



Chapter 14

Bauxite and Nickel-Cobalt Lateritic Deposits of the Tethyan Belt

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Abstract

Laterites are regoliths developed under tropical to subtropical conditions and are host to key deposit types, notably bauxites (major sources of Al, derived from weathering of aluminosilicate rocks) and Ni-Co laterites (derived from ultramafic rocks). Research on the western Tethys region, where bauxites and Ni-Co laterites developed during the Mesozoic and Cenozoic, probably peaking at the Paleocene-Eocene thermal maximum when geology, paleogeography, and climate were ideal for the deep weathering of favorable lithologies, is reported in this article.

Bauxites were developed on the rocks forming the continental margins to the various branches of the Tethys Ocean and were already forming in the Triassic, whereas the Ni-Co laterites developed on fragments of obducted ophiolite from the Tethys Ocean, which were only uplifted and exposed to weathering after the Jurassic. Residual lateritic bauxites are known in the region but karst bauxites are much more common.

Ni-Co laterites are found as residual profiles, ranging from oxide, to clay-silicate, to hydrous-silicate types, but are also represented by distinctive, extensively redeposited clay-oxide ores. This diversity of styles probably reflects differences in topography and uplift history because the deposits all formed within a similar, restricted climatic time window. The bauxite belt extends from Spain in the west, through the type locality of Les Baux in France, and intermittently through the Balkans, Greece, and Turkey to Iran and beyond. Bauxite resources in Europe constitute around 2% of the world's current known stock. Significant Ni-Co laterites are found in a more restricted geographic area stretching from Serbia to Turkey.

The bulk of both Al and Ni-Co production currently comes from Greece, today accounting for around 1% of world production of both Ni and bauxite, and with published resources on the order of 650 Mt @ >50% Al₂O₃; other mines are located in Turkey, Albania, and Kosovo. Ferronickel plants are located in Greece, but also in the Former Yugoslav Republic of Macedonia, and Kosovo. The region has significant potential for the discovery of additional bauxite resources, although they would most likely be karst bauxites, less suited to large-scale mining efforts. Many undeveloped Ni-Co deposits are recorded in the region, with a recent focus to unlock the potential of oxide mineralization using novel hydrometallurgical technologies. Particularly noted is the potential for large low-grade redeposited lateritic Ni-Co-Fe deposits: Mokra Gora in Serbia, for example, has a resource of more than 1 Gt @ 0.7% Ni and 0.05% Co.

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