

Geogenic Occurrence of Cr(VI) in Groundwater of Northeast Peloponnese, Greece

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We report on geogenic Cr(VI) from both alluvial and fractured aquifers located in the wider area of Geraneia Mountains ophiolitic complex in Northeast Peloponnese, Greece. Bedrock and subsoil from a weathering profile as well as groundwater and stream water samples were collected and analysed with a variety of analytical techniques (XRF, XRD and SEM-EDS for solid samples, spectrophotometry, HPLC and ICP-MS for water samples).

The weathering profile study shows Mg depletion towards the surface, reflecting the continuous impact of weathering on bedrock serpentine minerals. Fe and Mn show enrichment towards the upper soil horizons, while Cr does not present a systematic pattern along the profile. Three types of chromite grains presenting different textures are observed in all horizons: unaltered Al-rich chromite grains, Al-poor chromite grains with magnetite rims exhibiting dissolution features and relics of Fe-rich chromite grains. These findings suggest that as weathering progresses, the magnetite rim is removed allowing the dissolution and release of Cr(III) and Al from the chromite-grain cores [1].

Based on the water study, Cr(VI) concentrations in the alluvial aquifer (6.7µg/L to 74µg/L) are higher than those in the springs (<2µg/L-14.3µg/L) and stream waters (<2µg/L-3.9µg/L). Cr(VI) enrichment in groundwater could be attributed to the longer residence time within the aquifer. However, the increased Cr(VI) concentrations in the alluvial aquifer seem to be related to a combination of both weathering factors and anthropogenic pressures, such as the presence of nitrates which favors the prevalence of oxidative conditions and therefore the occurrence of Cr(VI).

[1] Morrison. J. *et al* (2015). Weathering and transport of chromium and nickel from serpentinite in the coast range ophiolite to the Sacramento Valley, Ca, USA. *Applied Geochemistry*, **61**, 72–86.