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GLACIOMARINE SEDIMENTS AND SUSPENDED PARTICULATE MATTER, WEDDELL SEA, ANTARCTICA

(Abstract only)

by

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ABSTRACT

Samples of glaciomarine sediments and suspended particulate matter filtered from seawater were collected in the Weddell Sea during the Norwegian Antarctic Research Expedition (NARE) in 1978-79. Analyses have provided information on the textural and mineralogical composition of shelf sediments, on the nature of biogenic and inorganic suspended particulate matter, and on the total sediment transport to the shelf areas and further into the deeper waters (Orheim and Elverhøi 1981).

The shelf waters contain 0.1 to 1.2 g m^{-3} of suspended particulate matter, which is close to the range of 0.5 to 1.5 g m^{-3} reported for suspension concentrations in the oceans, but considerably lower than that found for some other glaciomarine environments such as the Bering Sea (up to 13-15 g m^{-3} (Lisitzin 1972)) and off Kongsbreen, Spitsbergen (up to 500 g m^{-3} (Elverhøi and others 1980)).

Suspended particles from the Weddell Sea have maximum sizes of 50 to 70 μm and mean diameters in the range of 10 to 20 μm. In contrast, the bottom sediments on the outer shelf are deficient in the corresponding fractions. This reflects that when floating Antarctic ice supplies material to the Weddell Sea, the coarser fragments (>20-70 μm) are deposited, while the medium silt and finer fractions go into suspension. Considering the suspended-load data and the bottom-current measurements on the shelf break, it is evident that in January 1979 an average of 8.6×10^4 tonnes d^{-1} (or 32×10^6 tonnes a^{-1}) of particulate matter was transported by the current from the central Weddell Sea to the South Atlantic deep water. Morphological (scanning electron microscopy) and chemical analyses show the suspended material to be dominated by silica organisms (diatoms), and also to contain clastic grains of phyllosilicates, feldspar, quartz, zircon, in a few cases Al- and Fe-hydroxides/oxides also; authigenic "Fe-sepiolite" and secondary gypsum.

Mineralogical analyses (X-ray diffraction) of the bottom sediments show the fine sand silt fractions to contain mainly clastic materials like illite, smectite-vermiculite, and quartz. Biogenic silica (cristobalite) and carbonate (Mg-calcite) as well as authigenic Fe-silicates ("Fe-sepiolite") are also present.

REFERENCES

Elverhøi A, Liestøl O, Nagy J 1980 Glacial erosion, sedimentation and microfauna in the inner part of Kongsfjorden, Spitsbergen. *Norsk Polarinstitutt Skrifter* 172: 33-61

Lisitzin A P 1972 *Sedimentation in the world ocean.* Tulsa, OK, Society of Economists, Paleontologists and Mineralogists (Special Publication 17)

Orheim O, Elverhøi A 1981 Model for submarine glacial deposition. *Annals of Glaciology* 2: 123-128

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