Harnessing extreme weather risks to maritime and oil & gas operations

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www.blue-action.eu

Photo credit: SAMS

The notion of extreme weather

- Weather out of the ordinary, unseasonal, unprecedented, or historically rare
- Cannot be captured in weather models as we know them
- Typically classified as anomalies
- Weather in some regions becoming more *chaotic* and unpredictable as a result of climate change
- The face of storms has shifted
- Tropical hurricanes are becoming stronger, larger, and more durable

The case study

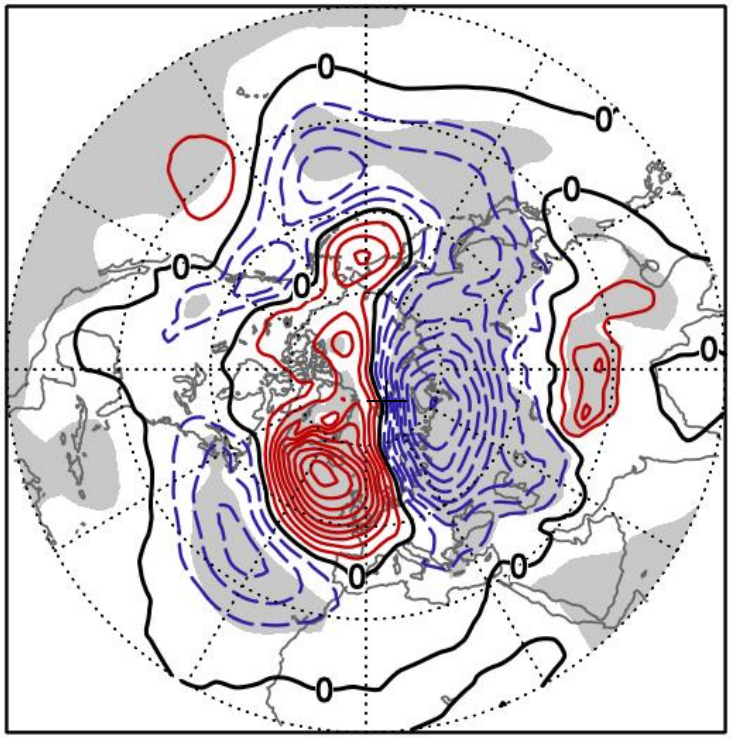
- Investigate predictability of extreme weather events associated with marine cold air outbreaks in the Arctic
- Identify how improved forecasts can be used to mitigate risks of operating in polar waters
- Co-design a service to help ships navigate the Arctic

What are climate services anyways..

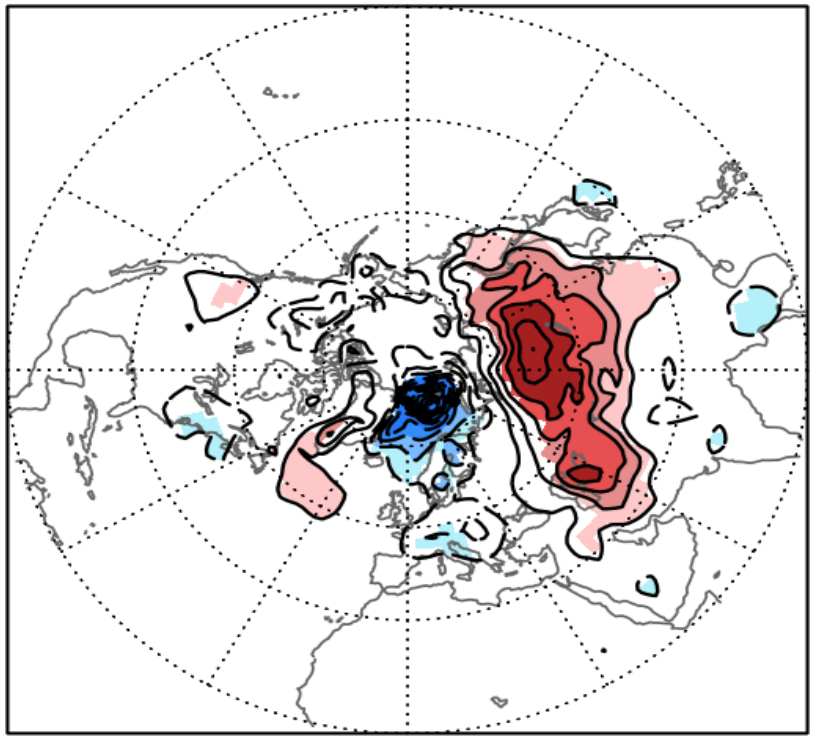
Modelling large-scale atmospheric conditions

Relationships between West Barents cold air outbreaks (CAO) durations and large-scale atmospheric features (sea-level pressure and near-surface temperature)

NOV: REG. SLP on MCAO Duration



NOV: REG. TAS on MCAO Duration



Decision support in trans-Arctic shipping

Do we anticipate a polar low on this voyage?

Should we,- and can we, re-route to avoid the storm?

AHI image captured by the Japan Meteorology Agency's Himawari-8 satellite SSEC/CIMSS, University of Wisconsin–Madison

Impact of climate change and extreme waves on tanker design

Impact of climate change and extreme waves on tanker design, DNV GL report 2015

Challenges related to ship operations in Arctic waters

Why icing is dangerous?

Credits: DNV GL

- Global icing jeopardizes stability and integrity of the vessel
- Local icing of essential components jeopardizes safety and operability of the vessel

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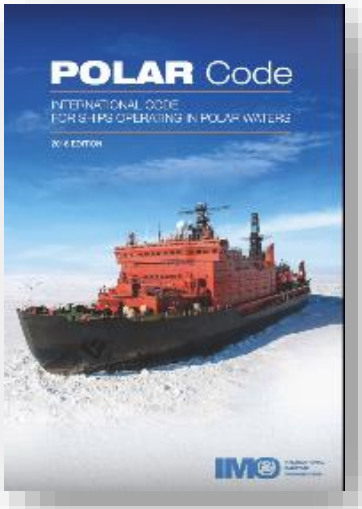
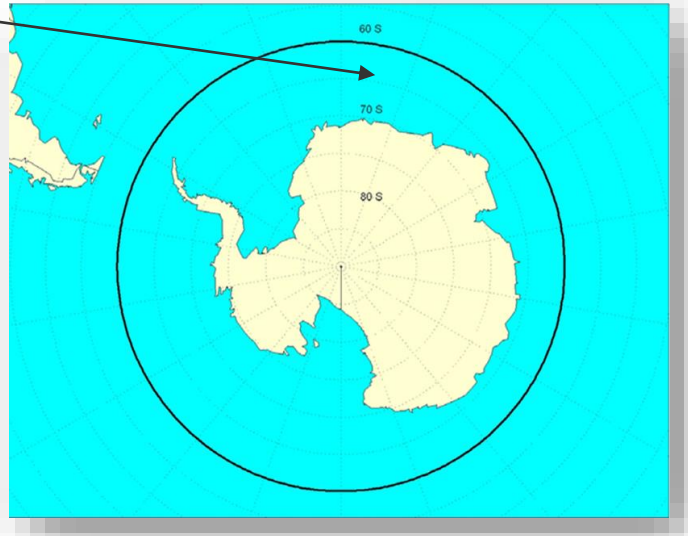
Could Polar Code help industry against Polar Low?



Goal

The goal of this Code is to provide for safe ship operation and the protection of the polar environment by addressing risks present in **polar waters** and not adequately mitigated by other instruments of the Organization.

60 degree north with exceptions



60 degrees south all the way round

Polar operations – New IMO Polar Code from 1st January 2017

Limitations to operations are defined by:

- Vessels Ice Class – actual ice condition
- Polar Service Temperature (PST)
- Level of Winterization
- Possible other design limitations

The Code: Main aim is to identify and make crew and owner aware of ship specific operational limitations.

- However; - it's always the responsibility of the Master to ensure that the vessel is operated within these limits!

Polar Code: Sources of hazards

The Polar Code considers hazards which may lead to elevated levels of risk due to increased probability of occurrence, more severe consequences, or both:

- Sea ice
- Topside icing, with potential reduction of stability and
- Equipment functionality
- Low temperatures
- Extended periods of darkness or daylight
- High latitudes, as it affects navigation
- Remoteness and possible lack of accurate and complete hydrographic data
- **Rapidly changing and severe weather conditions, with the potential for escalation of incidents**
- The environment with respect to sensitivity to harmful substances and other environmental impacts and its need for longer restoration

Climate resilient pathways

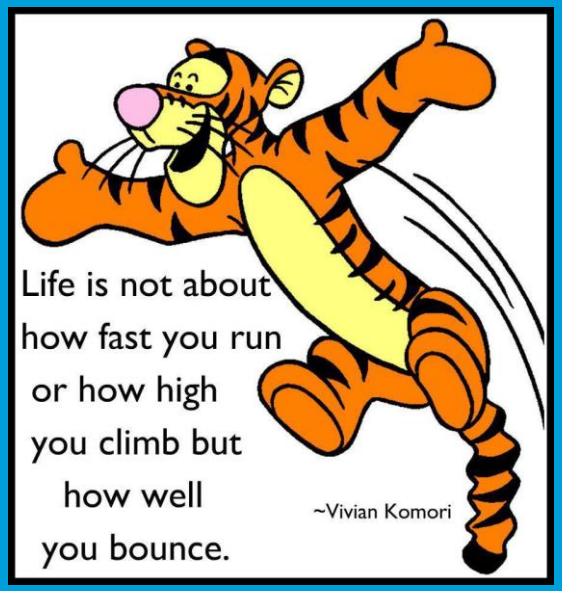
Climate-resilient pathways are development trajectories that combine mitigation and adaptation strategies to realize the goal of sustainable development

Knowing the risks and opportunities

Requires concerted efforts all across the board

Re-entangling with nature

Thank you for your attention!



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