



## **Application of pattern recognition methods for detecting the existence of EM precursor signals preceding major seismic events**

**D. Cavouras** (1), P. Georgiadis (1)

(1) Department of Medical Instruments Technology, Technological Educational Institution of Athens, Egaleo, 122 10, Greece

In the present study, the use of pattern recognition methods for the analysis of electromagnetic signals preceding seismic events is presented. Continuous recordings of electromagnetic signals (EM) at 46MHz were gathered (from January 1999 till December 2003) from a custom developed field-station that was installed at Valsamata, Cephalonia island, in western Greece. EM-signals corresponding to recordings preceding major seismic events (Ms $\geq$ 5R) were segmented, by an experienced scientist, using software developed in C++ for the purposes of this study. Seismic events were divided into two site-groups, in accordance with their location. Five features (mean, variance, skewness, kurtosis, and a wavelet based feature), derived from the EM-signals, were used to design a probabilistic neural network (PNN) classifier. The PNN performance was evaluated by the exhaustive search and leave-one-out methods. The PNN classification scheme gave 82.2% overall classification accuracy, in correctly identifying EM precursor signals within noisy background, and 78.9% overall classification accuracy, in correctly relating the precursor signals to the area of origin of the seismic events.