



A re-evaluation of the Pleistocene deposits of ODP Site 987 – implications for the behavior of the Scoresby Sund sector of the Greenland Ice Sheet

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In order to understand past and current dynamics of the Greenland Ice Sheet, it is essential to obtain detailed reconstructions of the natural fluctuations of the ice sheet on longer time scales. This study aims to improve our knowledge of the Greenland Ice Sheet dynamics in the Scoresby Sund sector during the Pleistocene, hence we have re-visited Unit I of Holes 987D and E of Ocean Drilling Program Leg 162 (Shipboard Scientific Party, 1996). Unit I comprises three main lithological facies: (i) mud with color banding characterized by horizontal – semi-horizontal boundaries and scattered clasts inferred to be glaci-marine and marine deposits; (ii) mud with sharp color changes, irregular boundaries, clay clasts/lenses, scattered clasts and no color banding, indicating reworking of facies (i), i.e. muddy debris flow deposits; and (iii) sand lamina/layers mostly comprising fine sand, sharp upper and lower boundaries interpreted to be turbidites. These facies have also been identified by the Shipboard Scientific Party (1996) but no detailed follow-up studies of their distribution have been undertaken to our knowledge. The results of this study show that facies (i) dominate the succession deposited between $\sim 2.14 - 0.99$ Ma. The interval shows only few signs of reworking. Generally thin sandy turbidites are rare, but they are occasionally more abundant in a few tens of cm thick intervals. The abundance of sandy turbidites increases markedly about 0.99 Ma. Throughout most of the overlying interval they are associated with muddy debris-flow deposits representing facies (ii) and, thus, this part of Hole 987D is inferred to be dominated by reworked deposits. We attribute the pronounced change at ~ 0.99 Ma to higher sediment input from the upper slope related to the repeated presence of the grounded ice at the shelf break. This could indicate that the Greenland Ice Sheet in the Scoresby Sund area reached the shelf break more frequently during the past 1 Ma as compared to the $\sim 2.14 - 0.99$ Ma period.

Reference:

Shipboard Scientific Party, 1996. Site 987. In Jansen, E., Raymo, M.E., Blum, P., et al., Proc. ODP, Init. Repts., 162: College Station, TX (Ocean Drilling Program), 345–387. doi:10.2973/odp.proc.ir.162.110.1996