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Climate-varve significance in Southern Chile (Lago Puyehue, 40°S)

X. Boes (1), M.F. Loutre (2), M. De Batist (3), N. Fagel(4)

(1) Clays and Paleoclimate Research Unit, Geology Department, University of Liege, Allée du 6 Août, B18, B-4000 Liege, Belgium; (2) Institut d'astronomie et de geophysique G. Lemaitre, Universite catholique de Louvain, Belgium; (3) RCMG, University of Ghent, Belgium (Tel: +32.4.3662210; Fax: +32.4.3662202; Xavier.boes@ulg.ac.be)

We analyse the relationships between climate and laminated lake sediments in Southern Chile. Sediments from Lago Puyehue (40°S) are investigated from continuous cover by large thin-sections for the last 600 years (short cores). Varve-years are determined by the occurrence of graded diatom-rich layers and couplets. Sediment accumulation rates are derived from varve-counting methods, after correction for intercalated instantaneous deposits, i.e. earthquakes/volcanic events. We argue that strong Westerlies-driven precipitations are forcing factors for seasonal biogenic silica turn-over in the lake. Comparison between standardized varve thickness with monthly climate instrumental data reveals no significant link between varves and austral summer/spring precipitations, except a poor relation with precipitations in January (r2=0,35; r=0,59). Only 1% of varve thickness variability is explained by the summer/spring precipitation months (e.g. r2=0,01; r=-0,1 in February). Variability is mainly explained by autumn/winter precipitations. About 40% of the varve thickness is explained by the highest precipitation month (June). The proportion of the varve thickness explained by the precipitation changes increase if we do consider only the two strongest precipitation months: then ˜60% of the varve thickness index is explained by the precipitations indices of May and June; the correlation being strongly positive (r=0,75). The possible teleconnection between varve index with ENSO, PDO index is discussed over the recent decades.