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Ice-dammed lakes reconstruction in the southeastern Scandinavian ice sheet periphery

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The study of glacier erosion processes, paleolake dynamics and topographical changes, together give us insight into both localized and broader landscape evolution patterns while also assisting human exploration. After carrying number of paleographic discoveries of North-West of Russia, we've gathered the data requiring generalizing, systemizing, visualizing.
Objective: reconstruction of proglacial lakes based on lithostratigraphic and geomorphic analysis using GIS technology. GIS modeling of ice-dammed lakes was done via the ArcGIS Desktop 10 software package. The GIS was used as a means to categorize published, time mapped data and thereby fuse and unify the changes into a single, integrated prototype. Publications on limnologo-glaciological and geomorphological reconstructions of paleotopography and paleolakes north of the Russian plain, along with additional copyrighted and grant-funded GIS studies, together served as resources to authenticate the paleolake contour modeling. A quaternary sediments map and an updated topography map that was designed via semiautomatic vectorization of a topographical map, served as foundations for the electronic shape modeling paleoreconstructions.
Based upon preliminary results from publication summaries, and initial data collected when analyzing the maps (quaternary sediments, geomorphological, topographical), the contours and maximum glacial lake rise levels in the southeastern Scandinavian ice sheet periphery, including the levels and contours of their coastline, have been duly identified. Boundary reconstruction of Late Pleistocene lake boundaries have been completed for five sections of the Scandinavian ice sheet: the Molovo-Sheksninskoy, the Belozersko-Kubensky, the Vozhe-Lachsko-Kubensky, the Vazhskoy, and the Severodvinskoy. The territories studied revealed 13 major paleobasins covering an area of more than 1,000 km^2, which based upon their position most closely resemble periglacial, intraglacial and postglacial lakes.
Of those proglacial paleolakes that have been reconstructed, currently the majority of them are located in the White Sea (Northern Dvina and Onega) basin. The largest of these proglacial lakein terms of area, the Molovo-Sheksninskoy, belongs to the Volga basin. The model reflects drain reconstruction and primary watershed migration within the territory in question. Paleobasins undergoing deglaciation processes repeatedly cooperated with one-another other to form lake systems, and then eventually collapsed or broke up into separate lakes.
Paleolake altitude level dispersion particularities have also been identified. Most distinguished among these are the modern regional terrain's paleobasin raised beach terrace levels at a height of 110-130 m. The highest raised beach level terrace formations were recorded at the Molovo-Sheksninskoy (150 m), at the Vozhe-Lachensk (150 m), and at the Belozersk (145 m) lakes. The lowest levels (below 70 m) but with the greatest number of raised beach terrace formations (6-7) were found at the Onega and Nizhnesuhonskovo lakes. Of the larger proglacial lakestudied, two have completely disappeared (Nizhnesuhonskoy, Vazhskoy), four have been preserved as primordial (Vozhe, Beloye, Kubenskoe, Onega). The Molovo-Sheksninskoy and Sredneshekskoy paleolakes also have an interesting history where back in the 20th century, after the Volga-Baltic Waterway reconstruction project took place, their levels were elevated by 18 m; and thus, the Late Pleistocene paleobasins were reengineered through human intervention to become what became known as the Sheksna and Rybinsk freshwater reservoirs.