



## **Mid-latitude Glaciers on Mars: Estimating water ice volumes using simple ice-flow models and inverse methods**

Nanna B. Karlsson, Louise S Schmidt, and Christine S Hvidberg

Centre for Ice and Climate, Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark

Numerous glacier-like forms have been identified at the mid-latitudes of Mars, and within recent years the acquisition of radar sounding data has revealed that the features are chiefly composed of water ice. The glacier-like forms are probably several million years old and currently covered in a layer of dust, that inhibit mass exchange with the atmosphere.

Here we apply simple ice-flow models and inverse methods to estimate the ice thickness and volume present at the mid-latitudes of the planet. We find that our method can estimate ice volume with an uncertainty of 25% when compared to observations from radar. Furthermore, we find that the yield stress at the ice-bedrock interface is comparable to that observed for terrestrial glaciers, indicating a similarity between the governing physical processes.