The Tasman International Geospace Environment Radar I (TIGER I): Initial results and future directions

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Abstract. The Tasmanian TIGER (Dyson and Devlin, *The Physicist*, The Australian Institute of Physics, **37**, 48–53, March/April 2000) is a HF backscatter radar located on Bruny Island, Tasmania (147.2°E, 43.4°S, geographic; –54.6ºΛ). TIGER is a member of the Super Dual Auroral Radar Network (SuperDARN), and was established by an international consortium to facilitate the conduct of basic scientific research and provide space weather data products to industry, private users, and the education sector. Note that TIGER is presently the only SuperDARN radar which can observe the full latitudinal extent of the midnight auroral oval under quiet to moderately disturbed geomagnetic conditions. Current and future basic research topics ideally suited to the TIGER radar include: (1) Measuring the time delay between the arrival of ionospheric convection changes in the Halley and TIGER radar field of views located diametrically opposite the corrected geomagnetic pole (i.e., separated by ~12 h of MLT). (2) The behaviour of electron density patches and sun-aligned arcs in the nightside extremity of the polar cap ionosphere, (3) Nightside signatures of the open-closed magnetic field line boundary and the effects of magnetic reconnection in the magnetotail, (4) The dynamics of the nightside auroral oval including signatures of magnetospheric substorms. (5) The study of narrow westward flow channels (e.g., polarisation jets) occurring in the sub-auroral ionosphere in close association with substorms. (6) The subsequent formation and evolution of the main ionospheric trough. (7) The occurrence of decametre-scale ionospheric irregularities extending from the sub-auroral to central polar cap latitudes in relation to different magnetospheric regions. (8) Relationships between signatures of ultra-low frequency wave activity in TIGER and ground-based magnetometer data recorded in proximity to the ionospheric foot print of the plasmapause. (9) The study of numerous phenomena facilitated by the near-range scatter (<600 km), including *E*-region plasma instabilities, meteor astronomy and mesospheric winds, and possibly PMSE. (10) The climate of medium-scale atmospheric gravity waves using the signatures they produce in backscatter from the Southern Ocean. Lastly, the TIGER radar has already proven its worth for basic scientific research, and many fresh challenges await. In this talk we will briefly present some of the more interesting results obtained with TIGER, but not shown elsewhere at this meeting.