Lithium Pegmatites of the Barroso-Alvão: remote sense approach

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Portuguese subsoil presents a great mining potential for strategic metals, which are either the main substance of deposits (Li, W, Sb) or by-products of base metals (In, Se, Ge). In order to develop this potential, mineral exploration must be supported by new technologies, improved exploration methods and a sound and responsible management of environmental and societal impacts. The adaptation of remote sensing, geophysical, geochemical, and GIS techniques will improve the knowledge before selecting areas of interest. The 3D data generated must be processed at different scales using innovative methods. Lithium (Li) is a strategic metal for the XXI century, mainly through its application in the Low Carbon Technologies, becoming one of the most searched high-tech metals around the world. Portugal is an important mining country of Li minerals inside the EU but its application is only for the ceramic and glass industries. Drones are now being used regularly in geosciences [1-3] for morphological analysis. Many applications require a precise georeferencing, for example to compare surface models of different epochs, or to compose mosaics of contiguous elevation models in a common geodetic reference system. The precise camera positioning allows for the production of 3D point clouds with the same accuracy level, without control points, or at least with a reduced number of check points. Drones will be used within this project to make photogrammetric surveys in very high resolution. High resolution, combined with very good positional accuracy results in very detailed 3D models of rocks and soil surface. The objective is to improve the selection of target areas in order to reduce exploration costs. Remote sensing technology is an effective and widely established analytical method for geology and mineral exploration in semiarid and arid areas. Remotely sensed imagery acquired from multispectral imaging sensors such as Landsat and ASTER, is applied to geological surveys, alteration zones mapping, and geomorphology applications [4-6]. More recently, the Copernicus Sentinel-2 mission offers high-resolution optical imagery for mineral exploration targeting [7]. Remote sensing will train with known targets in Barroso-Alvão area.

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