



## **Geogenic Chromium in Waters from Mining and Agriculture coastal area in the Sultanate of Oman**

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Groundwater is one of the major sources of freshwater in Oman. Moreover, Oman exhibits one of the largest and most complete ophiolitic nappes in the world. The mafic and ultra-mafic components of the ophiolite may contain environmentally available Cr (total and VI). The aim of this study is the investigation of Cr presence in groundwater within three areas of the ophiolite: a) the Nakhal chromite mining area, b) the Yanqul copper mine, and c) the alluvial fan in Barka coastal area (sedimentary basin). Groundwaters as well as solid samples (rocks, soils, and sediments) were analysed. The results show that total Cr exceeds the permissible limits even in control samples far away from the outcropping ultramafic rocks. Cr(VI) mostly appears in agricultural areas within the alluvial aquifer close to coastal areas. The solids leaching tests indicate that various forms of Cr in the sediments and soils relate to chromite, serpentine, and clinochlore. The Cr release is happening through different mechanisms in the different study areas. Cr is mobilised into the ophiolite aquifers as Cr(III) through the dissolution of minerals such as serpentine or micas and it is either absorbed by iron oxides in the form of Cr(III) or oxidised to Cr(VI) (possibly through the activity of microbes). In the alluvial aquifers, the release of Cr can either result from ion exchange with sulfates in the form of Cr(VI) or as Cr(III) desorbed from iron oxides.