REPORT ON GRAVITY CORE SAMPLES FROM ANT IV/2 EXPEDITION BRANSFIELD STRAIT 1985 SUBSAMPLED BY THE RGD

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(Enclosures: 4)

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Report on gravity core samples from ANT IV/2 expedition Bransfield Strait 1985 Subsampled by the RGD

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I Introduction

This report presents the results of a granulometric research on nine gravity cores from the King George Basin and a basin near Low Island in the Bransfield Strait. The cores were taken during the Antarktis IV/2 expedition November 1985 with the m.v. "Polarstern" of the Alfred Wegener Institut für Polarforschung und Meereskunde in Bremerhaven. The RGD was allowed by professor Dr. E. Suess of the School op Oceanographics of the Oregon State University in Corvallis to describe and subsample the cores.

The results of the on board descriptions and grainsize analyses will be briefly discussed.

II Core descriptions

The nine cores were mainly taken in the central part of the King George Basin (see enclosure 3). The core positions are indicated on the map of the research area (see enclosure 4).

The centre of the King George Basin can be described as a sedimentary basin with a relatively flat bottom and a waterdepth of approximately 1950 m.
Locally basaltic seamounts can be found in the area.

The cored sediments are mainly glaciomarine hemipelagic and turbiditic deposits with several volcanic intercalations. The difference between the sediment types are often small, which can be ascribed to the generally high sedimentation rate (1 cm/yr) in the basin. The hemipelagic sequences consist mainly of olive gray clays, which are locally slightly silty. In zones intensively bioturbated and burrowed sedimentary structures often are absent. The turbiditic parts consist mainly of silty beds with a fining upward sequence.

Hydrothermal alteration also occurs within the cores (Whiticar, M.J., et al., 1985). In core 1327 at the base at 7.27 m a calcium carbonate hexahydrate crystal (Ca CO3.6H20) was found, which occurence can be ascribed to hydrothermal alteration (Suess, E, et al., 1982).

In two cores, 1346-1 and 1347-1 a petroliferous smell was observed. Often sedimentary structures were vague or absent and hydrothermal altered reddish brown clays were also found.

III Grainsize analyses

The granulometric analyses were carried out by the Granulometric Laboratory of the Geological Survey of the Netherlands. The results, as presented in enclosure 3, are shown in two parts. The first part is a granulometric diagram in which four grain size classes are distinguished: $<$ 2 um; 2-16 um; 16-35 um and $>$35 um. These four classes are all normalized to 100 %. The second part of the granulometric analyses is a large table in which the values of $\frac{1}{4}$ phi classes are given ranging from $<$2 um to 2000 um.

The method used to analyse the sediment fractions $<$ 35 um is based on Stokes Law. The fractions $>$35 um were analysed by sieving.

IV Interpretation of the results

A study of the grain size distributions in several cores (1357; 1342; 1341; 1346 and 1347) revealed a sharp boundary at which the coarse base of a turbidite can be localized. In the cores 1341; 1342 and 1346 even two of such boundaries are present. Core 1333 is most remote from the King George Basin and contains compared with the other cores no distinct turbiditic sequences. The same phenomenon was found in the cores 1343 and 1340.

When all of the cores are positioned along the bottom profile it appears that the cores in which distinct turbiditic sequences are lacking (1333,1340 and 1343) are very remote from the main sediment entrance of the King George Basin (1333) or are situated on the slope of a basalt hill (1340 and 1343).

In the cores 1340 and 1343 the classes $<$ 2 um, 2-16 um and 16-35 um are the dominating classes throughout the whole core. This effect can be ascribed to "shadow" effect of the basaltic seamounts.

Little can be said about the current direction, which influences the deposition of sediments in the King George Basin. Turbidites do not seem to occur more often in combination with the basin slope in the south east. However, when cores 1347, 1357 and 1327 are compared it appears that turbiditic sequences tend to lack or decrease in influence to the southwest (1347 ---→ 1327). Therefore, an agreement exist to conclude that the sedimentary infill of the King George Basin is dominated from the northeast.

V Conclusion

From the above and the grafical results it can be concluded that cores in the research area are locally dominated by turbiditic sequences, which can be observed by a strong increase in coarser sediment (> 35 um).

These coarser intercalations are lacking in the vicinity of basaltic seamounts, probably due to a shadowing effect of the seamounts.

The infill of the King George Basin might be dominated by a north eastern current.

Sedimentary structures as observed in the cores are often lacking or vague due to hydrothermal effects (Suess, E., 1986).

VI Literature

Suess, E, et al., 1982. Calcium Carbonate Hexahydrate from Organic-Rich Sediments of the Antarctic Shelf: Precursors of Glendonites. Science, vol. 216, 4 June 1982, pp. 1128-1130

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Whiticar, M.J., et al., 1985. Thermogenic hydrocarbons in surface sediments of the Bransfield Strait, Antarctic Peninsula. Nature Vol. 314, pp. 87-90.

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