

### **Lava-cryptodome-pumice cone volcanoes in the Iberian Pyrite Belt**

Carlos Rosa<sup>1</sup>, Jocelyn McPhie<sup>2</sup>, Jorge Relvas<sup>3</sup>

<sup>1</sup>INETI, LISBOA, Portugal

<sup>2</sup>CODES, ARC Centre of Excellence in Ore Deposits, HOBART, TASMANIA, Australia

<sup>3</sup>CREMINER/Dept. Geologia, Faculdade de Ciências, Universidade de Lisboa, LISBOA, Portugal

The Volcanic-Sedimentary Complex (VSC) of the Iberian Pyrite Belt (southern Portugal and Spain) consists of an Upper Devonian to Lower Carboniferous submarine succession, which comprises mainly mudstone and felsic volcanic units. The felsic volcanic units were generated by both explosive and effusive eruptions at submerged, intrabasinal lava-cryptodome-pumice cone volcanoes.

The volcanoes ranged in diameter from 2 km to >5 km and the thickest preserved sections vary from ~400m to >800m. The lavas and domes are the most voluminous units, and vary in thickness from ~20m to >400m. They comprise thick hyaloclastite intervals (up to 250m thick) that surround thin coherent interiors (up to 40m thick), and have marginal aprons of redeposited autoclastic breccia that pass laterally to beds of crystal-rich sandstone and siltstone. Sediment-matrix monomictic breccias are common at the top contacts of the lavas and domes and formed by infiltration of sediment into the hyaloclastite carapace.

Pyroclastic units are common throughout the VSC and occur as coarse beds of fiamme breccia that were probably deposited from eruption-fed, high-concentration water-supported gravity currents. These units can be up to 60m thick and have relatively small extents (up to 5km). They have irregular, discordant and erosive basal contacts, and abundant altered matrix that was probably originally glassy ash. Pyroclastic units comprise a thick, massive, poorly sorted lower zone (up to 45m) composed of fiamme, irregular and angular clasts of black mudstone, dense rhyolite clasts, and crystal fragments. The lower zone grades upwards to a massive intermediate zone (up to 15m thick) that is mainly composed of fiamme and crystal fragments. The top zone (up to 7m) is typically massive or diffusely laminated, comprising siliceous mudstone with fiamme up to 6-10cm across. Diffusely to well-bedded fiamme-rich sandstone and mudstone are the distal equivalents of the fiamme breccia.

Felsic cryptodomes and partially extrusive cryptodomes were less common than lavas, domes or pyroclastic units. They occurred close to the top of the VSC and are identified by the presence of peperite on the top contact, together with lateral aprons of redeposited autoclastic breccia.

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