The South Portuguese Zone 1/400 000 LNEG-IGME-Junta de Andalusia common mapping program. A contribution for the Iberian Pyrite Belt VHMS exploration in Portugal and Spain

João Xavier Matos¹ and the João Xavier Matos*¹
¹Lab. Nacional Energia Geologia, I.P., Unidade de Recursos Minerais e Geofísica, Aljustrel, Portugal (joao.matos@lneg.pt)
*A full list of authors appears at the end of the abstract

A regional South Portuguese Zone (SPZ) mapping and stratigraphic program in SW Iberia is presented. It is being developed by LNEG and IGME and financed by the GEO_FPI Project (www.geofpi.eu).

The SPZ is the southwesternmost geotectonic unit of the Variscan Orogeny in Iberia. The following domains are considered: Pulo do Lobo (early Frasnian -late Famennian); Iberian Pyrite Belt (IPB, late Famennian-late Visean), Baixo Alentejo Flysch Group (late Visean-late Moscovian) and Southwest Portugal (late Strunian-mid Bashkirian). The mapping program also includes the Mesozoic sequences of the Lusitanian, Santiago do Cacém, and Algarve basins and the Cenozoic Lower Tagus, Alvalade and Guadalquivir/Algarve basins. Proper research was conducted in the IPB, considered one of the most important metallogenetic VHMS deposit provinces worldwide with significant Cu, Zn, Pb, Ag, Au, Sn, In, Se and Ge resources. Currently, mining is being undertaken both in Portugal (Aljustrel, Neves-Corvo) and Spain (Las Cruces, Aguas Teñidas, La Magdalena, Sotiel, Riotinto). Field surveys were done using common stratigraphic and GIS database methodologies, developed in cooperation involving the Portuguese and Spanish Geological Surveys. A joint fieldwork was carried out in the border region (Guadiana and Chança river sections), allowing a better integration and correlation of geological data. Palynological studies performed at LNEG allowed dating of 113 Palaeozoic sediment samples in outcrop and drill hole sections. The same approach was used for U/Pb zircon geochronology using 31 samples of plutonic and volcanic rocks. Rock dating results obtained are important to constrain the geological structures of the IPB Volcano-Sedimentary Complex (VSC) that host the massive sulphide and stockwork mineralization. Key ore horizons, important to identify, are dated late Famennian (late Strunian) age in felsic volcanic and in sedimentary sequences and Tournaisian age felsic volcanic sequences. For upper VSC, zircon ages ca. 340–330 Ma were reported for the first time, suggesting new geodynamic interpretations. The main project outputs are the first 1/200.000 scale cross border and the 1/400.000 scale SPZ Geological Maps. The latter covers SW Iberia from Lisbon to Seville along 330 km. This scale was also considered in the following thematic maps developed by LNEG, IGME and JA: mineral occurrences, mining, and geological heritage. Another project activity was the development of a drill hole database and equipment acquisition for the Aljustrel (LNEG) and Peñarroya (IGME) drill core sheds. LNEG and Aljustrel Municipality also promoted mining and
geological studies in the Algares (Aljustrel) mine sector on gossan, underground gallery mapping and mineral characterization. GEO_FPI Project has improved the geological knowledge of the cross border region and promoted IPB as a key mining region in Europe. Therefore, since 2010, exploration campaigns led to the discovery of the Semblana, Monte Branco, La Magdalena, Sesmarias, Lagoa Salgada Central and Elvira deposits. Regional surveys carried out to promote a common approach to SW Iberia and improve new business initiatives focused on mineral resources and territory management. These activities could predict a larger mapping program to be developed in central and northern sectors of the Portuguese-Spanish border. Acknowledgement: EU/Interreg-VA/Poctep/0052_GEO_FPI_5_E Project/ funded by European Regional Development Fund/ERDF.

João Xavier Matos: Alejandro Díez-Montes2, Zélia Pereira3, Rita Solá4, Ruben Dias4, Ricardo Ressurreição4, Susana Machado4, Luís Albardeiro1, José Tomás Oliveira4, Paulo Fernandes5, Emilio González-Clavijo2, Juan Julián Huerta6, Márzia Mendes3, Rute Salgueiro4, Teresa Pena Silva4, Daniel Oliveira4, Igor Morais1, Pedro Gonçalves1, Sara Santos1, Augusto Filipe4, Carlos Inverno4, Jorge Carvalho4, Pilar Orche Amaré7, Ángel Martínez Girón7, Alejandro Robador6, Maria Teresa López6