

HEAVY METAL DISTRIBUTION IN SURFICIAL WATERS FROM CHIAVENNA VALLEY (CENTRAL ALPS, ITALY)

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Main components and 49 heavy metals of about 200 surficial and ground waters from the Chiavenna Valley (Central Alps, Italy) have been analysed. The Chiavenna Valley (~700km²) is a NNW-SSE elongated basin and is a relatively open valley since the northern watershed is intersected by the Spluga Pass while water flows into the Mezzola Lake to the south. The valley is composed by terranes of the pre-Alpine crystalline basement interbedded by Permian-Mesozoic meta-sediments. Allochthonous Thetys-related ophiolitic and Alpine-related Tertiary intrusive bodies also occur. The strong differences of the outcropping rocks are suitable to evaluate the occurrence of naturally-derived toxic elements. The Chiavenna waters are low-salinity Ca(Mg)-HCO₃ and Ca(Mg)-SO₄ in composition with pH between 7.1 and 8.5. Nitrogenated species are 3.5 (NO₃) and 0.5 mg/L (NH₄) while NO₂ is 0.01mg/L. Heavy metals have extremely low values, often below the detection limits for ICP-MS analyses. Higher contents of trace elements and heavy metals, such as Sc, V, Mn, Cu, Zn, As, Ba, Pb and U are in wells (supplying drinking water) than those in spring and stream samples. One well sample, at -140m) has an As content of 55 mg/L. The available data suggest that the Chiavenna Valley is a relatively pollution-free area, though small, presumably natural, enrichments in toxic elements have been locally detected. On the whole, the geochemical data gathered do represent an useful data-base from which future water evolution and pollu