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Title Towards circumpolar mapping of infrastructure based on Sentinel-1 and Sentinel-2
Last Name of PRESENTING Author Bartsch
Middle Name or initials of PRESENTING Author
First Name of PRESENTING Author Annett

Country of PRESENTING Author Austria

Institution, organization or general address Austrian Polar Research Institute

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Author list (in order) Bartsch, Annett*; Pointner, Georg; Ingeman-Nielsen, Thomas

Poster title (brief) Towards circumpolar mapping of infrastructure

Abstract - text box
The European Union (EU) Horizon2020 project “Nunataryuk” aims to assess the impacts of thawing land, coast and subsea permafrost on the climate and on local communities in the Arctic. One task of the project is to determine the impacts of permafrost thaw on coastal Arctic infrastructures and to provide appropriate adaptation and mitigation strategies. For that purpose, a circumpolar account of infrastructure is needed.
The two polar-orbiting Sentinel-2 satellites of the Copernicus program of the EU are continuously providing multi-spectral images with high spatial and temporal resolution. Sentinel-2 data is of high value for mapping land cover. However, most traditional land cover classifications only contain one class for built-up areas. By using a multi-sensor approach, such as the combination of multispectral and Synthetic Aperture Radar (SAR) data, additional information can be derived that goes beyond the identification of built-up areas. Different types of infrastructure can be distinguished, as it is commonly needed.
We assess the potential of combining Sentinel-2 multispectral data with Sentinel-1 (Synthetic Aperture Radar) data for mapping and characterizing Arctic infrastructure. Settlement characteristics (building properties, surface types) have been collected for sites in Greenland and Longyearbyen on Svalbard, Norway. First results based on machine learning methods show that the available resolution (10m) allows the identification of narrow features such as roads, which were not previously identifiable by commonly used data such as Landsat. Deep learning methods further improve the mapping with respect to errors of commission as well as distinguishing surface types.