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**Important geological parameters in the assessment  
of LOI data for delineation of climate change**

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P.J. DICKINSON AND B.E. BROSTER  
*Department of Geology, University of New Brunswick,  
Fredericton, NB, E3B 5A3 <pamdickinson@unb.ca>*

Loss-on-ignition (LOI) is the most commonly used method to measure the organic content of sediments for the delineation of past fluctuations in climate. Recent publications have discussed in detail, suggested optimum temperatures and duration to burn off organic carbon. The accepted LOI procedure is that sediment samples are weighed to calculate original weight ( $W$ ), then dried ( $W_d$ ) at  $105^\circ\text{C}$  to remove moisture ( $Mc = W - W_{d105}$ ), and finally burned at  $550^\circ\text{C}$  to calculate LOI ( $LOI = W_{d105} - W_{d550}$ ). It has been demonstrated that the  $W_{d550}$  weight represents ignition of all organic compounds in the sample. However, few studies have considered the possibility of an LOI error due to the occurrence of coal in the sample.

Examination of core samples collected from the Grand Lake - Saint John River valley for LOI analysis were found to contain traces of coal or charcoal in the upper one metre, likely due to historical transport. Samples from known coal deposits at Minto, New Brunswick, were collected and tested to determine combustion temperatures. Tests were repeated for organic residue (collected by hand) to provide a reasonable estimate of coal-free organic matter (LOI). Ignition tests were conducted under various temperatures and duration to identify the optimum combination that would enable distinction between the organic and inorganic (coal) content by LOI.

Results indicate that coal from our study region begins to burn off below the temperature recommended for organic LOI

analysis (300°C). However, in some regions complete ignition of the coal may require higher temperatures. In addition, the transport distance for coal detritus is dependent upon the hardness of the local coal variety (0.5–3.0 Moh's) and the energy of the transporting agent. In our region the coal is soft (<2.0 Moh's) and transport distance is likely limited to a few kilometres. Results presented here indicate that it is paramount that LOI data be supported by knowledge of local coal deposits and an understanding of sediment processes. LOI data published without consideration of the possible contribution of local coal detritus should be considered suspect.