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An Open-Access Repository of Holocene Marine Limit and Relative Sea Level Data for all of Greenland

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The Last Glacial Maximum (LGM) represents a critical period in Earth's history, and understanding the dynamics of the Greenland Ice Sheet (GrIS) during this time is pivotal for predicting its response to present and future climate change. Accurate reconstructions of the LGM ice sheet margin rely on marine limit and relative sea level data, which provide valuable insights into past ice sheet behavior. However, current databases of Greenland marine limits and relative sea levels are incomplete or not readily accessible, hindering scientific progress and impeding collaboration among researchers.

Here, we develop an online, open-access database hosted by the Geological Survey of Denmark and Greenland (GEUS) that consolidates all available information on the deglacial marine limit and relative sea level data from Greenland. The data is recorded in the HOLSEA format and includes realistic reporting of errors. The collected data comprises over 3,000 distinct data points, sourced from more than 120 publications and literature entries. These field observations span over 140 years, reflecting the evolution of measurement techniques and a growing comprehension of marine deposit and relative sea level features. By mining all existing databases, original publications, and unpublished data, this new database will provide researchers with a centralized and up-to-date resource for investigating the LGM ice sheet and subsequent deglaciation history.

In the future, the database will undergo regular updates to incorporate new findings and adhere to international standards for reporting marine limit and relative sea level data. This initiative forms the baseline for validating reconstructions of the past behavior of the GrIS contributing to more accurate predictions of its future response to changing climatic conditions.