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Lacustrine records of the June 2011 eruption of the Puyehue-Cordón Caulle Volcanic Complex, Central Chile (40°30'S, 72°10'W)

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Present volcanic eruptions offer unique opportunities to study the dispersion and spatial variability of volcanic deposits. The objective of this work is to assess lateral variations of pyroclastic deposits from the June 2011 volcanic eruption of Puyehue-Cordon Caulle Volcanic Complex (PCCVC) by analyzing the sedimentology and geochemistry of tephra layers deposited in different lakes situated in North Patagonia (Chile and Argentina), located along the main dispersion axis of the volcanic cloud. Short sediment cores were extracted from selected lakes in Chile and Argentina using a short Uwitec gravity corer; coarse tephra deposits were collected with a grab sampler. The sediment cores were opened, visually inspected, photographed and described, and the magnetic susceptibility was measured with a Bartington MS3 meter and MS2E sensor. Visual inspection included the identification of the 2011 tephra layer, and the description of colour, grain size, thickness, and sedimentary structures of the sedimentary sequence. Subsequent studies were focused on the tephra layers. Samples were freeze-dried for multi-proxy analyses, including bulk mineralogy analyzed by X-ray diffraction and bulk geochemical characterization by Instrumental Neutron Activation Analysis. In this presentation, the main characterization features of the pyroclastic products will be presented, together with dispersion patterns. Lacustrine tephra deposits clearly reflected the predominance of westerlies, with thin deposits on the Chilean side of the volcano, but much thicker and coarser tephra close to the volcano. Ash dispersion extended hundreds of kilometers towards the east of the volcano, i.e. in Argentinean territory. Tephras deposited in water bodies in Chile are mainly transported from the eruptive center by rivers and watercourses with headwaters located in the volcano area, whereas tephra deposits in Argentinean lakes mainly result from direct ash falls. We also observed in-lakes variations in the sedimentological properties of the 2011 tephra in large lakes located to the West (Lake Puyehue) and to the East (Lake Nahuel Huapi) of the PCCVC. The characterization and precise understanding of this very recent eruption, and the observations of distribution patterns associated to wind directions and precipitation effects help us understand the mechanisms responsible for tephra deposition in lakes. Ultimately, this study will provide important clues to interpret tephra records from longer sediment cores, and improve tephra correlations on longer distances.