



The Low Noise Underground Laboratory, a unique environment for very weak electromagnetic measurements

E. Pozzo-di-Borgo (1), **C. Bordes** (2), S. Gaffet (2), R. Blancon (1), M. Auguste (3), D. Boyer (3) and A. Cavaillou (3)

(1) Département de Physique, Université d'Avignon France, (2) Géosciences Azur, Université Nice Sophia Antipolis France, (3) Laboratoire Souterrain à Bas Bruit de Rustrel (Université Nice Sophia Antipolis, France)

Since the closing of the underground launching control room of the ground-based component of the French nuclear missile system, the whole installation has been turned into a cross-disciplinary underground laboratory. The LSBB (Laboratoire Souterrain à Bas Bruit) is a unique low-noise underground laboratory located in the natural park of Luberon (Provence) far from large cities, industry and heavy traffics. At the deepest point (500 m below the surface) a non-conventional shielded cylindrical capsule is embedded with no μ -metal (1268 m³ in volume). The chamber is suspended on massive springs cutting off low frequency ground motions with a residual electromagnetic noise lower than 2 fT/sqr(Hz) above 10 Hz. The shielded chamber can be reached by a 3 km gallery totally equipped with fiber optics.

Seismo-electromagnetic phenomena have been revisited in recent years through field observations and laboratory measurements. Most studies have concentrated on measurements of electrical fields as they require simple and cheap instrumentation. The investigation of seismo-magnetic fields has received much less attention, mainly because of the complex apparatus for measuring magnetic fluxes. Thus the LSBB laboratory offer exceptional conditions to perform experiments from the sample scale (1m) up to the massif scale (10 km) with opportunities at the tunnel scale (1km). We illustrate the most significant characteristics and facilities of the underground laboratory as well as examples of experiments performed within the shielded chamber.