RECENT RESULTS FROM SPECTROGRAPHIC CORRELATION OF WHISTLER-MODE SIGNALS AT DUNEDIN, NZ

NEIL R. THOMSON 1, Mark A. Clilverd 2, and Keith H. Yearby 3

1 Physics Department, University of Otago, Dunedin, New Zealand
email: n_thomson@physics.otago.ac.nz
2 British Antarctic Survey, Cambridge, United Kingdom, email: macl@bas.ac.uk
3 Department of ACSE, University of Sheffield, Sheffield S1 3JD, UK
email: k.h.yearby@sheffield.ac.uk

Group delays and frequency shifts of man-made whistler-mode signals have proved useful tools for measuring plasmasphere parameters. The measurement technique, known as "SCODAR" (Spectrographic Correlation, Doppler And Ranging) or as just "Doppler", calculates, in real time, cross-correlations at the receiver between a direct VLF subionospheric signal from a man-made transmitter and any indirect signals from the same source, such as whistler-mode signals via the Earth's plasmasphere.
The observations (typically over periods of hours) of the changing group delays from whistler ducts together with the corresponding Doppler-shifts have enabled the determination of plasmaspheric electric fields and plasma fluxes between the plasmasphere and ionosphere.
More recently, over the last several years, it has been possible to receive such whistlermode signals from six or more VLF transmitters simultaneously at Dunedin (NLK, 24.8 kHz, Seattle; NPM, 21.4 kHz, Hawaii; NWC, 19.8 kHz, N.W. Australia; Omega Australia, 13.0 kHz, S.E. Australia, JJI, 22.2 kHz, Japan; NDK, 25.2 kHz, North Dakota, USA; NAA, 24.0 kHz, N.E. USA), resulting in some unexpected paths and very good coverage of special events such as geomagnetic storms.
More recently still, in the last 1-2 years, a new software version of the "Doppler" receiver has been developed which is giving improved signal to noise ratios. Some results from this new version will be shown and compared with the old (partly) hardware version.

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Neil R. Thomson, Physics Department, University of Otago, Dunedin, New Zealand
Fax: +64 3 479 0964, email: n_thomson@physics.otago.ac.nz