

LITHOLOGIC AND TECTONIC CONTROL OF THE MINERAL WATERS IN THE HERCYNIAN BELT: NORTHEAST PORTUGAL

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The diversity of the Mineral and Thermal (M-Th) waters of NE Portugal is here explained on the basis of both the encasing terrains of the Central Galicia and Trás-os-Montes geotectonic Zone with its underlying Centro-Iberian geotectonic Zone and the Neotectonic active faults. The regional distribution of the clusters (36 sites spread on a region with 12,000 km²) of the various types of M-Th water springs overlaps correlative terrains. This testifies that the identified three major hydrochemical groups - 1) CO₂ rich, Na bicarbonated, high TDS, 2) sulphydric, Na carbonated, highly alkaline and silicic, 3) sulphydric, Na bicarbonated, mildly alkaline, low TDS - are the hydrothermal fluids to be expected to ascend along faults from the fractured type aquifers which are supported by the in situ known lithochemical logs, which extend down to a maximum of 5 km. M-Th waters are associate to deep, sub vertical faults of the following major sets - NNE, ENE and NW. So, these M-Th waters might be considered as evidencing the on-going anchymetamorphism and Neotectonics operative on these geological massifs. The nearby cropping Hercynian granites and the Lower Paleozoic sequences with quartzites, carbonaceous slates, calc silicate rocks, amphibolites, green schists and the Pleistocene rainwater are the sources for the chemical components (HCO₃⁻, CO₂, HS⁻, SO₄⁼, SiO₂, F⁻, Cl⁻, Na⁺, Ca⁺⁺) and isotopes mostly used to discriminate the groups and subgroups of these M-Th waters.