

The Quaternary record of eastern Svalbard – an overview

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Landvik, J. Y., Hjort, C., Mangerud, J., Møller, P. & Salvigsen, O. 1995. The Quaternary record of eastern Svalbard – an overview. *Polar Research* 14(2), 95–105.

The eastern part of the Svalbard archipelago and the adjacent areas of the Barents Sea were subject to extensive erosion during the Late Weichselian glaciation. Small remnants of older sediment successions have been preserved on Edgeøya, whereas a more complete succession on Kongøya contains sediments from two different ice-free periods, both probably older than the Early Weichselian. Ice movement indicators in the region suggest that the Late Weichselian ice radiated from a centre east of Kong Karls Land. On Bjørnøya, on the edge of the Barents Shelf, the lack of raised shorelines or glacial stripes from the east indicates that the western parts of the ice sheet were thin during the Late Weichselian. The deglaciation of Edgeøya and Barentsøya occurred ca 10,500 BP as a response to calving of the marine-based portion of the ice sheet. Atlantic water, which does not much influence the coasts of eastern Svalbard today, penetrated the northwestern Barents Sea shortly after the deglaciation. At that time, the coastal environment was characterised by extensive longshore sediment transport and deposition of spits at the mouths of shallow palaeo-fjords.

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Introduction

The Quaternary geology of the Svalbard archipelago (Fig. 1) has been the subject of extensive research during the last three decades. The investigations have concentrated in particular on the largest island, Spitsbergen (Fig. 2), and models have been developed for the Late Quaternary glaciations (Boulton 1979; Miller 1982; Landvik et al. 1992a; Mangerud & Svendsen 1992), glacio-isostatic rebound (Schytt et al. 1968; Forman 1990; Forman et al. 1993) and the Holocene marine conditions of both Svalbard and the adjacent seas (Salvigsen et al. 1992). However, due to the more difficult accessibility, less progress has been made in understanding the Quaternary geology of the eastern islands of the archipelago such as Edgeøya, Barentsøya and Kong Karls Land (Fig. 2). These islands, however, are critical for the understanding of the geology of the northern Barents Sea, and their geological history is fundamental for the development of regional models.

As a result of both the PONAM programme (Polar North Atlantic Margins, Late Cenozoic Evolution) and hydrocarbon exploration in the Barents Sea, renewed interest has been expressed in the Quaternary geology of the sea floor and

the surrounding land mass. Thus, the eastern islands of the Svalbard archipelago can now contribute towards an integrated understanding of the Quaternary development along a profile from the central Barents Sea to the continental shelf west of Svalbard. In this paper we summarise the main results obtained from the PONAM expeditions to Edgeøya, Barentsøya, Kongøya and Bjørnøya, and use the new data to compare and modify the present models of the Quaternary history of Svalbard and the Barents Sea.

The Late Quaternary record

The pre-Late Weichselian

Sediments which record the Late Quaternary ice growth and decay have been preserved in several sections on Spitsbergen (Boulton 1979; Troitsky et al. 1979; Miller 1982; Miller et al. 1989; Landvik et al. 1992a; Mangerud & Svendsen 1992; Mangerud et al. 1992) and an updated glaciation curve for the last interglacial/glacial cycle of Svalbard and the northern Barents Sea was recently suggested by Mangerud et al. (1996), based on correlation of the different sediment successions.

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Research, 1965 **Quaternary Records of Southwestern Illinois and Adjacent Missouri** American Quaternary Association. Meeting, 1986 **Reconstructing Quaternary Environments** J.J. Lowe, M.J.C. Walker, 2014-07-10 Examines the various forms of evidence used to establish the history and scale of environmental changes during the Quaternary. The evidence is extremely diverse ranging from landforms and sediments to fossil assemblages and isotope ratios bringing the book fully up to date since its last publication.

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