



Geochemical analysis of recent tephra layers from a lacustrine sequence in Northern Patagonia Andean Range

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Recent magmatic events identified in a sedimentary sequence recovered from Brazo Rincón, lake Nahuel Huapi, North Patagonia, Argentina, were investigated by means of morphological features and geochemical signature of volcanic material. Four tephra layers were identified in the core by differences in colour and grain size, after a detailed inspection under binocular magnifying glass of the sedimentary sequence. Primary volcanic components were sub-sampled from coarser granulometric fractions of each tephra layer according to macroscopic characteristics such as colour, size, and shape. The primary components distinguished from the variety of ash glassy were white and brownish pumice shards, scoriae and glass shards. Bulk sediment, less than 63 μm fraction, was also analyzed. The samples obtained were characterized by measuring major and trace element contents by using Instrumental Neutron Activation Analysis. The elements determined were major Al, Ca, Fe, Mg, Mn, Na, K, and Ti, Rare Earths La, Ce, Nd, Sm, Eu, Tb, Tm, Yb, Lu, and other relevant trace elements Sb, As, Ba, Br, Cs, Zn, Co, Cr, Hf, Sc, Sr, Ta, Th, U, and V. Standard Reference Material (SRM) IAEA SL Lake Sediment was analysed by triplicate to check analysis quality. Characteristic trace element composition patterns of each glassy fraction from each volcanic event registered in the sediment sequence were obtained. The sedimentary sequence was dated previously by ^{210}Pb and ^{137}Cs techniques, allowing the association of the tephra layers with historical records of the volcanic events in the study region. The two upper tephra layers can be linked to Cordon Caulle fissure (Puyehue-

Cordon Caulle region) eruptions that occurred in 1921-1922 and 1960.

The third tephra layer, which can be associated to an event produced in 1890-1900 decade from the extrapolation of the sedimentation rate determined in upper layers, shows different compositional patterns when compared with two the upper tephtras, revealing a different source. The composition of this tephra layer is similar to that of volcano Calbuco rocks, which registers an event in 1893-1894, within this tephra deposition date range. Villarrica and Llaima volcanoes had eruptions also within 1890-1900 decade, and their products show similar REE patterns as Calbuco, hence not allowing identification of the source by this mean, but they are about 140 and 220 km farer from to the sampling site, respectively. A more comprehensive analysis of the elemental composition will be performed to complete the geochemical identification of the source.

The fourth tephra identified, which could be associated to an event produced at the end of 18th century, shows the same composition patterns as those registered in the Cordon Caulle fissure events.