Subject area: **Applications of new analysis techniques**
Presenting author's name: **M. L. Parkinson**
Preferred mode of presentation: **Oral**

SuperDARN: A new network of HF radars for oceanographic research

R. I. Greenwood[1], M. L. Parkinson[1], H. Ye[2], and A. S. Yukimatu[3]

[1]*Department of Physics, La Trobe University, Melbourne, Victoria 3086, Australia*
[2]*Department of Electronic Engineering, La Trobe University, Melbourne, Victoria 3086, Australia*
[3]*National Institute of Polar Research,1-9-10, Kaga, Itabasi, Tokyo, Japan 173-8515*

e-mail of corresponding author: ri2greenwood@students.latrobe.edu.au

Large military OTH radars can measure ocean wave heights, surface currents, and surface wind directions over vast, remote regions. It has long been a dream to deploy a network of relatively compact sky-wave radars dedicated to the provision of real-time oceanographic and meteorological data. We demonstrate the potential for the SuperDARN radars to achieve this. This has become possible with the implementation of the TMS operating system which permits the acquisition of complex time series data. The detection of illegal fishing vessels in the remote Southern Ocean may become possible with inevitable advances in hardware and software. In order to realise these goals, we recommend the deployment of SuperDARN radars with footprints which encompass large swathes of sea with small islands (for co-ordinate registration). This will have the added benefit of improved global mapping of ULF wave and atmospheric gravity wave activity because the cross section of the sea at HF is generally greater than that of ground and ice. Upgrading the log-periodic antennas with switchable, two way capability would potentially double the spatial coverage of ocean wave measurements. The ability to transmit vertically polarised signals would also permit more reliable measurement of ocean wave parameters via surface wave propagation out to ranges of ~400 km. The radar electronics, software, and operating modes will need upgrading to permit simultaneous acquisition of the I and Q samples recorded on all sixteen antennas at the maximum practical time resolution. This will permit the concurrent measurement of many phenomena which require disparate coherent averaging, Nyquist frequency, spectral resolution, and data analysis, such as measurement of sea state and ionospheric convection.