

Geochemical and isotopic characterization of surface water on sub-Antarctic Marion Island

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River systems in the sub-Antarctic are important indicators for identifying early and subtle signals in the hydrological response to climatic change. In particular, small sub-Antarctic watersheds are characterized by a high degree of sensitivity, making them valuable and unique research environments. The aim of this study is to determine the geochemical and isotopic composition of stream water on Marion Island under varying climate conditions. Here we present the results of temporal and spatial sampling of the Soft Plume River, investigated in conjunction with high-resolution hydrological, physio-chemical and meteorological measurements. Stream water samples were collected daily over a 16-day period during April and May 2015. Samples were analysed for their ionic content and isotopic composition (δD and $\delta 18O$) to determine the role of landscape position and climate on stream chemistry and to better understand the hydrology of these systems. The results from this study build on previous geochemical research on Marion Island with the addition of continuous, high-resolution hydrometeorological measurements. The δD and $\delta 18O$ values of stream water complement the isotopic data from precipitation collected on Marion Island as part of the Global Network of Isotopes in Precipitation (GNIP) programme. Examined in conjunction, they provide a more holistic understanding of the hydrometeorology of Marion Island.