Characteristics of Anomaly of HF radio wave arrival direction observed near dusk terminator

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The evening enhancement or prereversal enhancement (PRE) is a phenomenon in which the upward ExB drift velocity increases for one to two hours just before the reversal of drift direction from up to down around dusk terminator. This phenomenon is known to have a large day-to-day variability and a tight connection with plasma bubble onsets. NICT has a project to detect ionospheric irregularities for early warning against advanced utilities of satellite positioning system since 2002. In this study, we use these data for deducing the character of PRE. Our previous study shows that the variation of HF arrival angle has clear seasonal dependence; namely, it becomes large in spring and fall which are active seasons of PRE.

In addition, we use theoretical model of HF ray tracing for deducing the relation between HF arrival angle and pre-reversal enhancement. We deduce the influence of arrival angle with some simple anomaly of electron density in the model.

In this study we discuss the relation between radio wave arrival direction and PRE in the clear events.