Geophysical Research Abstracts, Vol. 7, 03066, 2005
SRef-ID: 1607-7962/gra/EGU05-A-03066

Climate oscillations recorded in Chilean lacustrine sediments (Lago Puyehue)

M.F. Loutre (1), X. Boës (2), N. Fagel (2), F. Charlet (3) and M. De Batist (3)

(1) Institut d'astronomie et de géophysique Georges Lemaître, Université catholique de Louvain, Belgium (2) URAP, Department of Geology, University of Liège, Belgium. (3) RCMG, University of Ghent, Belgium. (loutre@astr.ucl.ac.be/ Xavier.Boes@ulg.ac.be/ Nathalie.Fagel@ulg.ac.be/ Francois.Charlet@UGent.be/ marc.debatist@ugent.be)

The Chilean Lake District is located in Southern Chile, between 38° and 42°S. Several long sediment cores were collected in these lakes. Their analysis aims at a better understanding of the climate mechanisms related to ENSO in this part of the world. The recognition of ENSO related periodicities and their stability is studied through the analysis of two cores collected in Lago Puyehue. Several methods of spectral analysis were applied to identify potential periodicities in the signal. Blackman-Tuckey, Maximum Entropy, Multi-Taper Methods (MTM) and singular spectrum analysis were applied on the whole record. In addition evolutive MTM and wavelet analyses allow identifying temporary influence of some periodicities. First, annual varve thickness was analysed for two pilot cores. The first core is rather short, i.e. 282 years. A period at ˜3.0 year appears in a large part of the interval, mostly in the most recent part. Periods at ˜5.2 year and ˜23 years also show up. The second one (longer than 550 years) displays the most robust periodicities at around 15, 9, 4.4, 3.2 and 2.4 years. These periodicities are in good agreement with the sub-decadal periods identified by Dean and Kemp (2004) and linked to the Quasi-Biennal Osciallation, El Niño Southern Oscillation and the Pacific Decadal Oscillation. Moreover, the evolutive MTM analysis and the wavelet analysis suggest a striking break in the periodicities at around 1820 A.D. This could be coherent with the end of the Little Ice Age. In fact the sedimentation process is slightly different for the two cores. Varves in the first one can be related to the flood of the Rio Golgol and in all the drainage basin, while in the second core they are more directly related to local precipitation. This could explain the difference in the recorded periodicities in the two sites. Second, magnetic susceptibility of a longer

core, covering the last 18 kyr, was also analysed. It suggests several periods, i.e. 950, 750, 380, 280, 220, 208, 180 years, although their significance is questionable.