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Contrasted lacustrine sedimentary basins at both sides of the Andes in Northern Patagonia have been investigated in order to better understand the sedimentary record of major subduction earthquakes from Southern Chile. The case study of 21-22 May 1960 earthquake and induced Puyehue-Cordon-Caulle eruption is used to establish regional correlations and to evaluate the influence of earthquake-induced landslides in the generation of catastrophic flooding events and violent waves in lakes located at the piedmont. This study combined high-resolution seismic reflection profiles (3.5 kHz), and well-dated short sediment cores from lakes located close to the Puyehue-Cordon-Caulle volcanic complex in Chile (Lago Puyehue) and in Argentina (lakes Nahuel Huapi and Frias). Radionuclide dating (^{137}Cs) and tephrostratigraphic analysis combined with a multi-proxy study of lacustrine sedimentary facies (grain size, magnetic susceptibility, gamma density, X-ray radiography, total organic carbon) allows the development of detailed age-depth models and the correlation of striking sedimentary events with the impact of May 1960 earthquake. These interpretations are further supported by geomorphic and tephrostratigraphic studies in the catchment areas and by historical chronicles. In Lago Puyehue, the identification of tephra layers (Rininahue 1907, Cordon Caulle 1921-22 and 1960) highlights the development of erosive sedimentary events resulting from ground shaking during the earthquake and from the outburst of earthquake-induced landslide dams in the course of the main tributary of the lake after the end of the eruption. These outbursts triggered a large hyperpycnal flood event of ca. 3 x 106 m^3, as identified both on cores and seismic profiles in the basin facing the Golgol delta. More than 150 km from the main epicentre, ground accelerations during the 22nd of May 1960 triggered a large subaqueous landslide offshore San Carlos de Bariloche in Lago Nahuel Huapi. This mass wasting deposit is well identified on seismic profiles and evolved into a mega turbidite in the deep basin. On core, the 1960 slide deposit is cap by a thin tephra layer bearing the typical signature of the 1960 Cordon-Caulle event. This earthquake-induced slide was favoured by both a specific tectonic context and by the construction of a new harbour several months before the event. The subaqueous slide not only destroyed the harbour but also triggered a series of well-documented destructive waves offshore Bariloche. In the narrow proglacial lake Frias, the 1960 event formed an unusual organic rich layer in the deep basin intercalated within glacial varves and several tephra layers.

S18-01

Characterizing and counting fine laminations using high-resolution geochemical analyses from a micro-fluorescence core scanner: An example from Ounianga Kebir, Chad

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Lake Yoa, a permanent hypersaline lake at Ounianga Kebir in northeastern Chad (19.03 °N; 20.31 °E), contains a continuously laminated sequence spanning the last ~2700 years. Lamination couplets are about 1–mm thick and are typically composed of a dark brown to black organic layer and a reddish brown layer with coarser texture. The red-brown layer is often mixed with or replaced by a white carbonate layer. Microscopic observation revealed an alternation of wind-blown sand layers, organic layers and layers of neoformed micritic calcite. We used a new generation of micro-fluorescence core scanner to characterize the laminations directly from the surface of the core. The 100-micron thick, 4-mm wide flat beam enables to discriminate each couplet using the variations of Ca, Sr and Fe, each couplet being identified by ~10 data points. Our counts of Ca peaks over the 3.68 meters of the composite section match the age model established by radiocarbon dating and confirmed the annual character of the laminations. Iron and Calcium content measured by XRF compares well with the results of ICP analyses. By comparison with microscopic investigation, we linked elemental composition with

specific sedimentary facies, and hence to variations of environmental conditions, such as wind intensity.
This technique has several advantages for high-resolution analysis of finely laminated sediments: it is fast, non-destructive and allows to continuously measure the interannual variability of elements over long sedimentary sequences. Our investigation demonstrates the feasibility of counting varves with this new generation of micro-fluorescence core scanners.

S18-02

Chronostratigraphy of a ~700 ka old lacustrine sequence: A multi tool dating of the mid-Pleistocene Amora Formation, Mount Sedom, Israel

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The limnological history of the terminal and hypersaline water bodies that occupied the Dead Sea Basin during the Upper-Quaternary (lakes Amora, Lisan and the Dead Sea) reflects millennial to decadal shifts in hydrological conditions in their drainage area, which in turn respond to changes in the east Mediterranean (EM) climate. The lakes fluctuated between low and high stands and layered and mixed limnological configurations. Contrary to intensive studies on the sedimentary-lacustrine archives of late Pleistocene Lake Lisan and Dead Sea, the sediments deposited from Lake Amora received little attention due to difficulties in setting their chronology.
The lacustrine Amora Formation, underlying the Lisan Fm. (70-14 ka BP), consists of laminated aragonite and detritus, Ca-sulfate minerals, halite and clastic units. The sediments were uplifted and tilted by the rising Sedom diapir, exposing ~330 m of the Formation on the eastern flanks of Mt. Sedom.
*Here, we present a new chronology of the Amora Formation, determined by ^{234}U-^{230}Th and [$^{234}U/^{238}U$] ages combined with paleomagnetic data and a floating $\delta^{18}O$ stratigraphy in primary carbonates. The application of the $\delta^{18}O$ record as a floating chronometer is based on the correlation found between the $\delta^{18}O$ values of synchronously deposited Lisan primary aragonites, EM foraminifers and Judean Mountain speleothems (Kolodny **et al.**, 2005). The $\delta^{18}O$ values in Amora aragonites range between 6.0 and -1.0‰, shifting periodically between Glacial and interglacial sequences throughout the sedimentary section marking the corresponding shifts in the global marine records. Paleomagnetic data indicate the entire section was deposited after the 780 ka Matuyama-Brunhes magnetic transition.*
Data compilation renders the age of the base of the exposed Amora Fm. to be ~750 to 700 ka BP (MIS 20 to 19), and the age of its capping sediments to be between ~200 and 130 ka BP (MIS 6 and the transition to MIS 5). Climatic-limnologic shifts throughout the sedimentation period are recorded by the lithological, chemical and isotopical properties of the sediments, and are correlated to global and regional events. During MIS 11 (~400 ka BP) a prominent ~6 meter thick salt layer was deposited, marking a significant lake level decline (of a dimension similar to the salt deposition that occurred in the Dead Sea during the Pleistocene-Holocene transition).

S18-03

Middle-Late Pleistocene paleoclimatic and geomagnetic record from Lake Baikal sediments

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Lake Baikal sediments offer the unique possibility of obtaining very long, continuous profiles of past global change. Our central objective, therefore, was to pursue the possibility of high resolution comparisons with other paleoclimate proxies, notably the oceanic oxygen isotope record. The magnetic remanence data also revealed the presence of some geomagnetic excursions that have been variously reported within the Brunhes and about which considerable uncertainty still exists. Magnetic remanence vectors from two ~100 m cores of Lake Baikal sediments are reported along with complete magnetic susceptibility profiles obtained from a pass-through system. Chronological control is established by means of two independent correlations; first, by matching susceptibility variations to the oceanic oxygen isotope record and second, by matching the relative paleointensity variations to the SINT-800 global reference curve. These both imply an average deposition rate of 15 cm/kyr and a basal age of ~640 ka. Spectral analysis reveals the presence of Milankovitch signals at ~100 kyr