

On the occurrence of TIGER auroral and subauroral echo parameters sorted according to season, the K_p index, and the interplanetary magnetic field at sunspot maximum

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The Tasman International Geospace Environment Radar (TIGER) is a Leicester-type SuperDARN HF backscatter radar located on Bruny Island, Tasmania (147.2°E, 43.4°S geographic). TIGER is the most equatorward of the SuperDARN radars, both geographically and geomagnetically, but its default range window (180 to 3555 km) still covers an interval of high geomagnetic latitude (57°S to 88°S). We show the occurrence rates of auroral and subauroral ionospheric echoes and the corresponding average FITACF parameters derived from all the normal scan beam 4 and 15 observations made during the period December 1999 to November, 2000. These sunspot maximum results were sorted according to season, the K_p index, and the IMF vector separated into the four basic quadrants of the B_y – B_z plane. The peak occurrence rate of echoes from irregularities forming in the discrete auroral oval was >65% near magnetic midnight and 71°S (magnetic latitudes hereafter) for all seasons and K_p values, with the peak moving equatorward with increasing K_p . The total number of echoes detected increased for $K_p < 3$, thereafter decreasing for larger values of K_p . Like the other SuperDARN radars, TIGER is sensitive to the effects of enhanced absorption, but its equatorward location means that it is more likely to detect ionospheric scatter during magnetospheric substorms. Another advantage of TIGER's equatorward location is in the routine detection of auroral and subauroral echoes immediately equatorward of the sharp decrease in velocity and spectral width on the nightside at ~68°S. These echoes are usually observed in the nightside ionosphere between ~62°S and 67°S under geomagnetically quiet conditions, and they often have very low spectral widths (<50 m s⁻¹). The term "subauroral echoes" is a misnomer in that many of the echoes are probably from the diffuse auroral oval, but they sometimes do extend into the main ionospheric trough, and perhaps even the outer most part of the mid-latitude ionosphere. To consolidate the routine detection of true subauroral scatter establishment of a mini-SuperDARN radar a further ~5° equatorward of TIGER, but with an overlapping field of view, would be ideal.