Geophysical Research Abstracts,
Vol. 11, EGU2009-2832, 2009
EGU General Assembly 2009

Morphological elements of the Lofoten Basin Channel - implications for the properties of the latest turbidity currents

J.S. Laberg (1), M. Forwick (1), H.B. Johannesen (1), M. Ivanov (2), N.H Kenyon (3), and T.O. Vorren (1)

(1) University of Tromso, Department of geology, Tromso, Norway (jan.laberg@ig.uit.no), (2) UNESCO Centre for Marine Geology and Geophysics, Moscow State University, Moscow 119899, Russia, (3) National Oceanography Centre, Empress Dock, Southampton SO14 3ZH, UK

A modern turbidite system, the Andøya Canyon – Lofoten Basin Channel and associated deposits, is located on the continental margin offshore northern Norway (Laberg et al., 2005; 2007). Based on swath bathymetry, side-scan sonar records, and high-resolution seismic data, the Lofoten Basin Channel can be followed from the mouth of the canyon at the base of the continental slope into the abyssal plain of the Lofoten Basin. The proximal part of the channel is a straight erosional feature, up to 30 m deep and about 3 km wide with poorly developed levees. Coring retrieved sandy turbidites deposited both on the channel floor and on its levees. Thus, some of the most recent flows were sandy, up to 3 km wide and more than 30 m high in order to overspill the channel. About 50 km off the mouth of the Andøya Canyon, the Lofoten Basin Channel joins with another channel entering from the northeast. Beyond there is a complex sea floor morphology including one main channel, several smaller channels and various erosional features. The main channel terminates 20 – 30 km to the southwest. Further into the basin an elongated, positive lobe-formed deposit is located. In front of it part of an older, smaller lobe is seen. The main channel is continuing into the deepest part of the Lofoten Basin where it terminates at about 3200 m water depth. About 20 - 25 km from its termination the channel splits into several smaller (up to 500 m wide and 10 – 30 m high), meandering channels. The inter-channel areas are dominated by down-flow elongated scour marks, some located near and in parallel with the channels. These were probably formed by smaller flows confined by the meandering channels. Other scour marks are oriented parallel to the overall flow direction and were probably formed by larger unconfined flows that overtopped and moved independently of the meandering channels. The latter may have been up to an order of magnitude wider and higher compared to the confined flows. A depositional lobe is located beyond the mouth of the meandering channels. Its areal extent is yet unknown. High-resolution sub-bottom profiler records show units of some meter thickness that can be followed for several tens of kilometres. They are separated by continuous to slightly discontinuous medium to high amplitude reflections. Recent coring has identified up to 4 m thick intervals of sand between units of mud.

Acknowledgement
This work is a contribution to the UNESCO Training Through Research (TTR) program (http://ioc.unesco.org/ttr/) and the Democen project (http://www.ig.uit.no/Democen/). Financial support from the Research Council of Norway and StatoilHydro is greatly acknowledged.

References
Laberg, J.S., Vorren, T.O., Kenyon, N.H., Ivanov, M., Andersen, E.S. 2005. A modern canyon-fed sandy turbidite system of the Norwegian continental margin. Norwegian Journal of Geology 85, 267-277.
Laberg, J.S., Guidard, S., Mienert, J., Vorren, T.O., Haflidason, H., Nygård, A. 2007. Morphology and morphogenesis of a high-latitude canyon; the Andøya Canyon, Norwegian Sea. Marine Geology 246, 68-85.