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Application of polarization ellipse technique for analysis of ULF magnetic fields from two distant stations in Koyna-Warna seismoactive region, W India

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Abstract. A new approach is developed to find the source azimuth ultra low frequency (ULF) electromagnetic (EM) signals believed to emanating from well defined seismic zone. The method is test appl magnetic data procured from the seismoactive region of Koyna-Wa known for prolonged reservoir triggered seismicity. Extremely low- high-sensitivity LEMI-30 search coil magnetometers were used to simultaneously the vector magnetic field in the frequency range 0.(Hz at two stations, the one located within and another ~100 km a from the seismic active zone. During the observation campaign ext from 15 March to 30 June 2006 two earthquakes (EQs) of magnitu (M_L>4) occurred, which are searched for the presence of precursor signals.

Comparison of polarization ellipses (PE) parameters formed by the magnetic field components at the measurement stations, in select frequency bands, allows discrimination of seismo-EM signals from t natural background ULF signals of magnetospheric/ionospheric orig magnetic field components corresponding to spectral bands domin seismo-EM fields define the PE plane which at any instant contains source of the EM fields. Intersection lines of such defined PE plane distant observation stations clutter in to the source region. Approx the magnetic-dipole configuration for the source, the magnetic field components along the intersection lines suggest that azimuth of t source align in the NNW-SSE direction. This direction well coincides orientation of nodal plane of normal fault plane mechanism for the largest EQs recorded during the campaign. More significantly the correspondence of this direction with the tectonic controlled trend seismicity, it has been surmised that high pressure fluid flow along fault that facilitate EQs in the region may also be the source mecha EM fields by electrokinetic effect.

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