

Chemical weathering in a Mediterranean karstic watershed as a proxy to climate changes

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Carbonate weathering is an important tool to determine the extent of climate change. The eastern Mediterranean region is under arid to semi-arid climate and suffers from water scarcity. The study area (Kadisha-Abou Ali watershed, Lebanon) is a coastal karstic watershed of 491 Km² area. It extends from sea level till 3 km in altitude, thus leading to a contrasted land cover. To understand the weathering processes, water samples were collected throughout the seasons. Physicochemical characterization as well as H-, C-, O- and Sr-isotope ratios of the water and dissolved species were established. The isotopic composition of the dissolved carbon ranges from -15.4 to -7.9 ‰. Lightest values are mainly found in area having the highest anthropic impact, and are likely associated to biological respiration and biologically mediated (through the soils) carbonate dissolution. In addition, ⁸⁷Sr/⁸⁶Sr fluctuates between 0.7072 and 0.7081 associated with a Ca/Sr ratio between 399 and 889, which indicates marine carbonate dissolution. Furthermore, temperature loggers were installed at the river's springs, presenting different behaviors. At Rachiine Spring it ranges between 10.3 and 15.8 °C, with a significant decrease triggered by the snowmelt; whereas Kadisha Spring shows a more buffered temperature (7.1 to 7.9 °C). In conclusion, the upstream river reflects natural patterns with negligible anthropogenic contribution. A new sampling site is therefore chosen on the estuary to evaluate the anthropogenic input.