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Greenland ice sheet runoff reconstruction 1873-2005: ocean freshwater impacts

J. E. Box, S. Das, R. Alley, D. Reusch
Byrd Polar Research Center

Significant correlations exist between a mesoscale model of Greenland ice sheet surface mass balance (1958-2005) and in-situ temperature and accumulation rate observations. A host of in-situ records exist from coastal and ice sheet weather stations and ice core sites on time scales reaching back more than one century. It is therefore feasible to reconstruct Greenland ice sheet surface mass balance over the instrumental record to shed light on ice sheet climate variability on longer time scales than usually considered. This presentation thus focuses on the link between the ice sheet environment and local to regional-scale climate variability via instrumental records. Further, a reconstruction of ice sheet freshwater contribution to surrounding seas is presented based on the correlation of summer ice sheet temperatures and model-derived runoff. A positive degree day model is also considered. The two are compared. Finally, quantitative estimates of Greenland freshwater interaction with regional oceans is presented.