$\Delta^{18}O$ prediction from corelog data – high-resolution paleoclimate proxy generation

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As part of the Canadian Climate System and Dynamics History Project (CSHD), we studied sediment cores retrieved with RV Marion Dufresne in 1995 and 1999 during IMAGES cruises MD101 and MD99, respectively. Our major goal was to predict the downcore variation of $\Delta^{18}O$ values (measured in N. *pachyderma*, left-coiled) from log data sets of density, velocity, magnetic susceptibility, and color, in order to collect important paleoceanographic and paleoclimatic data rapidly and at very high resolution. The 27 "Canadian" piston cores originate from the shelf and slope off Atlantic Canada.

Sediments are primarily composed of terrigenous components (with minor proportions of carbonate and opal) and mostly reflect varying grain sizes from fine-grained hemipelagic (e.g., cores 2028, 2029) to sandy (e.g., core 2031) and coarse-grained terrigenous sediments (e.g., core 2026). For core MD2024, a comprehensive data set exists (4) for discrete sample data (collected at Geotop, Montreal) and log data (collected at Bedford Insitute of Oceanography, Halifax). Therefore, we applied the $\Delta^{18}O$ prediction to this core first. All corelog data sets were normalized to variance before a

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multiple linear regression determined the correlation between $\Delta^{18}O$ and the corelog. Accordingly, velocity and color provide the substantial portion of the correlation (35% each), followed by susceptibility (20%) and density (9%). The correlation coefficient is up to 0.9 for younger intervals of the last glacial, where fluctuations of $\Delta^{18}O$ are related to Heinrich events and Daansgaard-Oeschger cycles and are undeniably mimicked by variations in corelog parameters. During the Holocene, both $\Delta^{18}O$ and corelog values are decoupled, pointing most likely to a change in water mass structure.