



Spatial analysis of freeze-on plumes within the Greenland ice-sheet

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Large, englacial, near-basal, plume-like structures have been observed in recent radio echo sounding surveys over the Greenland and Antarctica ice-sheet. The mechanism behind the formation is not fully understood. However, these features may be caused by a range of factors and processes, such as ice dynamics, basal conditions, ice rheology and transient ice-sheet history.

Here I will, by means of a spatial analysis, identify and quantify factors related to these plume-like structures. I use data sets such as bed and surface topographies, as well as parameters obtained from these surfaces (e.g. ice flow and velocities, surface slopes, accumulation rates) and estimated geothermal heat fluxes. This allows me to investigate potential constraints and relationships between the observed complex, near-basal layer structures and the prevailing spatial conditions. The results of this analysis are consistent with the existing hypothesis of basal freeze-on.