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Hydrogeochemical characteristics of a stratified aquifer and groundwater quality degradation, Sila Massif, Italy

CARMINE APOLLARO[1], MARINA ACCORNERO[2], ANDREA BLOISE[1], RICCARDO BIDDAU[3], ROSANNA DE ROSA[1], LUIGI MARINI[4], FRANCESCO MUTO[1] & MAURIZIO POLEMIO[5]

1 *Department of Earth Sciences, via Ponte Bucci 4, cubo 15B, 87036 Arcavacata di Rende (CS), Italy*
m.polemio@ba.irpi.cnr.it

2 *D'Appolonia S.p.A., Via San Nazaro, 19, 16145, Genova, Italy*

3 *Department of Earth Sciences, Via Trentino 51, 09127 Cagliari, Italy*

4 *Laboratory of Geochemistry, Dip.Te.Ris., Genoa University, Corso Europa 26, 16132 Genoa, Italy*

5 *CNR-IRPI,Via Amendola 122/I, 70126 Bari, Italy*

Abstract Hydrogeochemical surveys were carried out in eastern Calabria (Italy) for recognizing the groundwater flow domain, assessing the utilization level, and characterizing the degradation risks. Physical-chemical parameters of groundwater and surface water were determined. Waters draining crystalline and metamorphic rocks have Mg-HCO_3 to Na-Ca-HCO_3 compositions and low salinity (<0.20 g/L), whereas waters from sedimentary environments belong to the Ca-HCO_3 facies and have higher salinity (0.20 to 0.76 g/L). Waters interacting with evaporite formations show a dominant Ca-SO_4 composition, and high salinity (up to 2.9 g/L). The concentrations of toxic components are usually low, but in some samples nitrates and arsenic exceed the drinking limit. It is shown that quality degradation is due to anthropogenic activities, mis-use of fertilisers, or discharge of untreated urban wastes.

Key words layered aquifer; geochemistry; contamination; water quality