

# Séminaire

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## **The glacier bed - does it know it's raining: Combining a statistical study of two decades of subglacial data with modelling stress redistribution near a channel**

Basal pressure has been recorded at the Svartisen Subglacial Laboratory (Northern Norway) for 20 years, and is measured by pressure sensors installed at the ice rock interface under ~200 m of glacier ice.

A running correlation is used to study the temporal variation in the response of several sensors. By studying the nature of this correlation as well as the correlation between sensor pairs, it is possible to investigate evolution of the degree of basal connectivity at the glacier bed. Persistent seasonal variations associated with the melt season are observed over the entire measurement period, indicating dependence on surface hydrological forcing. Overlying this pattern, specific years with longer periods of positive and negative correlation of pressure between sensors are presented to show contrasting inter-annual variability in basal pressure. An anti-correlated connectivity is associated with an increase locally in the rate of daily subglacial discharge, and is caused by load transfer or passive cavity opening.

Load transfer is investigated with a simple full Stoke model of a subglacial channel to quantify the impact of channel pressurisation on the glacier bed response. An anti-correlated signal between the channel and its surrounding is reproduced over a distance greater than 45 m. The changes in pressure gradient have implications for water flow in the vicinity of channels.