

## Possible Association between Geomagnetic Anomalies and the Tectonic Activity in Central Italy during 2002

# Emad Moris Henry Takla[1]; Kiyohumi Yumoto[2]; Antonio Meloni[3]; Paolo Palangio[4]; Peter R. Sutcliffe[5]; Valerian Nikiforov[6]; Richard Marshall[7]

[1] Dept. of Earth and Planet.Sci., Grad.School of Sci., Kyushu Univ.; [2] Space Environ. Res. Center, Kyushu Univ.; [3] Geomagnetism dept., INGV; [4] Observatorio de L'Aquila, INGV; [5] Hermanus Magnetic Observatory ; [6] Pacific Ocean. Inst., Rus. Acad. Sci; [7] IPS Radio & Space Services

During the last 20 years many researchers have been reported facts that confirm the interrelations between the tectonic activity and the anomalous changes of the geophysical and geochemical and parameters characterizing the Earth's lithosphere. Mechanisms for generating magnetic field changes associated with tectonic and volcanic activities are generally attributed to the piezomagnetic and electrokinetic effects. Where, rocks change their magnetization under mechanical or thermal stress and also under variation of concentration gradients of electrolytes and flow of pore fluids in fractured rocks. All these mechanisms are strongly supported by laboratory tests.

During 2002, two earthquakes occurred in the Molise region, central Italy, on October 31 and November 1. These earthquakes were caused by east-west strike-slip fault. Both caused severe damage over 2000 Km<sup>2</sup> region straddling Molise and Puglia

Data from the Circum-pan Pacific Magnetometer Network (CPMN) were analyzed in order to find any magnetic or electromagnetic anomalous behavior in vicinity of the epicenter of Molise 2002 earthquake. Our obtained results indicate to the presence of long term variations in both horizontal and vertical components of the geomagnetic field about a few months before the occurrence of the Molise earthquake. In addition, there are anomalous ULF emissions (the period range 10-150 sec) a few months before the Molise earthquake 2002.

The observed anomalous behavior can be explained as a result of stress accumulation (Piezomagnetic effect) and enhancement in the conductivity of the analyzed region before the earthquake.