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Biogeochemical dynamics of Flores Island aquatic systems, Azores

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The present work was developed during the 2009 Flores and Corvo expedition organized by the Department of Biology, University of the Azores. The main goal was to conduct a robust ecosystem analysis in which the microbial community composition assessment of the lakes water column and of the adjacent bottom sediments was integrated with the environmental characterization of specific Flores Island freshwater habitats. For this, three lake systems and three mineral springs were studied. Water and sediment samples were collected at each site. Additionally, microbial biofilm samples were also collected where detected and the community was studied using a culture independent integrated approach.

The Azores archipelago is located within the North Atlantic, between the boundary of three tectonic plates (American, Eurasia, and African plates), and it is composed of nine volcanic islands spread along a general WNW-ESSE direction, between 37º to 40º N and 25º to 31º W. The islands correspond to the emerged portions of the Azores plateau defined by the 2000 m bathimetry line Flores and Corvo form the western islands group, with Flores being the western most island of the archipelago. These islands genesis would have started during the Miocenico Flores island subaereal phase is dated of 0.7 M BP and the island volcanic actividade is thought to stop around 3000 years A.C.

All lakes included in the study are of volcanic origins and are subject to vulcanic contamination. Hydrogeochemical studies can be used as an insight to the volcanic systems since vulcanic gases condensation and/or thermal fluids mixing can occur at these sites. Most microbial community studies within azorean freshwater systems were restricted to phytoplanktonic community studies or were conducted at hydrothermal sites solely. This is the first work that integrates microbial community composition studies of the lakes water column (phytoplankton as well as bacterioplankton) and of the adjacent bottom sediments using a multidisciplinary approach in order to characterize the ecosystem dynamics. Additional sampling was conducted at short mineral springs streams that feed into the lake systems in study. These streams were sampled at sites that were oxygen depleted as well as CO2 enriched.