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Preliminary hydrochemical study of Ronda ultramafic massif (South Spain)

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During 2015 more than 70 springs related to the peridotite outcrops of the Ronda mountainous massif, South Spain, have been identified. The field work included "in situ" measurements of physical-chemical parameters (T, EC, pH), and water sampling for major components and stable isotopes of water and DIC.

The hydrogeochemical study allowed us to characterize different flow systems: (1) springs with very low to medium electrical conductivities (200-700 μS/cm) and pH below 9.0, and (2) springs with EC above 700 μS/cm and pH above 9.0.

The first group of springs are supposed to be linked with surface and subsurface flows. The hydrogeochemical reactions that determine their composition are characterized by the low solubility of minerals, atmospheric CO_2 (open system) and active serpentinization reactions that supplies hundreds of ppm of Mg^{2+}. All of them are waters of HCO_3-Mg or HCO_3-Mg-Na type.

The second group of springs drains water with EC above 700 μS/cm and pH over 9. In general, these springs are associated to deep flows connected to regional faults or major tectonic features. Deeper flow enhances water-rock interaction and time of contact, so this system evolves towards a closed system to O_2 and CO_2. All these waters are old or older than the first group and show reducing features and are of Na-Cl or OH-Ca type.