

# Vila Velha de Ródão Variscan complex syncline: stratigraphy and structure (Central-Iberian Zone, Portugal)

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The complex syncline of Vila Velha de Ródão is located in the Central-Iberian Zone (CIZ), SW sector. The studied lithostratigraphic succession is situated above the unconformity that separates the Beiras Group (BG) shale and greywacke complex from the Armorican Quartzitic Fm (AQF). This presentation shows the geological relationship between the Ordovician-Silurian lithostratigraphic succession and the Variscan structure, which is based on new data that the review of geological mapping on the 1/25000 scale allowed to establish.

The revision of Vila Velha de Ródão geologic mapping emphasizes the presence of a lithostratigraphic succession with Lower to Middle Paleozoic age, already recognized in the Amêndoa-Carvoeiro synform (Romão, 2000; 2001; 2006). The stratigraphic series is represented from the basis to the top, by: Beiras Group, BG (Ediacaran to Cambrian) - the shale and greywacke complex contacting with Lower Paleozoic through angular unconformity and faulting surface. Ordovician-Silurian succession - Armorican Quartzitic Fm, AQF (80m) - massive coarse-grained arenites with conglomerates and fine laminated quartzites with Skolithus and Cruziana; Brejo Fundeiro Fm, BFF (120m) - pelites and siltstones with Didymograptus and trilobites (Ribeiro *et al.*, 1965; 1967; Teixeira, 1981); Monte de Sombadeira Fm, MSF (15m) - impure quartzites with storm characteristics; Fonte da Horta Fm, FHF (15m) and Ribeira do Casalinho Fm, RCF (10m) - pelites and quartzo-arenites; Cabeço do Peão Fm, CPF (25m) - bioturbated pelites and arenites; Ribeira de Laje Fm, RLF (5m) - micaceous impure arenites and arkoses; Casal Carvalho Fm, CCF (50m) - pelite-siltitic sediments with glaciogenic genesis; Vale da Ursa Fm, VUF (20m) - gray massive quartzites with aggregates of pyrite; Aboboreira Fm, AF (10m) - dark laminated graphitic pelites with Monograptus (Romão, 2000; 2001; 2006).

The main synclinal structure ends in SSE with a monocline (Campos & Pereira, 1991) in the Serra de São Miguel. The NNW final part of this macrostructure culminates in a triangular zone (Foz do Cobreão), limited to SW by a forethrust and to NE by a backthrust, with opposite facings. Their SW limb is imbricated by the Vinagra-Foz do Cobreão forethrust, which is characterized by a duplex geometry (Ramsay & Huber, 1987) and it is caused the displacement of the BG metasediments above the AQF quartzites. The forethrust and backthrust terms are related with the dominant regional facing of the thrust-fold system; where their interference originates a triangular zone and it suggests that there may exist a *décollement* in depth of thin-skinned type (Butler, 1982).

The macrostructure of the Vila Velha de Ródão syncline was affected by a progressive superposition of Variscan deformation events. The Variscan D<sub>1a</sub> event induces early overthrusts with NE facing, coeval of the primary folds with a penetrative axial planar S<sub>1</sub> foliation, giving rise to a L<sub>1</sub> intersection lineation, sub-parallel to the fold axis. The Variscan D<sub>1b</sub> event retakes the early D<sub>1a</sub> overthrusts and generates larger forethrusts (Fig.1): Vinagra-Foz do Cobreão; Portas do Ródão-Perdigão, Vale do Cobreão forethrusts, with duplex geometries. All of them show NE facing and induce displacements in the Beiras Group and in the Ordovician-Silurian succession. The Variscan D<sub>1c</sub> event generates backfolds and backthrusts with SW facing: Chão das Servas-Carregais backthrust, induced by the superposition of the Beiras Group above the quartzites of

the AQF on the NE board. The forethrusts and backthrusts system forms the Foz do Cobrão triangular structure and induces a décollement in depth of thin-skinned type.

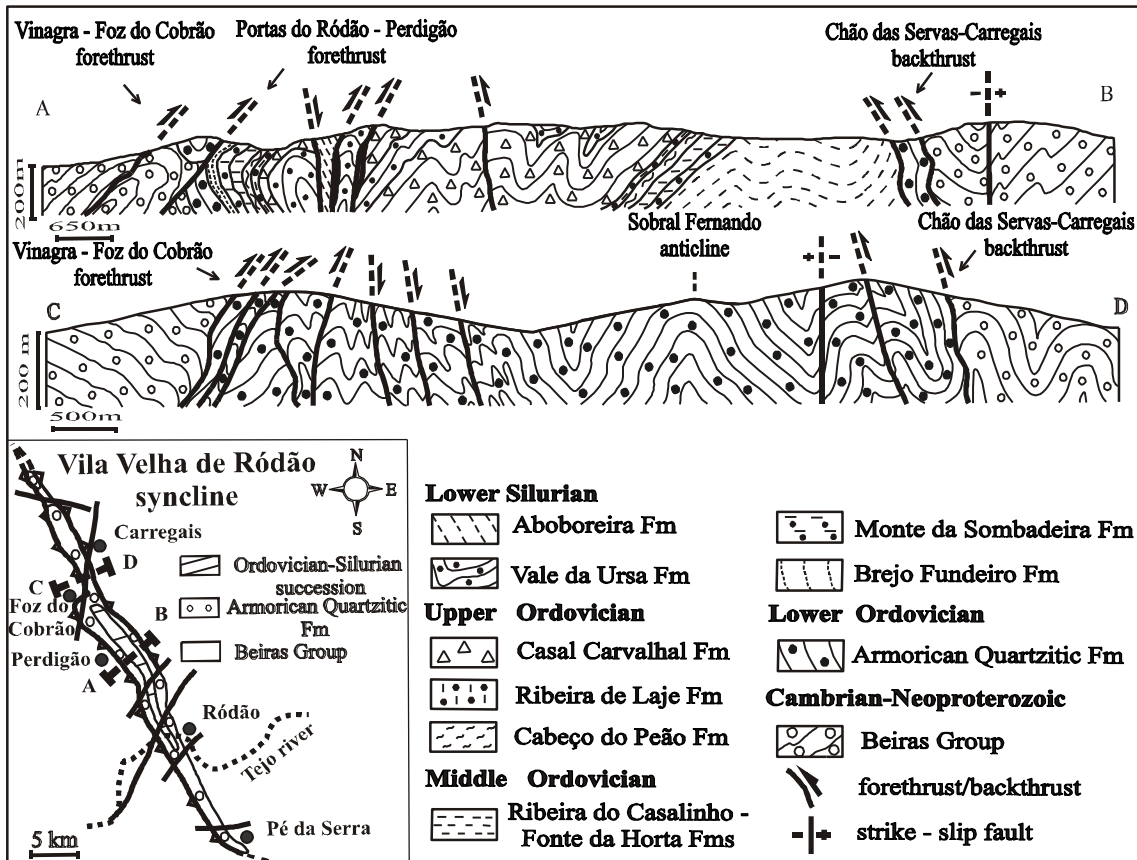


Fig.1 - Schematic framework and geological cross sections of the Vila Velha de Ródão complex syncline.

The Vila Velha de Ródão complex syncline is affected by two generations of late-Variscan faults: the first with a NNE-SSW orientation could be interpreted as domino structures. Among them stands out the Ponsul fault (Ribeiro, 1943; Dias & Cabral, 1989), which was reactivated as a reverse fault during the Alpine movements and is responsible for the overlapping of the Variscan substrate upon the continental Tertiary deposits. The second, probably later with a WNW-ESE orientation is a dextral strike-slip system, cutting the entire Variscan structure. The Ordovician-Silurian succession of the Vila Velha de Ródão syncline was deposited during a major sedimentary cycle with duration of within 50Ma (Romão & Oliveira, 1997; Romão, 2000; 2006): transgression - from Arenigian to Dobrotivian; condensation - near the basis of Caradocian and regression - from Lower/Middle Caradocian to Lower Silurian. The folds geometry and attitude, as well as the  $S_1$  foliation are compatible with a maximum NE-SW compression during the  $D_1$  phase. The sub-vertical stretching (sub-parallel to the kinematic  $a$  axis) indicates a vertical escape of material (Ribeiro *et al.*, 1990; Romão, 2000); the stress field is thus characterized by horizontal shortening and vertical stretching. The studied thrust-fold system indicates that the deformation gradually continues during the  $D_1$  later events, induced by a similar stress field, but with one slight rotation of the compression towards ENE-WSW due to the progressive deformation of the Iberian-Armorican Arc (Ribeiro *et al.*, 2007).

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