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Hydrogeochemistry of volcanic lakes from Flores islands (Azores, Portugal): preliminary data

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In order to characterize the water composition from volcanic lakes at Flores islands (Azores, Portugal), as well as to evaluate the volcanic contamination, a sampling campaign was made in 5 water bodies. Two geochemical profiles were made at Lagoa Comprida, Lagoa Funda and Lagoa da Lomba lakes, and one profile at Lagoa Negra and Lagoa Rasa lakes. The islands of the Azores archipelago represent the emerged portion of the Azores plateau, which is defined by the 2000 meters bathymetry line. This area is located nearby the triple junction between the American, the Eurasian Plate and the African Plates, according to a complex geodynamic setting. Flores Island is the western most island from the Azores archipelago, which is made of 9 volcanis islands located in the north Atlantic Ocean, between the latitudes of 37°N to 40°N and the longitudes of 25°W to 31°W. The archipelago is geographically divided in three groups of islands, and Flores and Corvo constitutes the Western Group. The genesis of Flores Island began in the Upper Miocene and the subaerial volcanism is dated from 0.7 Myr BP, and ended from 3,000 years A.C. The water of these lakes is mainly of the Na-Cl type, with some samples showing a trend to Na-HCO3 compostion. Samples are cold, with temperatures ranging between 12.8°C and 23.4 (average=15.2°C; median=14.7°C). The water composition is partially controlled by the marine contribution, due to sea-salt input as a result of a sea salts spraying effect. The water samples present low mineralization, as deducted from the electrical conductivity, which ranges from 55 to 148 μS/cm (average=109 μS/cm; median=131 μS/cm). The maximum pH values, equal to 9.94, was registered at the Lagoa Funda lake surface, and decreases in depth to minimum values of 6.22 (average and median = 7.8). The pH higher values observed ate the lake surface are related to biological processes that occurs in some of these systems. Total CO_2 values varies between 2.10 and 41.14 mg/L (average=23.5 mg/L; median=26.56 mg/L), being the maximum value observed in the bottom of

Lagoa Negra lake. The surface emanation of volcanic volatiles, where CO_2 is dominant, occurs in several locations of the Azores archipelago, associated to hydrothermal activity, and can be diffuse or concentrated in fumarolic fields. Nevertheless, the geologic situation in Flores island, and the low concentration of CO_2 observed in the studied lakes, suggests that the concentration of the total-CO_2 in these systems is controlled mainly by the free-CO_2 produced by the degradation of the organic matter. Nevertheless, some lakes present a slight increase of a few ions (K, Ca, Cl and HCO_3) and the iron, suggesting the possibility of hydrothermal seepage contamination.