

### **Fine-Grained Storm Deposits on the Inner Shelf of the Canadian Beaufort Sea**

Philip R. Hill

*Geological Survey of Canada, Atlantic Geoscience Centre, P.O. Box 1006, Dartmouth, Nova Scotia B2Y 4A2*

The inner shelf of the Canadian Beaufort Sea is characterised by a seaward succession of seabed fine-grained facies. Seaward of shoreface sands and silts, the surficial facies show the following sequence: (i) thin-bedded silt and clay couplets (<1 cm thick); (ii) massive to graded, medium to thick-bedded silt beds (up to 20 cm thick); (iii) thin silt beds (<2 cm thick) with thick interbeds of bioturbated silty clay; (iv) bioturbated silty clay with no silt beds. The massive to graded, medium to thick-bedded facies occurs between water depths of 4.2 m and 5.5 m and is

interpreted to result from major resuspension events in a zone of maximum wave energy during large storms. Oceanographic measurements support this interpretation: a nearbed maximum of suspended sediment concentration (SSC) is observed centred at the 5 m isobath and increases in intensity during moderate storms. Time series of nearbed SSC and wave heights at 5.9 m water depth record strong resuspension resulting in SSC values of 4000 mg/l during strong storm conditions. The thin-bedded silt and clay facies found shoreward of this strong resuspension

zone can be interpreted to result from attenuation of wave energy in the resuspension zone. The amount of resuspension, therefore, decreases shoreward resulting in thinner beds. Seaward of the strong resuspension zone, the frequency of bottom sediment resuspension decreases with water depth, reflecting the lower

frequency of very large storm waves. This is also reflected in the deeper water facies where bioturbated clay becomes the dominant facies, with thin silt beds representing infrequent bottom resuspension during the largest storms.