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# Ice Accumulation in Greenland mainly determined by atmospheric Circulation

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The climate features archived in local ice accumulation ice core records in Greenland are investigated. For that reason, regression models are developed that describe multiannual accumulation records by meteorological mean fields. In order to distinguish between dynamic and thermodynamic influences on accumulation, the regression models gradually use streamfunction and temperature as predictors.

Seven Greenland ice cores and the NCEP Reanalysis data are used for the period from 1948 to 1992.

For six of the seven ice core records more than 56% of the multiannual accumulation can be described by the regression models. For all ice cores, the dynamic processes yield the main contributions to the accumulation variability. However, the circulation fields that are linked with accumulation show marked differences among the cores concerning the represented seasons, areas and structures. Thus, local accumulation generally represents only regional-scale climate features, which are probably to a great extent influenced by orography.

Furthermore, it is investigated, whether accumulation can only be described by a generally valid linear relationship with temperature. Thus, a second kind of regression model has been developed that uses temperature as predictor only. It has been found that such a relation does not exist for the time period investigated here. Therefore, paleoaccumulation rates derived from isotopic temperatures should be interpreted with caution. Moreover, it is not reasonable to describe accumulation by means of temperature in mass balance models for the Greenland ice sheet in decadal time scales.