Geochemistry and speciation of Cr in ultramafic rocks

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Over the last years more and more attention has been drawn to the high levels of Cr that are detected in soils and groundwaters throughout Greece. A growing number of studies report Cr(VI) in groundwater that often exceeds the limits established by WHO and EU legislation. Most studies focus on areas that host industrial activities associated with discharges of Cr (VI). Thus, until recently, high levels of Cr (VI) were always attributed to anthropogenic pollution. However, as other areas in the Balkan Peninsula, Greece is covered to a great extent by peridotites and serpentinites.

This study investigates the leachability of Cr(VI) from a variety of naturally – occurring ultramafic rocks, including ophiolites and laterites of various degrees of weathering, as well as overlying soils. The major ore mineral is the Cr-spinel chromite. Total Cr contents increase in the order: ophiolites < soils < laterites. The leachability of Cr(VI), determined by a series of chemical extractants varies significantly depending not only on the type of rocks, but also on the degree of their natural weathering. Significantly more Cr(VI) is leached from laterites than from ophiolites. Although Cr(VI) accounts for less than 0.6 ‰ of total Cr contents in the rocks, the absolute contents are high (up to 11 μg/g) and could lead to elevated aqueous Cr(VI) concentrations.