

Séminaire - Groupe OSUG Neige

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Mapping Greenland Surface Roughness from Multiangular Satellite Data

Surface roughness of the Greenland ice sheet is controlled by ice dynamics and surface-atmosphere interactions and has been used to classify different glacier zones. We have developed a technique for retrieving quantitative estimates of surface roughness over the Greenland ice sheet. Data from the Multi-angle Imaging SpectroRadiometer (MISR) were calibrated with surface roughness measurements from airborne LiDAR over a wide range of areas on the Greenland ice sheet. The calibrated data model was then used to produce a roughness mosaic of the entire Greenland ice sheet. An interesting feature of this process is that it estimates surface roughness values of 4-825 cm using image data with a spatial resolution of 275 m. Numerous satellite overpasses over the sunlit season allow us to see changes in roughness as the summer melt progresses. Progressive seasonal changes are investigated for selected areas including Humboldt and Jakobshavn Glaciers. We also explore relationships between physical surface roughness, aerodynamic roughness length (z_0), and turbulent energy exchanges.