radiation belt particles, and observed at the geomagnetic conjugate point. We analyze VLF data from Adelaide, Australia, conjugate to the Komsomolsk transmitter. An automated detection scheme separates the subionospheric and magnetospheric signals, after removing the dominant noise source from lightning-generated radio atmospherics. We track availability of ducts at L=1.9 and find them present often. We connect the ground signal to the signal observed by the DEMETER spacecraft, which also observe triggered emissions and spectral broadening. We correlate to geomagnetic conditions to assess the role of wave growth and triggering from wave-particle interactions. The result is essentially a mid-latitude pulsed VLF magnetospheric injection experiment. We also find a strong diurnal variation in the magnetospheric signal, and apply a full-wave model of transionospheric propagation to include the effects of ionospheric absorption on both ends. We discuss statistics on the growth rates, saturation amplitudes, and propagation delays, as a proxy for magnetospheric conditions. We report on the conditions that lead to triggering and to what extent they may be observed at these latitudes.