

Polar Thematic Exploitation Platform

Andrew Fleming, BAS/Polar View

ESRIN, 14th October 2015



polar
tep

Why a Polar TEP?



- Polar regions play an important role in regulating and driving the global climate & experiencing significant change
- Growing global interest both politically and economically
- New economic opportunities is driving increased attention and traffic
- Widespread concern about impact on delicate and pristine environment
- Developing tools to model, understand and monitor these changes is vitally important in order to better predict and mitigate the resulting global economic and environmental consequences.

25 August 2011 Last updated at 17:42

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Arctic sea routes open as ice melts



By Richard Black
Environment correspondent, BBC News

theguardian

News Sport Comment Culture Business Money Life & style Travel Environment

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Two major Arctic shipping routes have opened as summer sea ice melts. European satellites have found.

Data recorded by the European Space Agency's (Esa) Envisat shows both Canada's Northwest Passage and Russia's Northern Sea Route open simultaneously.

This summer's melt could break the 2007 record for the smallest area of sea ice since the satellite era began in 1979.

Shipping companies are already eyeing the benefits these routes may bring if they remain open regularly.

The two lanes have been used by a number of small craft several times in recent years.

But the Northern Sea Route has been free enough of ice this month for a succession of tankers carrying natural gas condensate from the north port of Murmansk to sail along the Siberian coast en route for Thailand.

"They're often open at the same time in the sense that with some ingenuity you can get through them," observed Peter Wadhams, an Arctic ice expert from the University of Cambridge.



Last year, the Peter using both passage:

Terry Macalister
guardian.co.uk, Tuesday 5 July 2011 15:50 BST
Article history



The MV Nordic Barents leaves Kirkenes harbour, northern Norway, carrying iron ore to China via the Northern Sea Route. Photograph: Helge Sterk/EPA

Cold is the new hot in shipping circles as melting sea ice opens up prospects for trade between China and the west to move across the top of the world.

An increasing amount of seaborne traffic is beginning to move on the new route called Northern Sea Route which traverses the Siberian coast. The route also hopes of opening up more of the North West Passage above Canada.

The attraction of the voyage is that it is one-third of the distance of traditional routes through the Suez Canal. This means less carbon-dioxide (CO₂) emissions and less fuel. It also means less pirates.

Thawing Arctic opens up new shipping routes on the 'roof of the world'

An increasing amount of seaborne traffic is moving along a new Siberian coastal route, cutting journey time and boosting trade prospects

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The Economist

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Melting Arctic sea-ice and shipping routes

Northern exposure

Sep 22nd 2011, 17:59 by The Economist online

Within four years, Arctic sea-ice cover has twice...

IN THE 16th century English navigators, cut off from the riches of the Indies by the growing Spanish and Portuguese empires, sought to reach Asia by sailing close to the North Pole. They failed, because so much of the Arctic ocean was frozen. No longer. Global warming is opening summer sea lanes through the ice, along the north-west passage sought by Martin Frobisher and the north-east one sought by Hugh Willoughby. Both have now been navigated—the north-east (or northern route, as it is known to Russians) most recently in August by a Russian supertanker, assisted by two icebreakers, as our [Science & Technology article](#) explains. In later life Barnes Wallace, the designer of the bouncing bombs used in the Dambuster raid by the RAF on Germany

Why Norway cannot resist the lure of its...

Shell stops Arctic activity after 'disappointing' tests

28 September 2015 | Business



Shell says it had not found enough oil and gas in the region to warrant further exploration, says the BBC's business editor Kamal Ahmed

Royal Dutch Shell has stopped Arctic oil and gas exploration off the coast of Alaska after "disappointing" results from a key well in the Chukchi Sea.

Energy

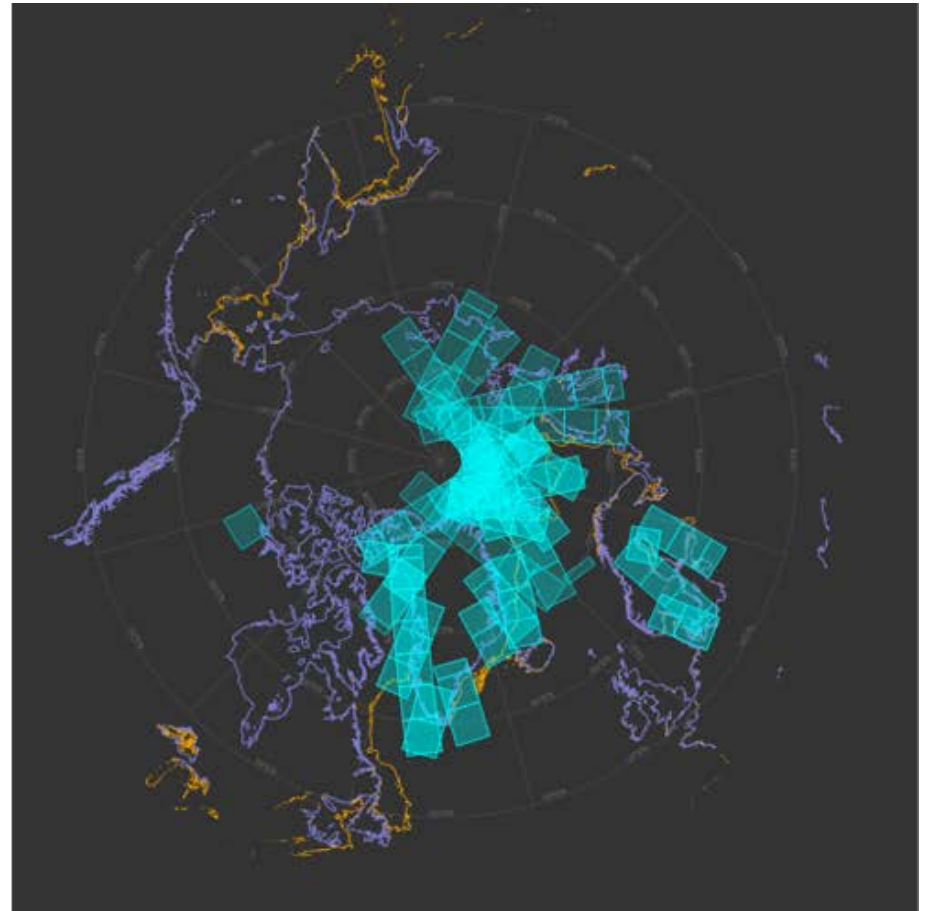
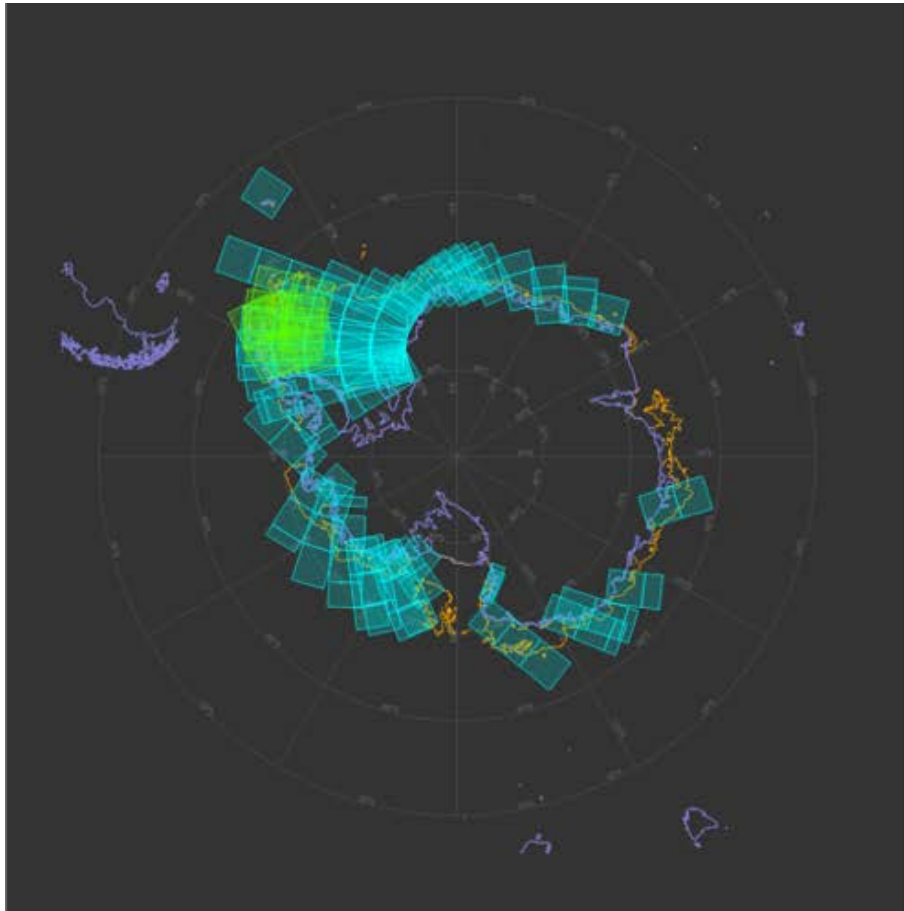
Harnessing the power of the ocean

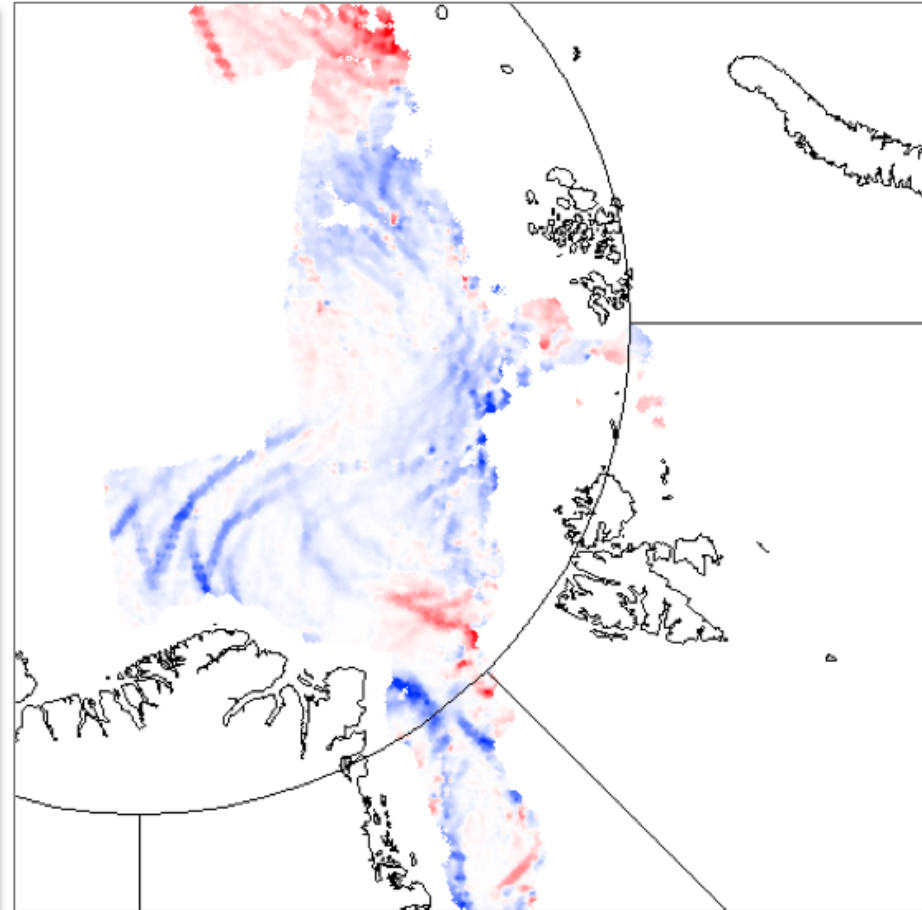
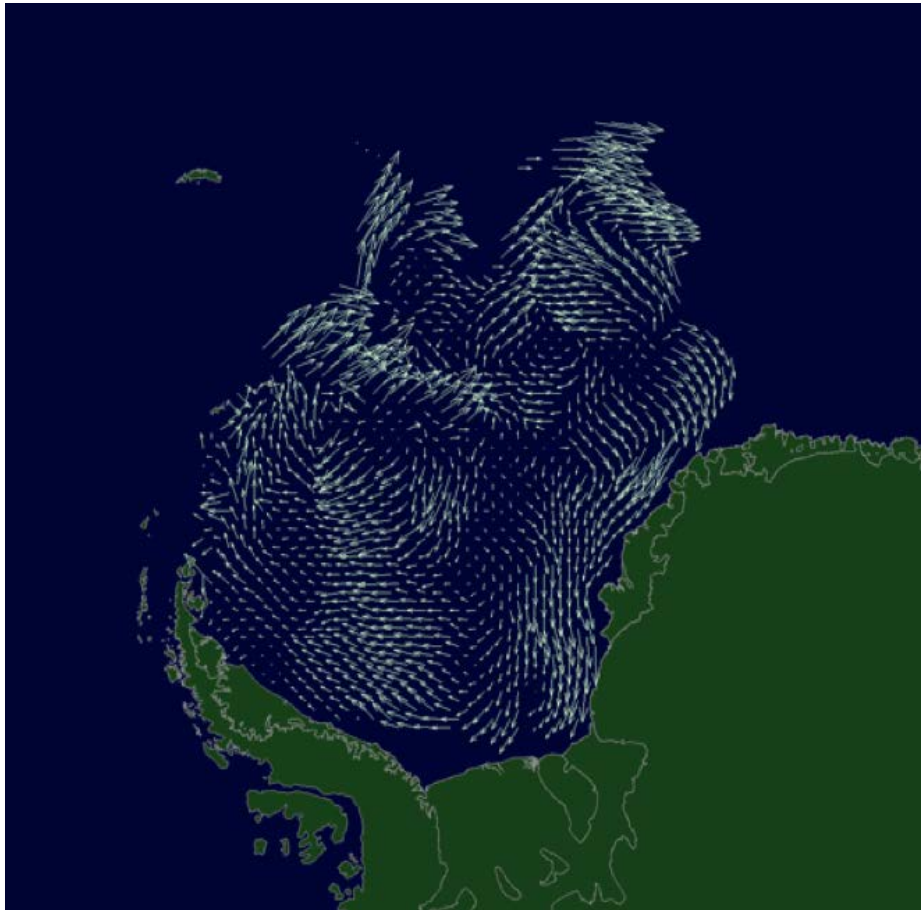




- EO is especially important in the polar regions
- Unique benefits in these vast and hostile regions – only source of consistent, repeatable, regional scale, calibrated, year-round data of the polar regions
- EO data is a key element supporting multidisciplinary and earth system science
- Essential to programmes required to inform political and economic decisions and better understand and monitor change
- Essential to support operations and commercial activities in the regions
- With improved access to larger volumes of data comes the need to discover, access, process, analyse and visualise results

Large volume of data acquired





Sea ice drift and compression/divergence information (courtesy of DTU/DMI)

So why a TEP?



- Large and increasing volume of data (not just EO)
- Increasing numbers and types of actors in the regions
- More demand for operational services, up to date information, advice etc
- Need for science and others to answer difficult questions
- Need to lower the barrier to
 - accessing information
 - developing new information
 - investigating new options and services
 - sharing and publishing products & services
- Put simply – an environment to support easier and wider exploitation

polar tep

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Monday 8th, Aug

8¹³ - 10³¹

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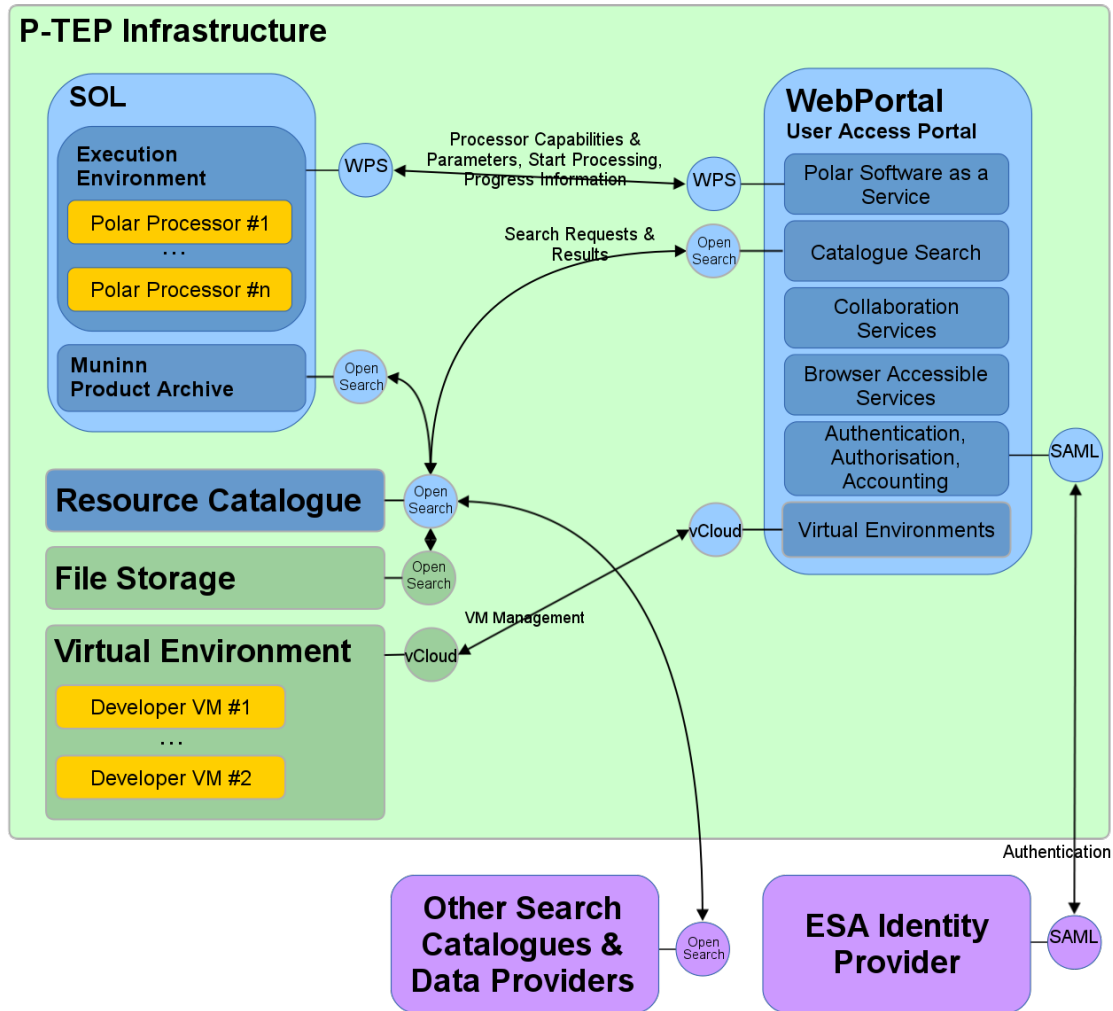
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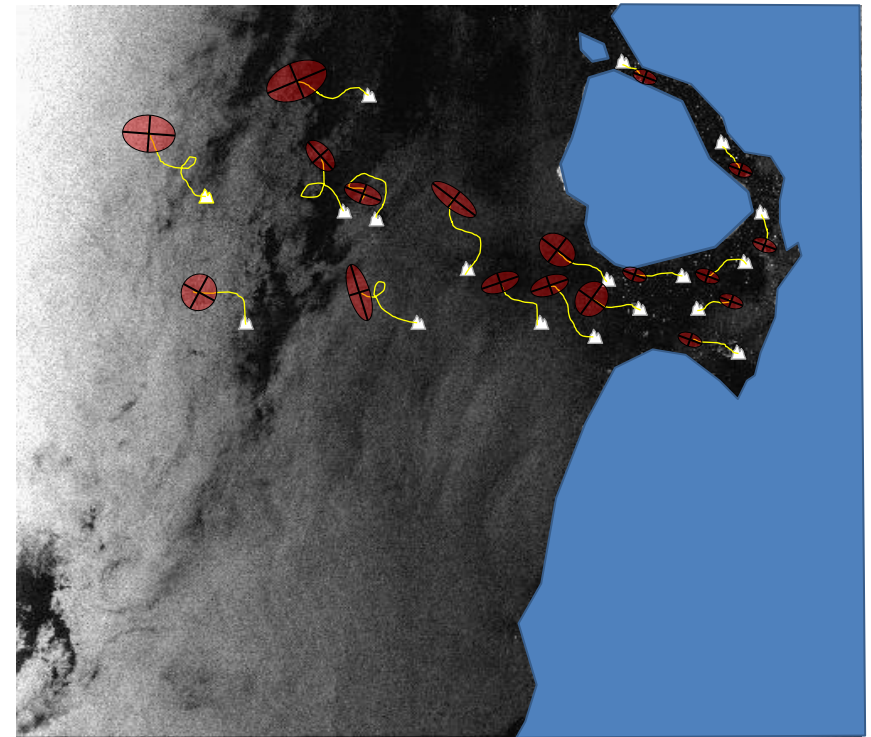
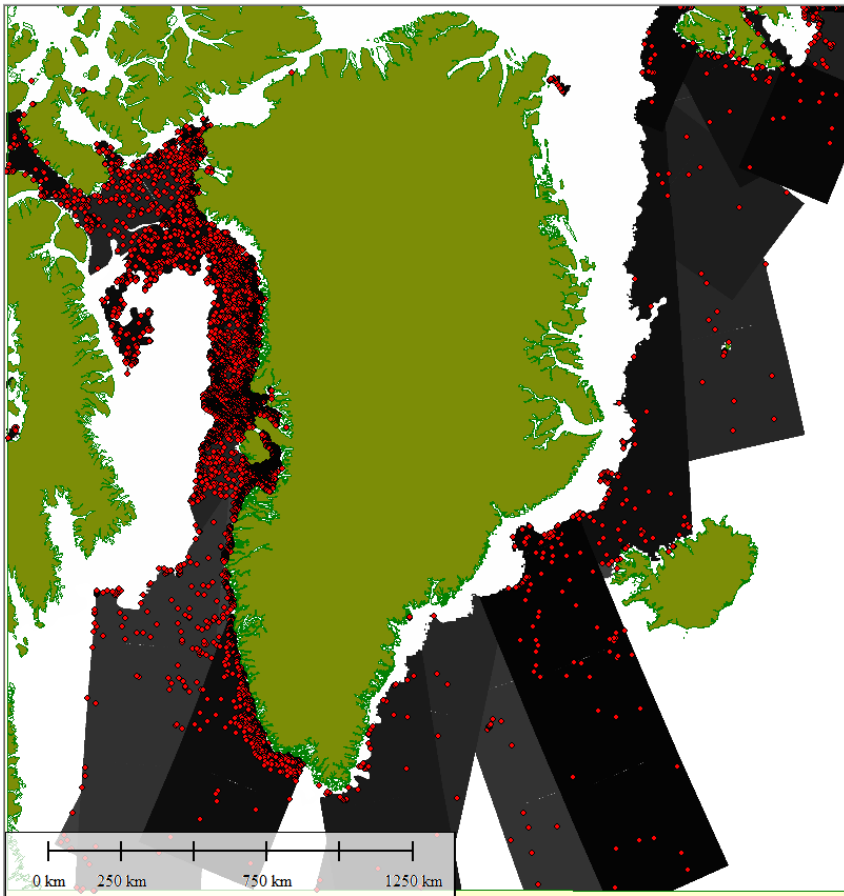
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Polar TEP architecture

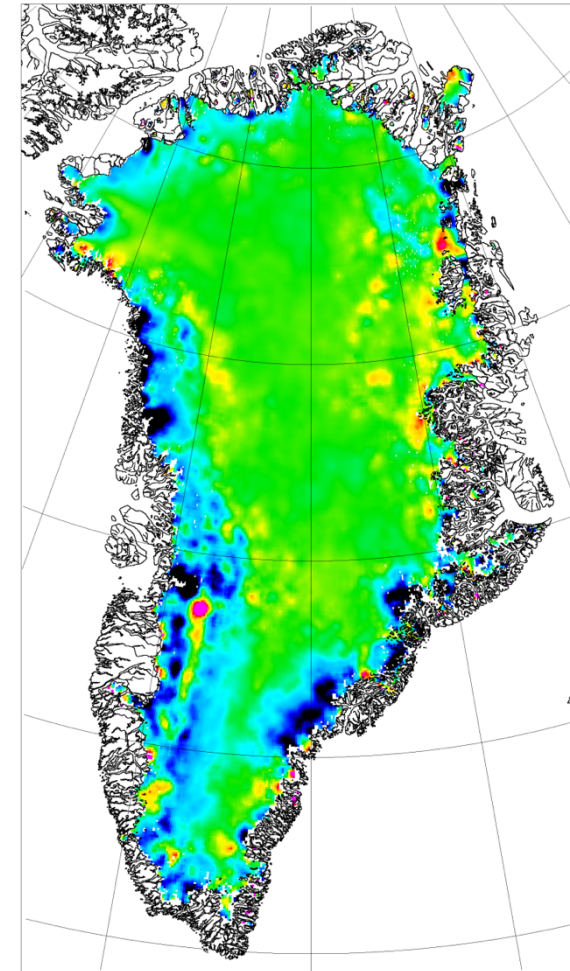
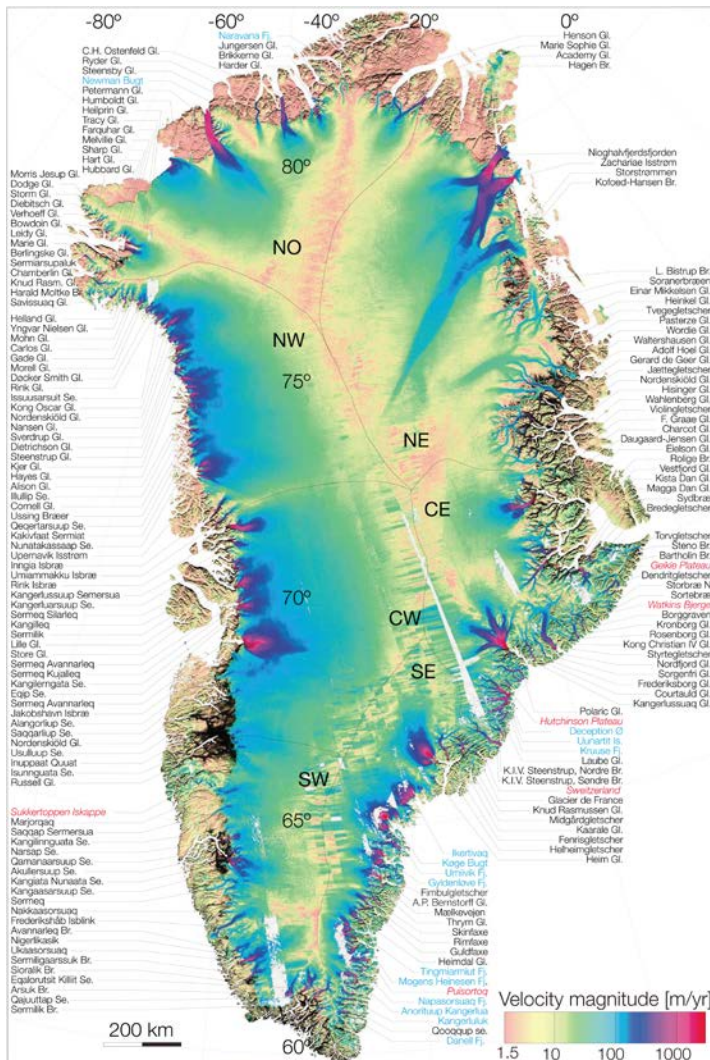


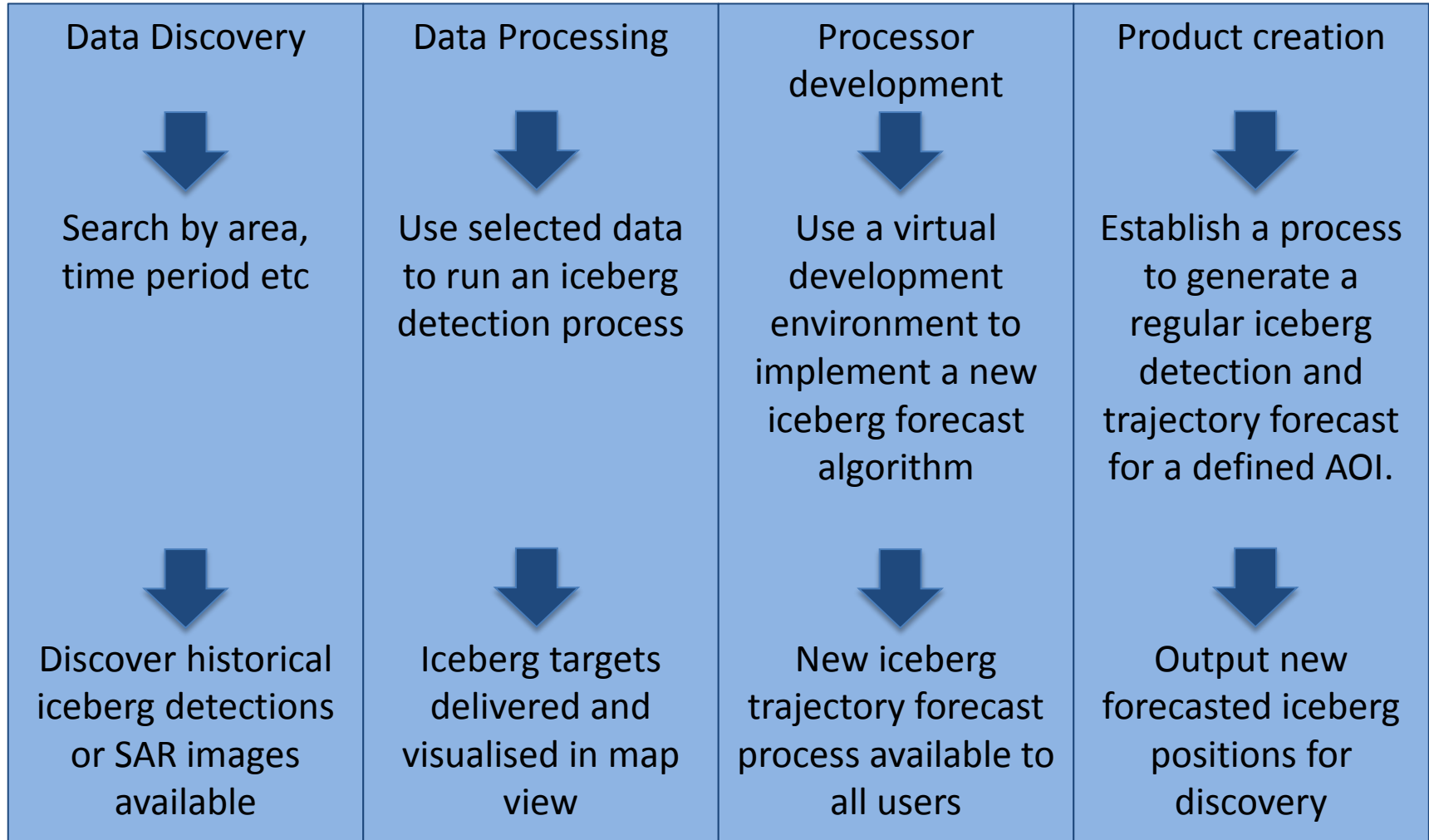
- Focused on Greenland-Baffin Bay Region
- Objective of this pilot will be to test whether the link between calving activity and iceberg populations can be demonstrated
- Several critical components that will be contributed from the project team.
 - Greenland Ice Sheets CCI products (DTU / S[&]T)
 - Greenland ice sheet dynamics model - data on iceberg calving (DMI/DTU)
 - Iceberg Detection from Satellite Imagery (C-CORE)
 - Iceberg trajectory modelling (CIS/DMI)
 - Baffin Bay 3D ocean current and wind data (DMI)

Polar TEP pilot project



Polar TEP pilot project





Pilot project – potential questions

- What are the current and historic iceberg production rates from the key glaciers of Greenland and Antarctica?
- What are the long-term patterns of iceberg population and trajectories?
- Can the factors attributed to changes in ice sheet and glacier dynamics be linked to changes in iceberg production?
- How do sea-ice factors (extent, thickness, type) affect iceberg trajectories?
- How can regional ocean models be integrated to drive iceberg trajectory models and how can historical iceberg tracks be used as validation data for iceberg trajectory models?
- How can ocean hydrodynamic models allow back trajectories of icebergs to establish the iceberg source for user defined locations?
- Can the link with longer term regional climate models be made to provide an outlook of changes to iceberg occurrence for these locations?
- Can Near Real Time iceberg monitoring and trajectory forecast be implemented to support tactical iceberg management?

Thank you.

Questions?

Arctic Council

Arctic Council
Arctic Marine Shipping
Assessment 2009 Report

- “While it may be technically feasible to cross the Arctic ocean by modern icebreaker ... the operational, environmental and economic implications and challenges for routine trans-Arctic voyages are not yet fully understood.” (AMSA, 2009)
- The necessary cost-benefit-risk analyses to answer these questions involves integration of data and tools currently not possible
- Potential use of a Polar TEP to query economic models and demographic data alongside environmental information

