## Recent industrial development across the Arctic

j 200

lea 150 -

as visible from space A. Bartsch<sup>1,2</sup>, G. Pointner<sup>1,2</sup>, I. Nitze<sup>4</sup>, A. Efimova<sup>1,2</sup>, G. Grosse<sup>4</sup>, P. Schweitzer<sup>4,2</sup>

(1) b.geos, Korneuburg, Austria; (2) Austrian Polar Research Institute, Austria; (3) Permafrost Research Section, Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Potsdam, Germany; (4) Department of Social Anthropology, University of Vienna, Austria

The SACHI (Sentinel-1/2 derived Arctic Coastal Human Impact) dataset has been primarily developed as part of the HORIZON2020 project Nunataryuk. It covers a 100km buffer from the Arctic Coast (land area), for areas with permafrost near the coast. It is based on Sentinel-1 and Sentinel-2 data from 2016-2020 using the algorithms described in Bartsch et al. (2020). It is a supplement to Bartsch et al. (2021)



SACHI includes polygons of all identified objects with infrastructure/impact classes and auxiliary information

b'geos (M

*universität* 

austrian polar research institute This project is funded by the European Union

NUNATARYUK ౨௳Ċ∩♪⁵⁵

eesa

- permafrost status and trends,
- nightlight radiance,
- vegetation zone,
- Normalized Difference Vegetation Index trends,
- settlement names (closest known, max 40 km distance; incl. land use/industry type)

SACHI class values:

1=linear transport infrastructure,

2=buildings (and other constructions such as bridges), 3=other impacted area (includes gravel pads, mining sites)



NDVI change, Alaskan North Slope







Night-time lights (in nWcm-2sr-1; extracted from Elvidge et al. 2021), Alaskan North Slope, PBO



## **References:**

Annett Bartsch, Georg Pointner, Ingmar Nitze, Aleksandra Efimova, Dan Jakober, Sarah Ley, Elin Högström, Guido Grosse, Peter Schweitzer (2021): Expanding infrastructure and growing anthropogenic impacts along Arctic coasts. Environmental Research Letters. <u>https://doi.org/10.1088/1748-9326/ac3176</u> Bartsch, A., Pointner, G., Ingeman-Nielsen, T., Lu, W. (2020): Towards Circumpolar Mapping of Arctic Settlements and Infrastructure Based on Sentinel-1 and Sentinel-2. Remote Sensing, 12, 2368. , https://doi.org/10.3390/rs12152368.

Nunataryuk: <u>https://nunataryuk.org/</u> Permafrost\_cci: <u>https://climate.esa.int/en/projects/permafrost/</u>