April 30, 2009

To: Ed Cook, Climate Center Committee

Title: Investigating the Provenance of the Hematite-stained Grains in the North Atlantic

Elizabeth Pierce (epierce@ldeo.columbia.edu)
Sidney Hemming (sidney@ldeo.columbia.edu)

Abstract:

The hematite-stained grain record from North Atlantic cores extends from the glacial period through the Holocene (Bond and Lotti, 1995; Bond et al., 1997), showing differing periods of cyclicity. During the glacial period, lithic peaks are seen in cores from VM23-81 and DSDP 609 every 2000-3000 years, indicating an increase in iceberg discharges during these intervals (Bond and Lotti, 1995). Bond et al. (1997) developed a record for percent of hematite-stained grains from the glacial into the Holocene in cores VM 28-14 and VM 29-191, and discovered that they recorded a ~1470 year cycle. This cycle is explained by either cooling sea-surface temperatures, allowing for greater advection of icebergs to the south (Bond et al., 1997), or by changes in surface-wind patterns (Bond et al., 2001). While the actual source of these grains has not been tested geochemically to ascertain their provenance, inferences have been made based upon other marine sediment cores pointing to possible source areas including the Gulf of St. Lawrence, northeast Greenland, Svaalbard and Norway. Here we propose to perform $^{40}Ar/^{39}Ar$ dating of feldspars from several red bed locations around the North Atlantic as an important step towards investigating the provenance of these grains.