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TRACK 4 - Intersecting the Multiple Scales of Climate Justice: Mapping Inclusive Adaptation and Just Fossil Fuel Transitions / Special Session 5

Towards an Arctic Atlas of Unburnable Carbon: Mapping Oil and Gas Extraction, Biodiversity, and Indigenous Lands under a Climate Justice Lens

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OUTLINE

Introduction

- Climate crisis and carbon budgets
- Unburnable Carbon and the Arctic region
- Aims

Materials and methods

- Data Mining
- Workflow

Results and discussion

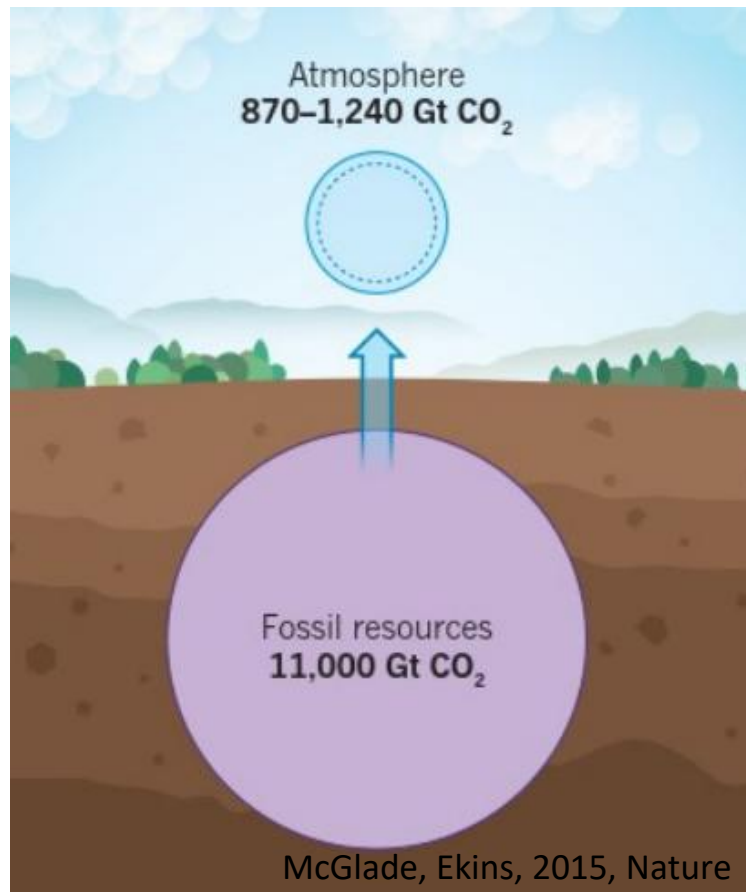
- Overlay analysis
- Future perspectives

Conclusion



Climate change: “within +1.5°C by 2050”

For a 50% chance to stay under the limits of 1.5° C above the average global temperature of pre-industrial times, cumulative carbon dioxide emissions must remain within 500 Gt of CO₂ by 2050 (IPCC, 2021)



**BUT WHERE?!
(Geographical
perspective)**

90% of coal, 60% of gas
and oil reserves
must remain **unextracted**
(Welsby et al., 2021)

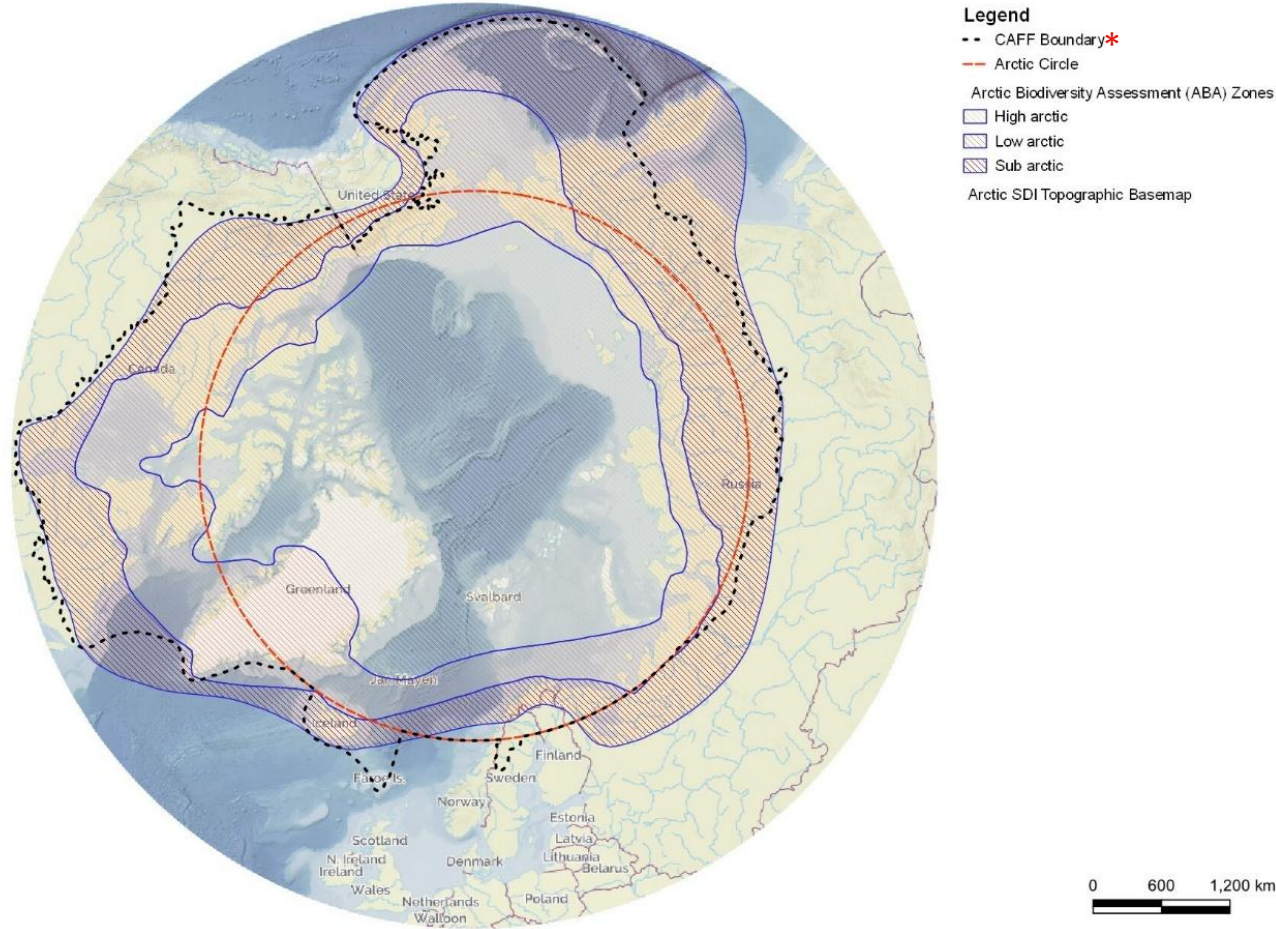


Socio-Environmental Impacts of Oil & Gas activities (directs & indirects)

- ✓ Deforestation & habitat fragmentation
- ✓ Gaseous emissions
- ✓ Noises and vibrations
- ✓ Oil spills: water and soil contamination
 - ✓ Social Conflicts
 - ✓ Diseases



the Arctic region and unburnable carbon



*CAFF region: boundary lines developed by the Arctic Council's Working Group on the Conservation of Arctic Flora and Fauna (CAFF), which combine climatic and bio-geographical criteria

- Warming in the Arctic is occurring x4 faster than the global average (Rantanen et al., 2022).
- to keep global warming below 1.5 °C, **all Arctic oil & gas resources must remain unextracted** (Welsby et al., 2021).
- But... Arctic oil & gas production = 5.5% of the global production and is expected to further increase in the next years (Tracy, 2023).
- home of **fragile ecosystems and biodiversity and Indigenous communities**

Aims

1. creating the first spatially explicit **atlas of oil & gas production and exploration of the Arctic CAFF region** in GIS environment;
2. estimating the spatial dimension of oil & gas activities and their **relationships with biodiversity protection and Indigenous Peoples Lands**

Towards a spatial Multi-Criteria Analysis (MCA) based on geographic climate and environmental justice criteria

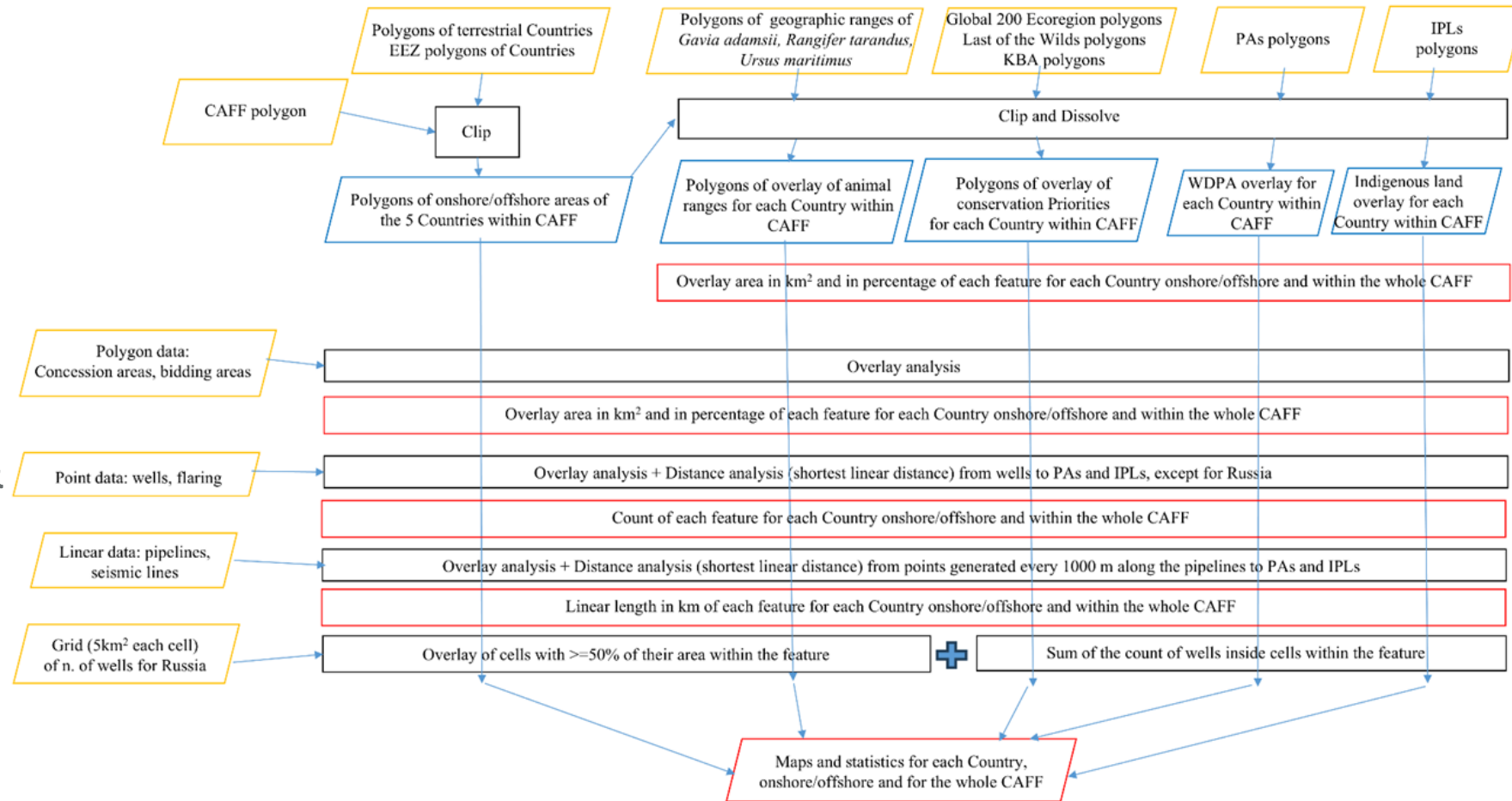


Workflow

Data mining of open-spatial data:

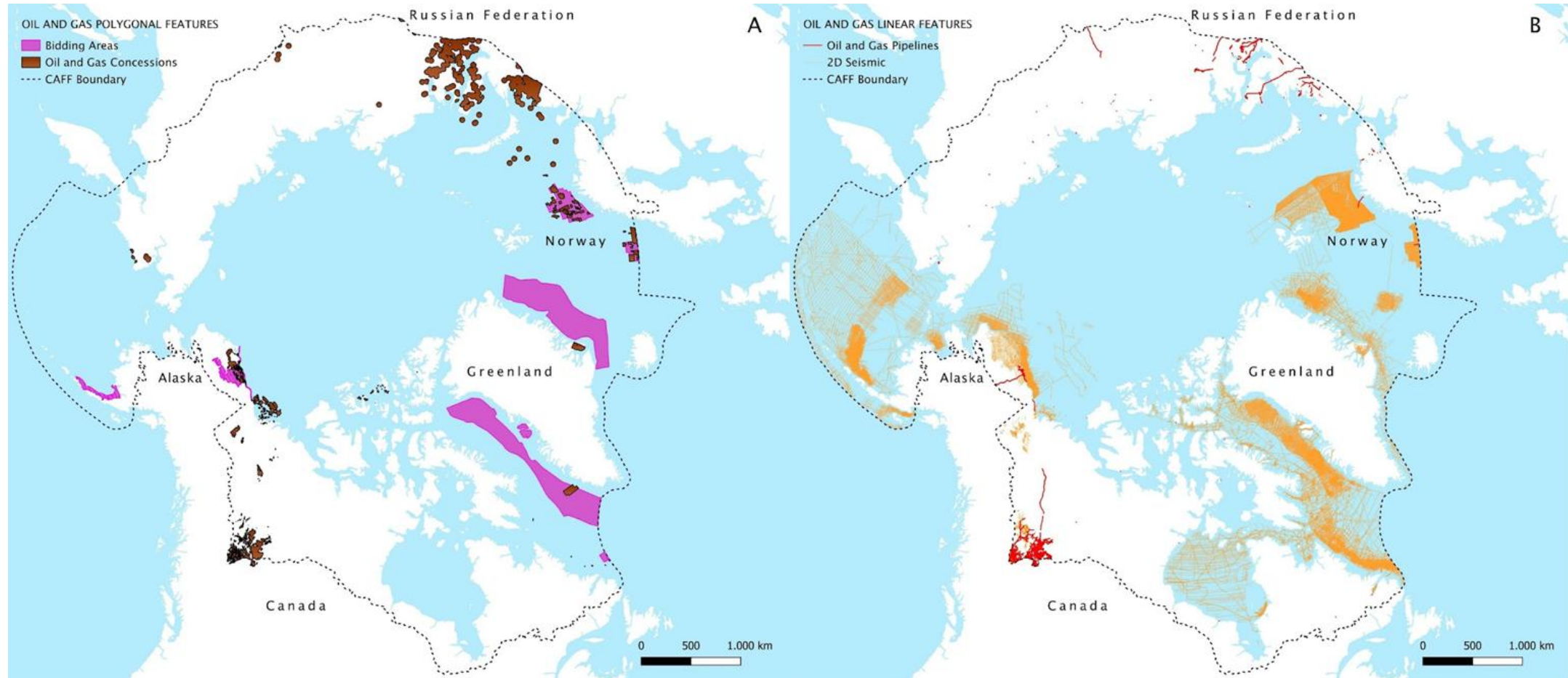
Sources: government
geoportals; oil company
websites; civil society

QGIS environment: overlap &
distance analysis between
oil and gas features and
protected areas/Indigenous
Peoples Lands



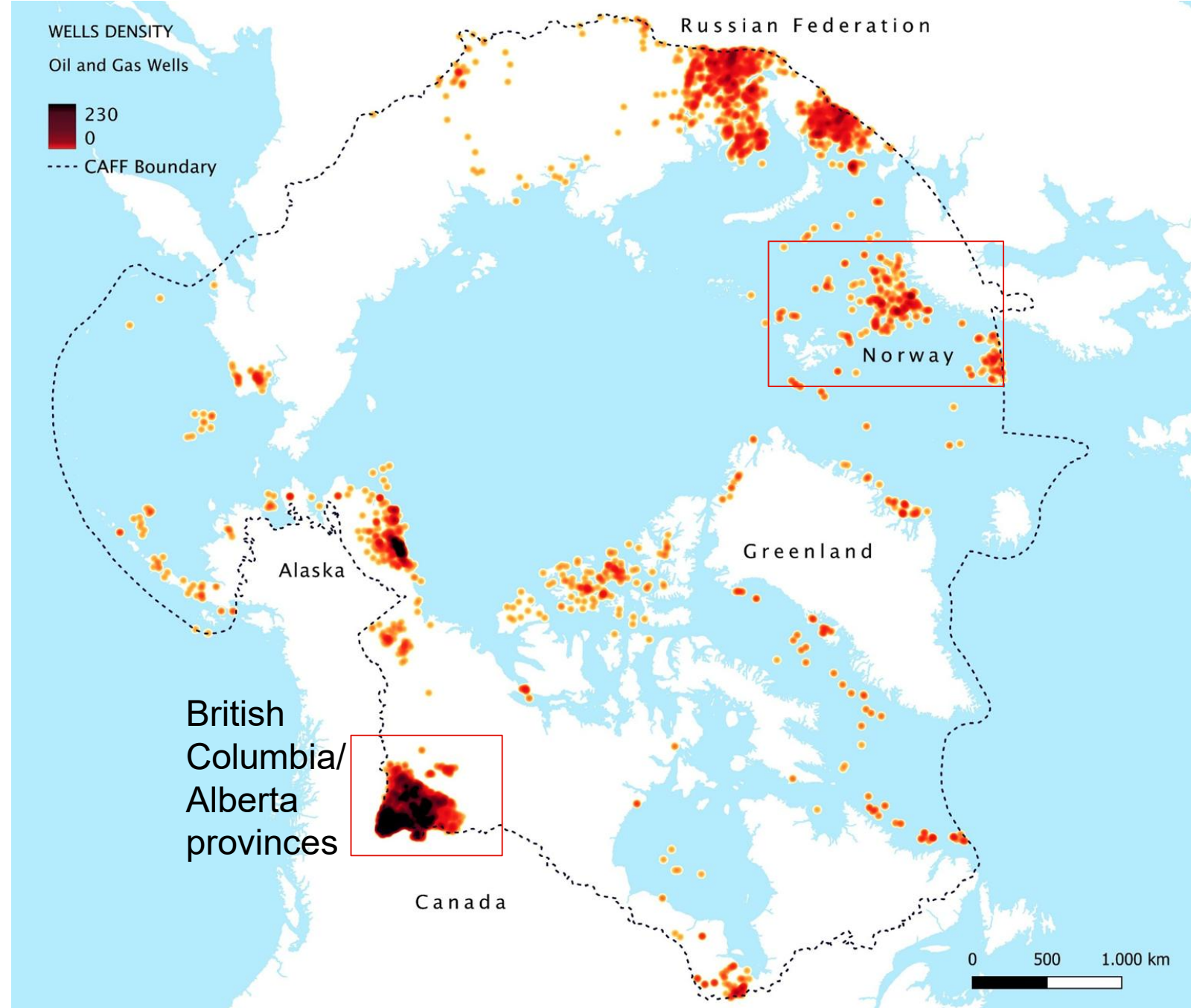
Oil & gas linear and polygonal features

- 543,000 km² of **exploited areas**, a territory size comparable to that of **European France**.
- 39,535 km of **pipelines** (more than **six times the Earth radius**)
- 1,743,321 km of **seismic lines** (4.5 times the Earth-Moon distance or 44 times the Earth circumference)



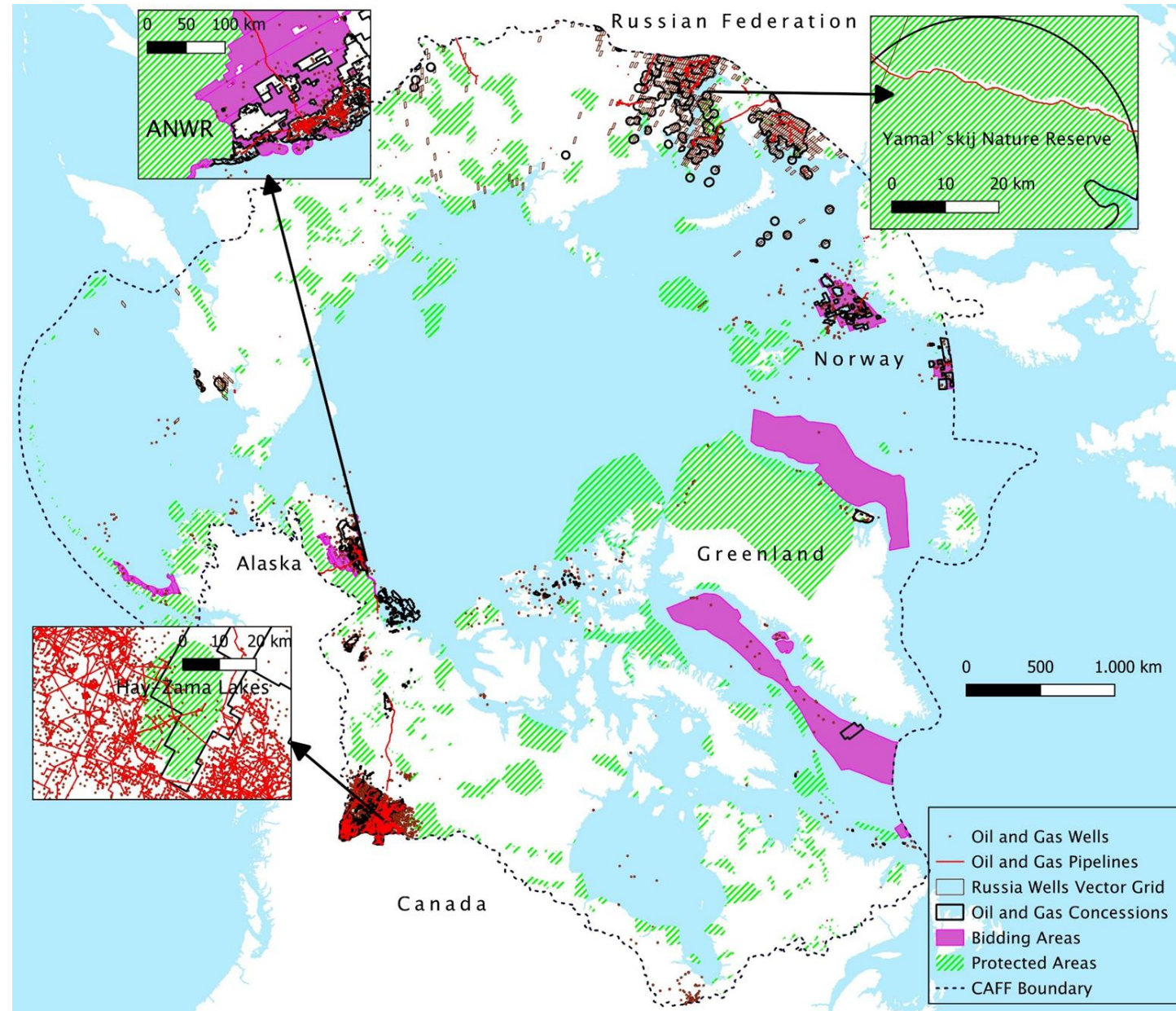
Oil&Gas Wells

- 44,500 wells (>1,000 offshore)
- 75% onshore in Canada
- 52% offshore in Norway



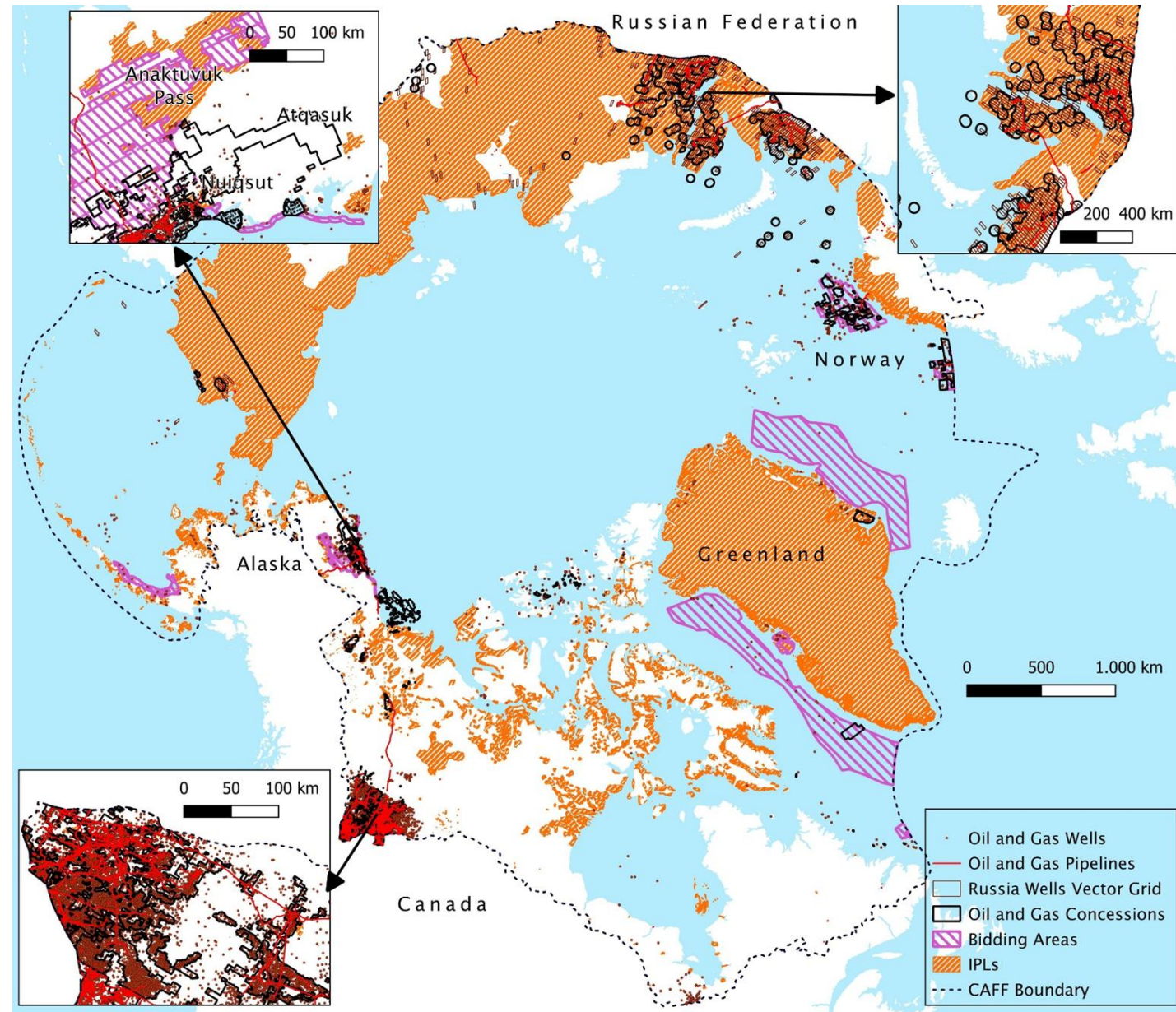
Arctic protected areas

- 7% of concessions overlaps with PAs
- 403 drilled wells
- 382.27 km of pipelines



Arctic Indigenous Lands

- concessions cover more than 4% of IPLs
- 73.3% of all concessions are located within IPLs



Data challenges

- Data on oil and gas in Russia and **data heterogeneity**
- Need for a **multiscale approach**, based on both quantitative and qualitative data (including data collected on site).
- **Defining criteria for the MCA**, based on participatory processes involving different stakeholders.
- Attention to rapid **changes in the geo-political and administrative landscape**, which may affect the reliability of the data used.



Future perspectives and conclusions

- Proposal to create a **MCA at different scales, CAAF, national & subnational**, in order to avoid excessive simplification and homogenization of geographic data (due to low accuracy or lack of data in some areas).
- Include the **time factor** within the analysis, assigning values that take into account the impact of past, present, and future choices on the territory.
- Encourage **a collective effort of data collection** at the regional level in the Arctic, with contributions from institutions and active stakeholders, to assess the current state of the art and trigger processes for the holistic development of the region.

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<https://unburnable.org/>

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