

ENVIRONMENTAL MAGNETIC RECORD OF ANTARCTIC PALEOCLIMATIC FLUCTUATIONS FROM GLACIOMARINE SEDIMENTS OF THE ROSS SEA

1VEROSUB, K.L., 2SAGNOTTI, L., 2FLORINDO, F., 3WILSON, G.S., 4ROBERTS, A.P. 1Univ. of Calif., Davis; 2Istituto Nazionale di Geofisica, Rome; 3Oxford Univ.; 4Univ. of Southampton

The CIROS-1 Drilling Project in 1985 and the Cape Roberts Drilling Project in 1997-1999 resulted in the recovery of Miocene through Eocene glaciomarine sediments from the Ross Sea, Antarctica. The goal of both of these projects was to obtain a better understanding of the transition from greenhouse to icehouse conditions near the Eocene/Oligocene boundary as well as to document more recent fluctuations in the size and nature of the East Antarctic ice sheet. We have used an environmental magnetic approach to study the record of these climatic changes and have found that in these sediments, the values of concentration dependent magnetic parameters vary significantly on time scales of several hundred thousand to a few million years. We believe that low magnetic concentrations are indicative of widespread glaciation while high concentrations occur when the glaciation is less extensive. Using this framework, we have determined that the marked increase in glaciation at the Eocene/Oligocene boundary was preceded by several periods of cold climate in the late Eocene. Thus, climatic deterioration began in the middle to late Eocene even though the major East Antarctic ice sheet apparently did not become established until the very beginning of the Oligocene. Our data also indicate that there may have been significant fluctuations in the extent of glaciation during the late Oligocene and early Miocene, but the environmental magnetic signature of these events is somewhat different than that resulting from the formation of a continent-wide ice sheet.