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Observations of VLF transmitters with the wave instruments on DEMETER

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The electric field instrument on DEMETER routinely receives signals from ground based VLF transmitters, in the frequency range from 12 to 18 kHz. These signals appear to leak through the ionosphere in regions not too far from the transmitter and to intensify in regions where VLF hiss natural emissions, possibly ducted are observed. In this presentation we will report on the initial statistical results from these observations, dealing in particular with the day-night and seasonal variations of the amplitude of the transmitters signals, the coupling efficiency of the lower ionosphere and the dependence on frequency of these characteristics. Short term variations of the amplitude of the received signals are frequently observed, mostly associated with simultaneous intensification of the natural emissions of the plasmaspheric VLF hiss. Detailed examination of these events reveals a complex frequency structure with variable characteristics for the same transmitter and from event to event. Disturbed spectra may show quite symmetrical broadening both above and below the transmitter line, broadening limited to frequencies below this line, side band generation or even generation of signals with a frequency below the transmitter frequency. This poster will display several examples of these effects together with an initial discussion of the possible mechanisms.