



- History

The Aljustrel area has undergone sporadic mining and exploration dating back to Phoenician times, and includes a period of extensive work by the Romans. During Roman times, precious metal and copper were exploited from surface gossans and underlying sulphides at the Algares and Sao João deposits. Records of this activity include underground workings at Sao João and surface pits with adjacent slag fields at Algares. Two bronze mining tablets with the inscribed Roman Mining Laws of the day were discovered in slag fields and are now on display at the Instituto Geológico e Mineiro (IGM) and at the National Archeological Museum in Lisbon.

Modern mining at Aljustrel began in the mid 1800's, when the Algares and Sao João deposits were exploited for pyrite, which was used as a source of iron and sulphur. Due to the extensive size of the deposits and the small rate of production during this time, reserve depletion was not an issue and no systematic exploration was done until the mid 1900's. By the end of World War II, the known reserves at Algares were nearly exhausted and poor ground conditions at Sao João made mining difficult. An extensive exploration effort was initiated southeast of Sao João, leading to the discovery of the Moinho deposit.

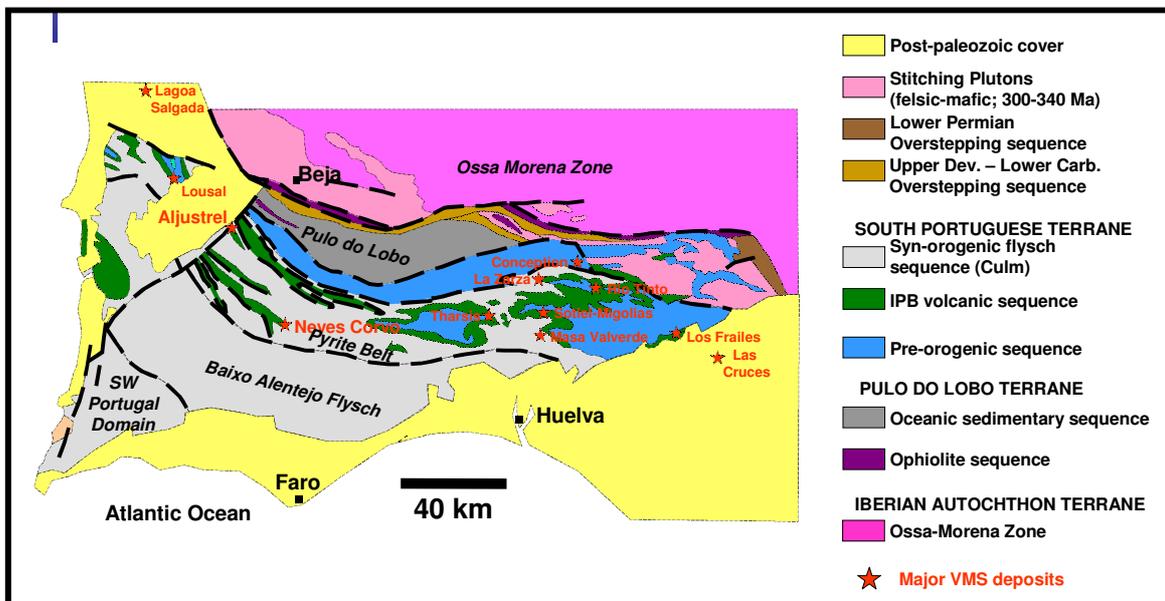
Gravity surveys across the Aljustrel area in the 1960's led to the discovery of the Feitais deposit in 1964 and the Estação deposit in 1969. In 1970, a combination of gravity and geology led to the discovery of the Gavião deposit 2.5 km southwest of the St. João deposit.

- Local Geology

The Aljustrel Mine area is interpreted to represent a Late Devonian rifted basin which appears to have controlled the distribution of both massive sulphide and stockwork mineralization as well as associated volcanic units. The deposits likely formed in shallow restricted basins adjacent to growth faults that acted as conduits for metal rich hydrothermal fluids. The thickest part of the massive sulphide deposits overlay stockwork mineralization that appears to be associated with growth faults along the basin edge. The deposits are comprised primarily of pyrite (>70%) with lesser sphalerite, galena, chalcopyrite and tetrahedrite. Base metals within these deposits are commonly zoned from zinc-rich zones near the top to copper-rich zones at the base of the massive sulphide. This zoning is interpreted to be largely a result of primary metal re-zoning caused by temperature, pressure and chemical gradients soon after deposition.

The waning stages of volcanism and hydrothermal activity are marked by the deposition of jasper and tuffaceous sediments of the Lower Sedimentary unit (Paraiso formation). This unit, deposited during a period of quiescence, forms a regionally extensive marker horizon in the Aljustrel Mine area and in other parts of the Iberian Pyrite Belt. The Quartz Feldspar Porphyritic Rhyolite unit appears to be a high-level intrusive unit that has intruded the stratigraphic sequence up to and including the Lower Sedimentary unit. The change from volcanism to sedimentation is marked by the deposition of the Upper Sedimentary unit (Flysch Group). It is characterized by a thick (>100m) turbidite sequence of argillite, siltstone and wacke.

The Late Paleozoic Hercynian Orogeny has folded and faulted the above units and is responsible for the present distribution of the Paleozoic stratigraphy. Anticlinal folds trend northwest and verge to the southwest. Thrust faults appear to have removed the intervening synclines, however these structures are poorly documented. North to northeast trending faults have offset the folded and thrust stratigraphy by 10's to 100's of meters.



Geology of the Iberian Pyrite Belt

- Deposit Types

The Aljustrel Deposits contain economic concentrations of copper, zinc, lead and silver. These deposits are classified as VMS deposits and are thought to be exhalative deposits formed at or near the sea floor in fault controlled restricted basins. The deposits are spatially and temporally associated with felsic volcanism, which was likely the heat source that drove the hydrothermal system.

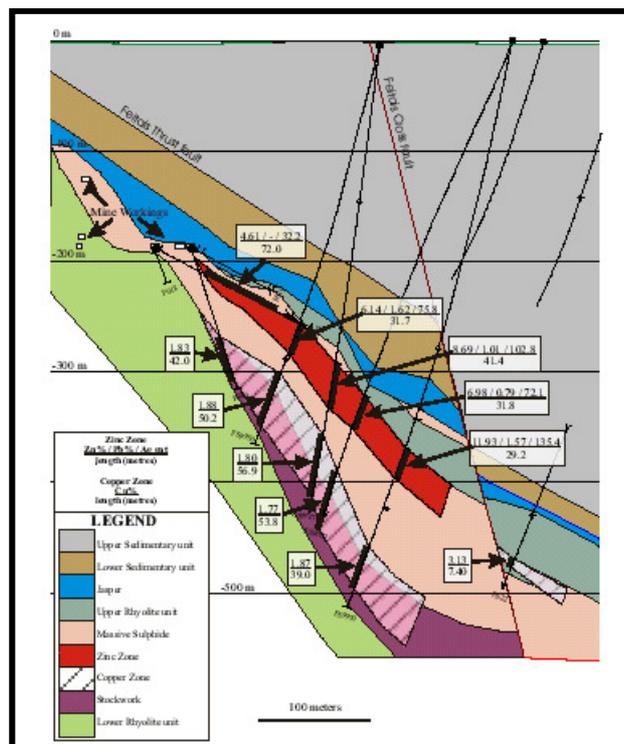
- Feitais Deposit

The Feitais deposit occurs in the southeastern part of the Aljustrel mine area on the normal limb of the Feitais anticline. It is spatially and temporally related to voluminous felsic volcanism that outcrops in the Aljustrel area. The deposit is underlain by extensive copper rich stockwork zones that mark the hydrothermal conduits along which heated metal rich fluids vented from depth to surface to form the overlying massive sulphide deposits.

The deposit is open down dip and down plunge to the northwest towards the Represa fault. Northwest of this fault, the deposit is displaced to the northeast with a relative horizontal displacement of 600 m where it is called the Estação deposit.

The stratigraphy of the Feitais deposit is subdivided, from oldest to youngest, into the:

1. Lower Rhyolite unit,
2. Stockwork unit,
3. Massive sulphide,
4. Upper Rhyolite unit,
5. Lower Sedimentary unit (Paraiso Siliceous formation)
6. Upper Sedimentary unit (Flysch group, Culm formation, Mertola formation).



Typical Cross-section through the Feitais Deposit

