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# Vegetation, fire, and climate during the Pleistocene-Holocene transition in SW Patagonia (51žS)

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We set out to develop a high-resolution, precisely dated paleoclimate record spanning the Younger Dryas Chronozone (YDC) and the early Holocene to assess the timing, frequency and direction of paleoclimate change during this critical and highly controversial time period in South America. Stratigraphic analyses of lake sediment cores from Lago Eberhard (51ž34'S, 72ž40'W, 71 m elevation) allow a detailed examination of the last glacial-interglacial transition in the Seno Última Esperanza area of SW Patagonia. A series of overlapping cores from this site revealed the presence of a 100-cm long organic-rich basal unit, which contains mm- and cm-scale authigenic carbonate layers deposited between 12.6-11.4 ka(ka=1000 cal yr BP), overlain by gyttja (40-cm long) and a tephra derived from the Reclús volcano which we have AMS-dated at 10.6 ka. High-resolution analyses on the laminated organic unit indicate the predominance of a grass steppe and high incidence of local fires under cold conditions. Multidecadal to centennial-scale fluctuations in arboreal taxa (chiefly Nothofagus) and charcoal influx are evident between 12.8-11.4 ka, these fluctuations are superimposed upon decadal-scale variations in authigenic carbonate laminae. An abrupt expansion of Nothofagus forests began at ˜11.4 ka, suggesting a warm pulse and stabilization in precipitation regimes. This event, which took place within 300 years, consists in a large increase in pollen percentages from 15% to 80%, a substantial decrease of steppe indicators, along with a decline in the charcoal trend and peak magnitude. Our results suggest that climate during the YDC remained cold despite moderate glacial recession in this area of SW Patagonia (unpublished data). Conditions within this interval inhibited forest expansion and favoured the persistence of a grass steppe, high fire incidence, and deposition of laminated authigenic carbonates in Lago Eberhard. We interpret these data as indicating high-frequency variability in precipitation regimes, suggesting that the southern westerlies may have experienced extreme, decadal-scale

variability during the YDC.