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# Changes in Glacier Extent and Links to Twentieth Century Climatic Variability on Novaya Zemlya, Russian Arctic

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Glaciers are sensitive indicators of climate and analysis of glacier fluctuations from many parts of the world show that they are currently retreating. Novaya Zemlya, an archipelago in the Russian Arctic, contains over 20,000 $km^2$ of ice; with over 60 outlet glaciers originating from the large ice cap in the north, several smaller ice fields with outlet glaciers, and over 200 valley glaciers. Landsat TM and ETM+, and ASTER imagery has been used to measure and analyse changes in glacier extent on Novaya Zemlya since the end of the Neoglacial maximum and over the last 25 years. Analysis has shown that almost all glaciers have retreated since the Neoglacial maximum and about 90% of the glaciers have retreated over the past 25 years. Termini of most of the glaciers have retreated by between 50 m to 800 m from 1989 to 2001. Records of summer temperature from Malye Karmakuly meteorological station, located in the south of the archipelago, and spatially-averaged ERA-40 data show that air temperatures have been increasing since the mid-1960s. This increase has provided ideal conditions for glacier retreat particularly as there has been no observed compensating change in precipitation.