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WATER TYPES AND HYDROLOGIC CYCLE IN MARITIME ANTARCTICA: THE CASE OF LIVINGSTON ISLAND, SOUTH SHETLAND ISLANDS

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The study of fresh water and its interaction with soil and ice in maritime Antarctica is of great environmental, ecological and geomorphological interest. The aim of this work is to describe and characterize from a hydrochemical point of view the different types of water existing in summer in Livingston Island, South Shetland Islands, trying to understand their relationships and origin. The presence of liquid water in summer has an important role in these latitudes. Direct precipitation, snow and glacier melting, streams, lakes, groundwater and permafrost melting as well as mixing with salty marine water in coastal areas contribute to the quality of the different water masses. Four main different types of water have been identified in Livingston Island by means of statistical analysis of hydrochemical and stable isotopes compositions as well as electric conductivity, temperature and studies on spatial distribution of the hydrochemical facies. The results allow to estimate the participation of each type of water having a particular chemical and isotopic composition. For instance, groundwater and permafrost melting are more important supplying water to streams than to lakes, where direct precipitation and snow and glacier melting is more significant. The study of water temperatures shows also notable differences between the existing water masses. These studies allow to establish the present conditions and to identify some hydrological parameters that could be indicators of the effects of climate change in this Antarctic region. Changes on environmental conditions have an important impact in the hydrologic cycle, specially signified in maritime Antarctic regions.