

Cover sheet

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NOVAYA ZEMLYA

Synonyms: not applicable

Definition: not applicable

Text:

The Russian islands of Novaya Zemlya ('New Land') are situated in the *Arctic* Ocean between 70.5-77° N and 51-69° E. There are numerous small islets but the archipelago primarily consists of the South (Yuzhny) and North (Severny) Islands, separated by the narrow Matochkin Strait. They form an elongate arc stretching for almost 1000 km and narrowing from 150 km in the south-west to 40 km in the north-east. Geologically, they are a northern extension of the *Ural Mountains*, characterized by a rugged terrain (maximum elevation: 1,547 m a.s.l.) and with large parts of the coastline incised by *fjords*. They represent a major orographic barrier between the Barents Sea to the west and the Kara Sea to the east.

The archipelago is approximately 90,000 km² of which ~24,400 km² is covered by *glacier ice* (Dowdeswell and Williams, 1997), dominated by a large *ice cap* on the North Island. The Catalogue of Glaciers of the USSR (Kotlyakov, 1978) lists 685 glaciers, most of which are relatively small *mountain/cirque glaciers*. There are, however, 60-70 large *tidewater glaciers* that drain the *ice caps* and *icefields* in the north and *calve icebergs* along both the east and west coasts. Further south, smaller glaciers terminate at much higher elevations. Indeed, glacier *equilibrium line altitudes* (ELA), which broadly range from 300 to 700 m a.s.l., increase from north to south, concomitant with an increase in mean annual temperature of ~5°C (Kotlyakov, 1978; Zeeberg and Forman, 2001). ELAs also increase in a west-to-east direction, reflecting a decrease in precipitation away from the more maritime climate of the Barents Sea, which is heavily influenced by advection of warm North Atlantic water. *Sea ice* is also less persistent along the west coast, which can remain ice-free for much of the year. Interestingly, the different climatic regimes appear to influence the location *surging glaciers*, which are far more common in the west (Grant et al., in review).

In the past, ice extent on Novaya Zemlya has been far more extensive. During the *Last Glacial Maximum*, for example, the archipelago was covered by the Barents Sea *Ice Sheet* (Svendsen et al., 2004). Following its *deglaciation* by the early Holocene (~9,500 cal yr BP), there was a period of relatively high sea level between 7,500 and 6,000 cal yr BP that created shorelines ~13 m above the present coastline (Forman et al. 1999). More recently, several relatively minor glacier fluctuations have taken place, with the latest readvance linked to '*Little Ice Age*' cooling in the second half of the 19th century (Zeeberg and Forman, 2001). Subsequent warming during the first half of the twentieth century resulted in rapid glacier recession (>300 m a⁻¹: Zeeberg and Forman, 2001). Perhaps surprisingly, mean annual temperatures appear to have decreased in the latter half of the twentieth century and, in addition to increased winter precipitation, some glaciers are thought to have stabilized, whereas others have continued to retreat (Zeeberg and Forman, 2001).

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