NEURAL NETWORK MODEL OF SOLAR WIND – PC3 PULSATION RELATIONSHIP

S.I. LOTZ 1,2, P.R. Sutcliffe 1,3, L. McKinnell 1,2

1. Hermanus Magnetic Observatory, Hermanus, South Africa
2. Department of Physics and Electronics, Rhodes University, Grahamstown, South Africa
3. School of Physics, University of KwaZulu-Natal, Durban, South Africa

Geomagnetic pulsations have been observed since the 19th century and their occurrence has subsequently been linked to the state of the solar wind and its interaction with the magnetosphere. Several generation mechanisms for geomagnetic pulsation activity are known, with some drivers having more effect than others depending on solar wind and magnetospheric conditions, and the latitude of the observed activity. Pulsations with frequency within the Pc3 band are mainly driven by waves excited upstream of the bowshock by an ion-cyclotron instability. Although the generation of these waves are generally understood, the propagation mechanism whereby they are transmitted into the magnetosphere and reach the Earth's surface is not clear. Using a neural network-based model we aim to find the combinations of solar wind-based input parameters which have the most influence on geomagnetic output parameters of Pc3 pulsations. Such a set of "influential parameters" will yield insight into the preferred channel of transmission oscillations from the foreshock region to the Earth.

Pulsations, Pc3, Solar Wind

S.I. Lotz, Hermanus Magnetic Observatory, PO Box 32, Hermanus, 7200, Republic of South Africa. Tel: +27 (0)28 312 1196, Fax: +27 (0)28 312 2039, email: slotz@hmo.ac.za