



Investigating core mineralogy and downhole logging data from the ICDP Lake Junin drilling project, Peru

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The lake Junin drilling project, co-funded by the International Continental Scientific Drilling Program (ICDP), is located at 4000 m a.s.l. in the tropical Andes of Peru. Several boreholes were drilled with the goal to obtain both high-resolution paleoclimate records from lacustrine sediments and to reconstruct the history of the continental records covering the glacial-interglacial cycles. The boreholes reached a maximum depth of 110.08 m and continuous coring was performed at three sites with 11 boreholes. An extensive geophysical downhole logging campaign was performed on five boreholes (1A, 1C, 1D, 2A and 3B) by the Operational Support Group of ICDP and comprise total and spectrum gamma ray, magnetic susceptibility, borehole geometry, temperature, and sonic p-wave velocity. Downhole logging data reveal information about the lithology and lithological changes along the boreholes mostly due to changes in element compositions (K, Th, U). In particular Th and K values are used as a proxy for a first estimate and characterization of clay content in the lake sediments, which are present as montmorillonite, smectite, illite, and kaolinite in different amounts. A more detailed mineralogical and geochemical characterization of the rocks can only be done when analyzing the rock itself. We have selected core material from 3B and 1D boreholes that show significant changes in element distribution first determined in logging data. Subsequently X-ray diffraction (XRD) analysis is performed to analyze in detail the bulk mineralogy as well as the clay mineralogy at depth. Linking the clay minerals in core samples with the downhole logging data would allow assessing the geological history of the lake and the relationship to climate change processes.