



EUROPEAN POLAR BOARD

Pjotr Elshout
Project Officer



Photo: Alfred Wegener Institute for Polar and Marine Research

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EPB Action Group on Environmental Impacts and Polar Research Logistics

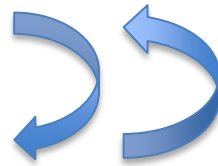
- EPB has four Action Groups
- AG on Environmental Impacts exists since 2018
- Main deliverable of the AG on Environmental Impacts was to deliver a synthesis report
- Why was there a need for this report?





Contents of the report

- Methodology
- Environmental Impacts
- Types of Polar Research
- Logistics and Infrastructures
- Legal Frameworks
- Examples of Best Practices and Experiences
- Existing Guidelines





Environmental Impacts

Examples of environmental impacts:



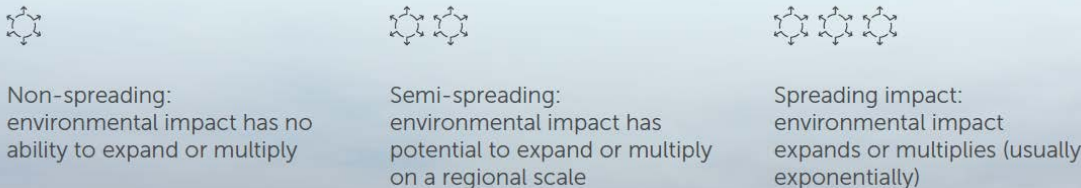
Impact's environmental geographical scale



Impact duration



Impact's spread ability



What are environmental impacts?

The Arctic and Antarctic regions are prone to several types of environmental impacts, which can be produced conducting scientific research. This chapter provides an overview of environmental impacts associated with polar research. Additionally, a paragraph has been added to identify environmental impacts that have only been studied to a limited extent. The severity of environmental impacts can be understood by using different variables, such

as the scale of the impact (local, regional or global), the duration and the ability of an impact to spread. In the one-pagers, the environmental impacts discussed in this report are discussed using these variables to estimate the severity of the impact, as not every environmental impact is equally impactful. Below the three variables are categorised and listed in tables to provide a general oversight of how the environmental impacts discussed in this report are categorised.

Examples of environmental impacts:



How we measure environmental impacts

Impact's environmental geographical scale



Impact duration



Impact's spread ability



Image credit: Christo Pimpirev



One Pagers Environmental Impacts

Every one pager:

- How is the environmental impact defined?
- How can polar research potentially produce this impact?
- How does this environmental impact effect the polar regions?

Carbon emissions

What are considered carbon emissions?

Carbon emissions are carbon dioxide and methane produced by (in the case of this report) human activities, such as the burning of fossil fuels by engines, food production and manufacturing other goods.

How does polar research produce carbon emissions?

Scientific research and operations rely on extensive logistics of supplying remote regions and research stations with provisions and staff. These logistics consist of airborne, marine and terrestrial infrastructures (mobile and fixed). Operating logistical networks causes emissions of carbon, black carbon and heavy metals caused by the burning of fossil fuels.

As this report highlights the environmental impact of conducting on-site polar research and the logistics of supply chains, the traveling of scientists from and to research sites is not the main focus. Recently, many guides have been



developed on how to reduce individual and organizational carbon footprints for polar research. These are:

- The INTERACT III pocket guide on how to reduce carbon footprints: D2.7.pdf (eu-interact.org)
- IASC's Carbon Footprint report: (published soon)

Impact's geographical scale



Impact duration



Impact's spread ability



What are the effects on the polar regions?

Emissions of carbon dioxide and methane (greenhouse gasses) contribute to the warming of the global climate. The Arctic is especially warming relatively quickly to the rest of the world, causing severe ice melt (Yadav, Kumar, Mohan, 2020). Global warming can also affect ocean currents, and change marine heat and cold transportation. A change in ocean currents can have effects on (accelerated) ice melt in the polar regions (add a source from an Horizon2020 project).





Types of Research



Types of research and their potential impact on the polar regions

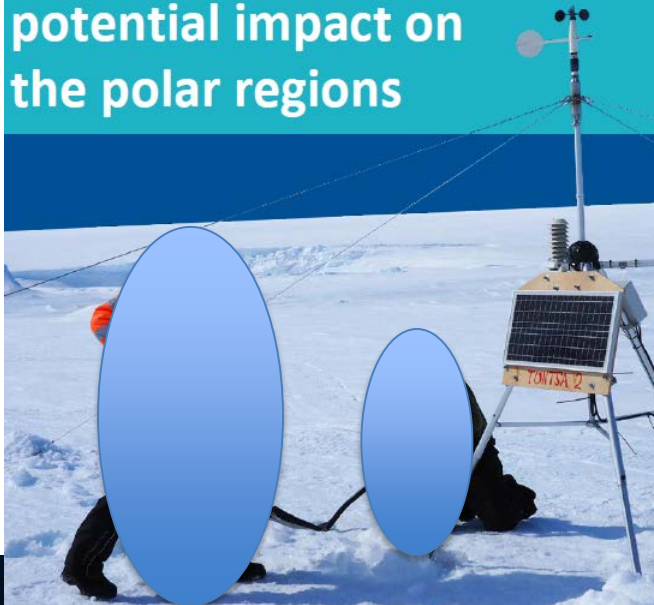


Image credit: FINNARP

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- Research vessels
- Research aircraft
- Terrestrial research facilities
- Large research campaigns
- Drones
- Automated sampling stations
- Individual researchers and fieldwork
- Citizen science

- Definition of research type
- Environmental impacts potentially associated with type of research
- Best practices to minimise impact





Logistics

- Terrestrial logistics and infrastructures
- Marine logistics and infrastructures
- Airborne logistics and infrastructures

Topics discussed:

- Definition to work with
- What impacts are associated?
- Best practices

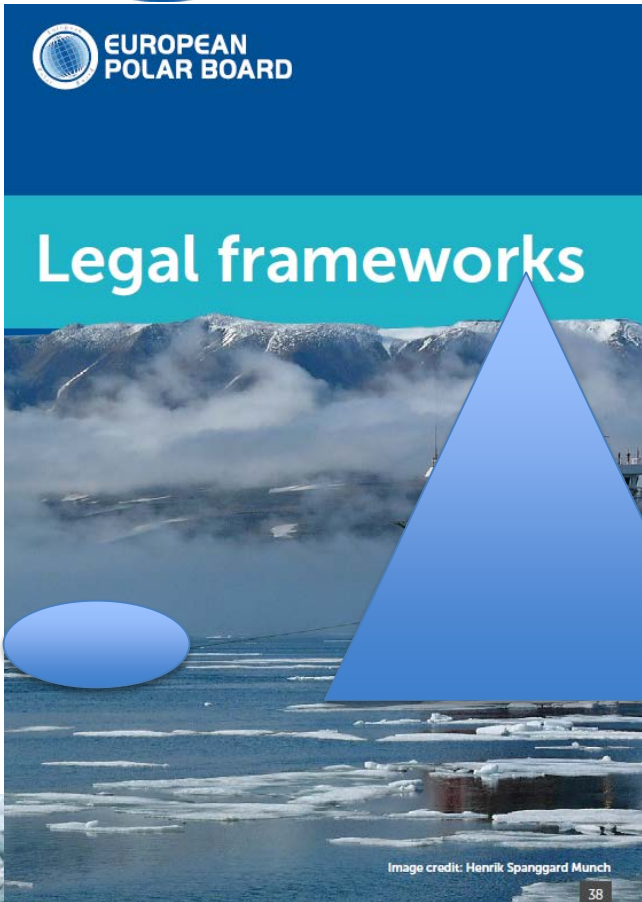


Potential impacts of logistics and infrastructures





Legal Frameworks



- Antarctic Treaty System
- Arctic Eight
- Arctic Council
- UNCLOS





Best Practices

Explore non-fossil-fuelled options

when replacing old generators for research stations. An example is Kilpisjärvi Biological Research Station in Finland, which aims to switch to heat pumps using warmth from the lake adjacent to the station, instead of fossil-fuelled generators.

Reduce the carbon footprints of (research) vessels by finding the most efficient speed to fuel ratio (this differs per vessel). This can be challenging, especially when vessels are operated by external organisations such as private sector companies or the military, which may have busy schedules.

Coordinate international cooperation for data collection to for example ensure marine research campaigns are optimally utilised by using the available resources and infrastructures. An example of this is the EU Horizon 2020 project ARICE.



Examples of best practices and experiences



Image credit: Latusek



Ways forward

- Report will be launched coming weeks
- Dive deeper into topics mentioned in the report





Thank you!

To keep track of our activities (and see the Synthesis Report on Environmental Impacts coming weeks, please visit our media channels:

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