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Spring and surface water quality of the Cyprus ophiolites

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Abstract. A survey of surface, spring and borehole waters associated with the ophiolite rocks of Cyprus shows five broad water types (1) Mg-HCO₃, (2) Na-SO₄-Cl-HCO₃, (3) Na-Ca-Cl-SO₄-OH-CO₃, (4) Na-Cl-SO₄ and (5) Ca-SO₄. The waters represent a progression in chemical reactivity from surface waters that evolve within a groundwater setting due to hydrolysis of the basic/ultrabasic rock as modified by CO₂-weathering. An increase in salinity is also observed which is due to mixing with a saline end-member (modified sea-water) and dissolution of gypsum/anhydrite. In some cases, the waters have pH values greater than 11. Such high values are associated with low temperature serpentinisation reactions. The system is a net sink for CO₂. This feature is related not only to the hydrolysis of the primary minerals in the rock, but also to CaCO₃ or Ca-Mg-CO₃ solubility controls. Under hyperalkaline conditions, virtually all the carbon dioxide is lost from the water due to the sufficiently high calcium levels and carbonate buffering is then insignificant. Calcium sulphate solubility controls may also be operative when calcium and sulphate concentrations are particularly high.

Keywords: Cyprus, Troodos, ophiolite, serpentinisation, spring, stream, water quality, bromide, iodine, boron, trace elements, hyperalkaline.

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