Factors affecting sedimentation rates at Laguna Mar Chiquita (Córdoba, Argentina)

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The Laguna Mar Chiquita, Córdoba, Central Argentina (62°40' – 30°54') is one of the largest saline lakes in the world. Its most remarkable feature is water-level fluctuation, which defines low level (LLP) and high level periods (HLP). These variations are intimately related to climatic changes (ENSO events).

Two cores were collected and dated by the Pb-210 method. One core was obtained at Laguna del Plata, a small saline lake connected to the Laguna Mar Chiquita, the other core was collected in the main water body.

The more constrained Laguna del Plata system yields a sedimentation rate of 0.70 $cm.y^{-1}$ (level 52 cm, year 1923) due to the fluvial contribution. The Laguna Mar Chiquita exhibits a lower sedimentation rate of 0.5 $cm.y^{-1}$ (level 52 cm, year 1900).

Sedimentation rates and sedimentological features change according to the water-level of the lacustrine system. Coarser sediments (3 -6 phi units) characterize HLP (from 1973 to 1997), with low organic matter and a sedimentation rate of 0.6 $cm.y^{-1}$. Finer sediments (6 phi units), higher organic matter and a rate in the order of 1.0 cm.y-1 distinguish LLP (from 1964 to 1973).

Higher rates may be produced during dry periods as a consequence of direct settling on the lake floor of wind-transported particles. At the same time, increasing salinity promotes the growth of microorganisms that increase the formation of flocs, thus increasing the sedimentation rate and the relative content of organic matter in bottom sediments.