



## **Investigation of transient seismo-electromagnetic phenomena: an experiment within the Low Noise Underground Laboratory of Rustrel Pays d'Apt**

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Seismic wave propagation in fluid-filled porous media generates electromagnetic phenomena due to electrokinetic coupling at the pore scale. These effects are perceived as a new method for the characterization of porous media with potentially important applications in reservoir geophysics. In order to better understand the conversion mechanisms between seismic and electromagnetic energy, we built an analogical experiment within the Low Noise Underground Laboratory (LSBB Rustrel, France). The experimental apparatus consists of a cylindrical column (1 m high, diameter of 8 cm) filled with Fontainebleau sand and equipped with piezoelectric accelerometers, unpolarizable electrodes and induction magnetometers. The comparison of the seismo-electromagnetic responses in dry and moist sand allows us to confirm the electrokinetic origin of the observed phenomena. The differences in apparent velocities of the seismic and electrical fields (1250 m/s) on the one hand and magnetic field (800 m/s) on the other hand, show that the seismo-magnetic field is coupled to the transverse propagation modes. In addition, our observations of seismo-electric signals emphasize the relevance of such measurements in the field. Moreover, this work stresses the need to continue the developments of the theory of electrokinetic effects in media with partial fluid saturation.