



Epicenter location determination by an ULF magnetic field polarization technique analyzing the 2009 L'Aquila earthquake

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We apply a polarization technique with the scientific objective to locate the source direction of magnetic ULF wave emissions in the frequency range from 2 mHz to 50 mHz before and during the L'Aquila earthquake series 2009. The determination of the source direction of emission helps to discriminate between background noise, geomagnetic effects and ULF emissions due to seismic activity. In the frame of the South European Geomagnetic Array (SEGMA) ground based magnetic field data is recorded in Mid- and South Europe to analyze geomagnetic effects. Further SEGMA data can be used to clarify whether ULF emissions are due to strong seismic activity. The magnetic field is recorded by a fluxgate sensor in the horizontal plane B_x (positive East), B_y (positive North) and the vertical direction B_z (positive towards the center of the Earth). The data sampling rate is 1 Hz. In the current work we extract the 10-min mean value and filter the horizontal direction components to obtain the polarization ellipse. The polarization angle is defined as the angle between the east direction of the geomagnetic field and the major axis of the polarization ellipse. We determine and compare data from three SEGMA stations Nagycenk (NCK), Castello Tesino (CST) and L'Aquila (LAQ) during the L'Aquila earthquake series 2009. The closest SEGMA station to the epicenter is L'Aquila observatory located in the seismic active region approximately 6 km distance to the earthquake epicenter whereas Nagycenk observatory is in 630 km distance to L'Aquila.