UNIVERSIDAD DE CONCEPCION
DEPARTAMENTO DE CIENCIAS DE LA TIERRA
7° CONGRESO GEOLÓGICO CHILENO 1994

ACTAS VOLUMEN II
pg. 1668-1669

Sedimentation Rates and Recycling of Holocene Glacial Marine Sediments, Antarctic Peninsula

Eugene W. Domack

Sedimentation rates have been determined on ten cores of glacial marine sediment collected from fjords and offshore basins along the western side of the Antarctic Peninsula from Hughes Bay south to Lallemand Fjord (Table 1). Both ^{210}Pb and ^{14}C methods were used to determine sedimentation rates over times scales of hundreds to thousands of years. It is important to establish sedimentation rates so that chronologic studies of paleoenvironmental change can be accommodated. Downcore changes in ^{210}Pb activity and ^{14}C content also provide insight into the processes of particulate transport and resedimentation within the basin. Sedimentation rates as determined by excess ^{210}Pb profiles range from a high of 1.5 cm/yr (Brialmont Cove) to a low of 0.17 cm/yr (Lallemand Fjord). Depths of apparent biological mixing range from 0 to 24 cm. Considerable variability in ^{210}Pb is apparent from arenaceous sediment collected within a kilometer of the Cayley Glacier, in Brialmont Cove. Background levels of ^{210}Pb are never reached even at depths of 100 cm. Sediment resuspension and redeposition is an active process in the ice-proximal environment and produces the disturbed ^{210}Pb profile.

Radiocarbon dating has been conducted on both foraminifera calcite and acid insoluble organic matter from several cores. Sedimentation rates determined from this method range from a high of 0.31 cm/yr (Andvord Bay) to a low of 0.107 cm/yr (Hughes Bay). Where correlative ^{210}Pb and ^{14}C analyses have been conducted on the same cores the ^{210}Pb method results in sedimentation rates that are some 31% to 75% higher than those rates determined from ^{14}C analysis. Modern surface ages are variable and range from 1475 $\pm$ 55 to 5150 $\pm$ 65. The younger of these two ages is close to the accepted reservoir age for the Antarctic Peninsula while the older of the two ages likely represents the presence of reworked organic matter. Several cores collected in ice-proximal locations have reversed ^{14}C stratigraphy, where ages decrease with increasing depth in the core. This indicates a relatively recent (in the last 70 years) increase in the resuspension and redeposition of particulate organic matter close to the calving line of the Cayley Glacier. This in turn reflects either an advance of the grounding line or an increase in meltwater activity in the last 70 years.

Department of Geology, Hamilton College, Clinton, New York 13323 USA

Table 1: Sedimentation Rate

Core	Water Depth	^{210}Pb method	^{14}C method
PD90 KC46	575m	----------	0.107 cm/yr
PD90 KC29	395m	0.18 cm/yr	----------
PD90 KC44	500m	1.5 cm/yr	----------
PD90 KC72	655m	0.21 cm/yr	0.12 cm/yr
PD90 KC75	644m	0.17 cm/yr	0.13 cm/yr
PD92 KC4	450m	----------	0.15 cm/yr
PD88 GC151	529m	0.28 cm/yr	----------
PD88 PC151	529m	----------	0.23 cm/yr
PD88 PC22	440m	----------	0.31 cm/yr
DF85 PC63	1373m	----------	0.132 cm/yr