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An 18,000-year multiproxy lacustrine record of climate variability in south-central Chile (40°S): Lago Puyehue, Chilean Lake District

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An 11-m-long sediment core was collected in Lago Puyehue (40°S, Lake District, Chile). The coring site had been selected on basis of a seismic-stratigraphic analysis that highlighted it as an area of relatively condensed, continuous and undisturbed sedimentation in this otherwise highly dynamic post-glacial lake. The 11-m core extends back to 17,915 cal yr BP. An age-depth model was established by 9 AMS ^{14}C dates, constrained by ^{210}Pb, ^{237}Cs, ^{241}Am measurements, by the identification of event-deposits related to earthquakes and/or volcanic eruptions, and by varve-counting for the past 600 yr. The core was submitted to a multi-proxy analysis, including sedimentology, mineralogy, grain-size, major geochemistry and organic geochemistry (C/N ratio, δ^{13}C), loss-on-ignition, magnetic susceptibility, diatom analysis and palynology. Along-core variations in sediment composition reveal that the area of Lago Puyehue was characterised since the Last Glacial Maximum (LGM)

by a series of rapid climate fluctuations superimposed on a long-term warming trend. These rapid climate changes are: (1) an abrupt warming at the end of the LGM at 17,300 cal yr BP, (2) a short, relatively cold interval between 13,100-12,300 cal yr BP, (3) a second abrupt warming, possibly with increased precipitation, at about 12,300 cal yr BP, and (4) an increase in climate variability in the late Holocene at 5000-6000 cal yr BP. The timing of these rapid climate changes confirms previously reported climate trends from continental southern South America and their out-of-phase relationship with those from the northern hemisphere and from Antarctica