

PAME 2nd Arctic Best Practices Information Forum
(London, 14-15 May 2018)

WMO Polar activities & requirements related to implementation of the Polar Code

WEATHER CLIMATE WATER
TEMPS CLIMAT EAU

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Affairs Division*



WMO OMM

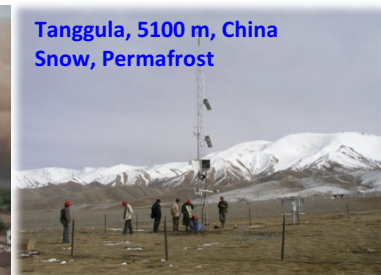
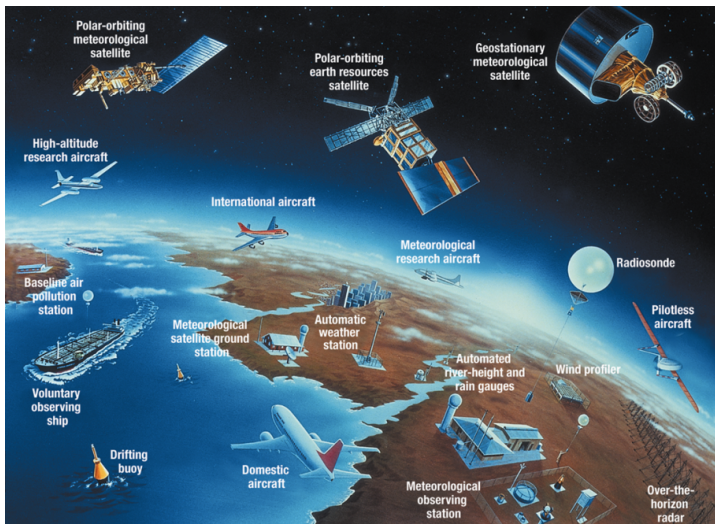
World Meteorological Organization
Organisation météorologique mondiale

World Meteorological Organization

UN Specialized Agency

Authoritative voice on weather, climate and water, enabling world-wide observations, research and services needed to meet the enormous challenge of climate change...

- Facilitate networks of monitoring stations and service centres
- Promote systems for real time global exchange of data
- Promote standardization of observations
- Further the application of meteorology to socioeconomic sectors;
- Promote activities in operational hydrology and cooperation among meteorological and hydrological services;
- Encourage research and training



WMO Priorities 2016-2019

Foundation for WMO's substantial contribution to

- *“the protection of life and property against natural disasters,*
- *safeguarding the environment enhancing the economic and social well-being of all sectors of society*

in areas such as food security, water resources and transport”

- **Disaster Risk Reduction;**
- **Global Framework for Climate Services;**
- WMO Integrated Global Observing System;
- Aviation Meteorological Services;
- **Polar and High-mountain Regions:**
 - *Improve meteorological and hydrological monitoring, prediction and services in polar and high-mountain regions and beyond.*
- Capacity Development;
- WMO Governance.



WMO Polar and High Mountain activities

Provide a focused, integrated understanding of global impacts of changes in polar and high-mountain regions, facilitating services in support of resilience and adaptation

Executive Council Panel of Experts on Polar & High Mountain Observations, Research & Services (EC-PHORS)

- In situ and space-based observing systems, and data exchange
 - Global Cryosphere Watch (GCW), and its CryoNet
 - Polar Space Task Group (PSTG)
 - Antarctic Observing Network (AntON)
 - Ship-based observations, data buoys, etc.
- Developing networks of Regional Climate Centres and Outlook Forums for the Polar and High Mountain regions
- Global Integrated Polar Prediction System (GIPPS)
 - Innovation in observations and predictive capability at timescales from hours to centuries
 - Polar Prediction Project, incl. Year of Polar Prediction (YOPP)
 - Polar Climate Prediction Initiatives
- Marine and sea-ice services in Polar regions (MSI, ship routing, etc.)
- Hydrological Services, with a focus in Polar Regions (Arctic, Hindu-Kush-Himalayan)
- Promoting cross-disciplinary engagements.

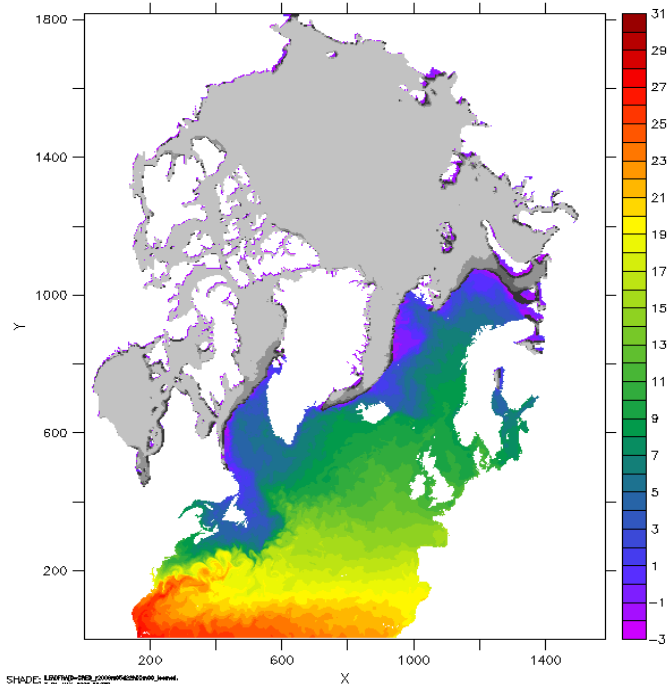
Promoting integration of research, observations and services;
Advance the understanding of the integrated system of weather, climate , hydrological , biological, ecological systems
Develop an understanding social values and perspectives

Designing an Arctic Prediction System

The Year of Polar Prediction

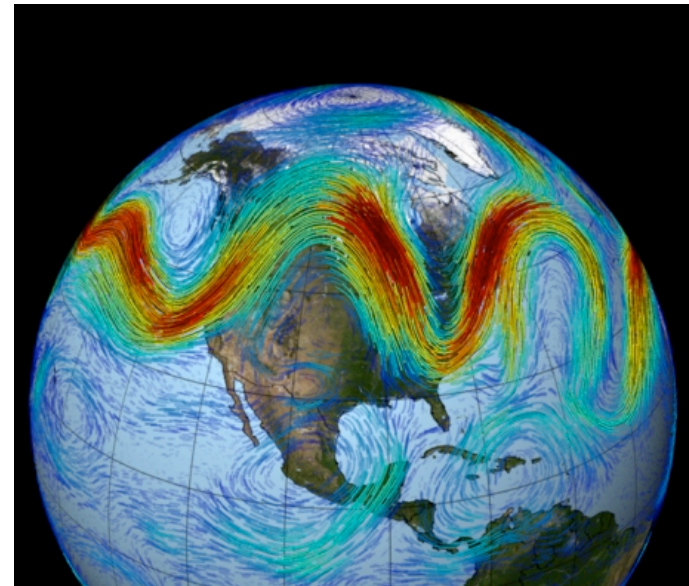
PERNET Ver 6.5
MPLS/PHL/THD
Dec '5 2011 11:46:41

TIME : 22-MAY-2008 05:00:00: CREG_y2008m05d22h00m00_gridT2D



Temperature (C)

WMO Polar Prediction Project is launching a modelling and field campaign (Year of Polar Prediction, mid-2017 to mid-2019) assist planning an Arctic observational network for improving predictive capabilities



Preparation Phase
2013 to mid-2017

YOPP mid-
2017 to
mid-2019

Consolidation
Phase
mid-2019 to
2022



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Climate Services Strategy for Polar and High Mountain regions

- Includes concept of Regional Climate Centres for Polar and High Mountain regions, with functions e.g.
 - **strengthened collaboration** among organizations on (third) polar matters;
 - develop **specific regional products** (e.g. sub-seasonal forecasts);
 - develop **sector-specific products**: stereographic projections including improved imagery (e.g. satellite);
 - Organize **regional or national climate outlook forums**, engaging users in product development and applications.
- Following RCCs under development:
 - **Arctic-PRCC : Implementation Plan approved. Demonstration phase in 2018**
 - **Third Pole TP-RCC: Implementation Plan under development**
 - **Antarctic-PRCC: Implementation Plan under development**

Importance of meteorology for safe shipping in polar waters

Polar Code acknowledges the following meteorological hazards and industry trends:

- Climate change & accelerating sea-ice melt in polar regions are:
 - Opening up new polar shipping routes and increasing summer availability to traditionally ice-locked areas
 - Increasing polar tourism
- Reliable marine weather forecasts & knowledge of state of the sea and sea-ice are crucial for safe navigation and planning voyages in Polar waters
- Specialist skills in ice navigation are needed to support safe passage of ships in polar waters
- Challenges of weather, communications and positioning (e.g. poor satellite coverage)



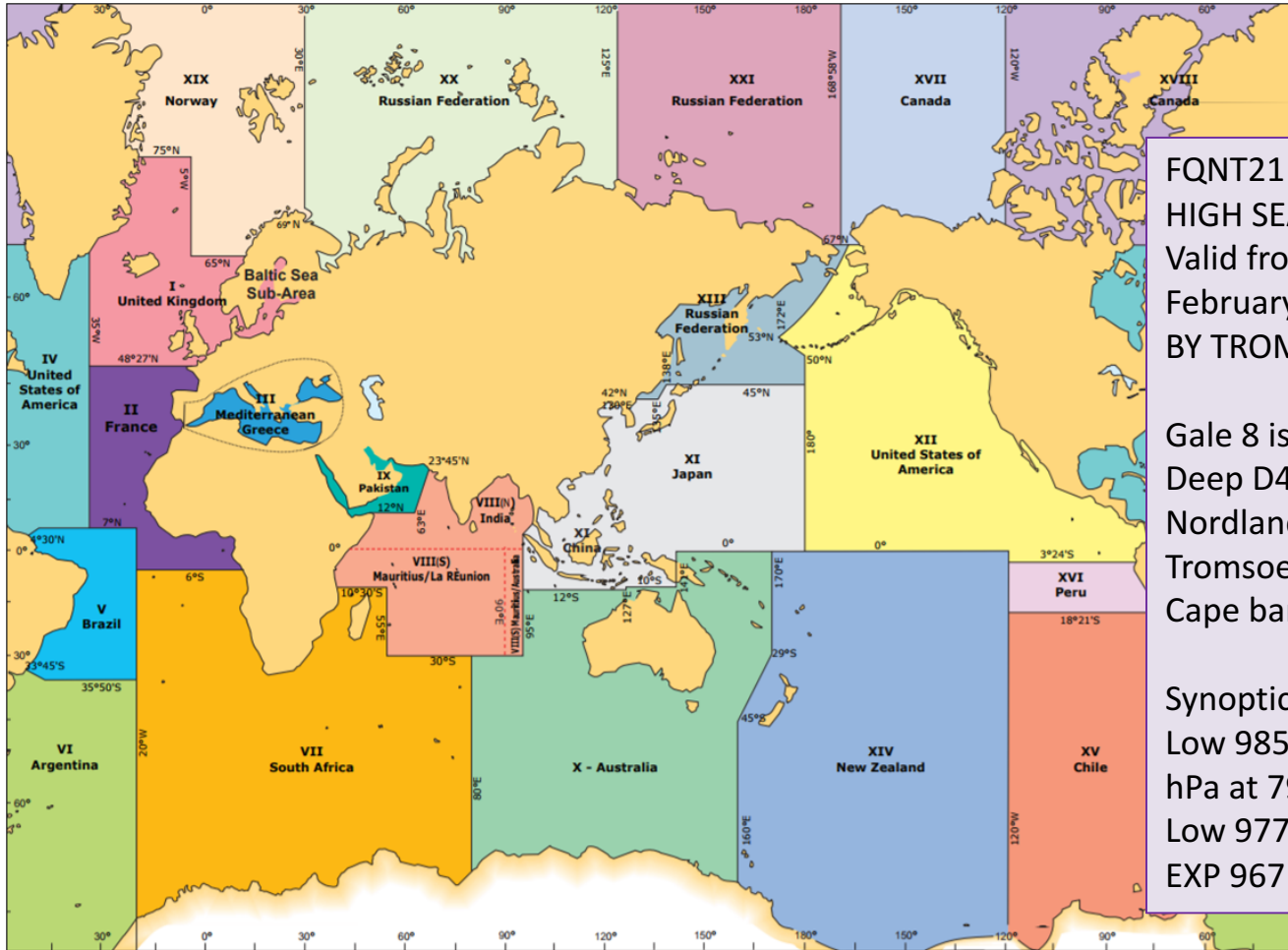
SOLAS and WMO's role

- *UN International Convention for Safety of Life At Sea (SOLAS): **WMO's obligation** is to support the provision of *Maritime Safety Information (MSI)* via the *Global Maritime Distress Safety System (GMDSS)*, and more specifically delivered by the **IMO/WMO WorldWide Met-Ocean Information & Warning Service (WWMIWS)**.*
- To effectively manage this provision of MSI, the world's oceans are divided into regions - METAREAS – to which specific warnings are delivered
- A METAREA Coordinator is responsible to coordinate the provision of the WWMIWS for their METAREA. The National Meteorological and Hydrological Services (NMHS) in each METAREA are the responsible issuing service, for forecasts and warnings to reach vessels in their METAREA
- 10 METAREAS (out of 21) cover polar waters, with Coordinators from Norway, Russian Federation, Canada, Chile, Argentina, South Africa, Australia, New Zealand
- WMO METAREAS align directly with the IMO/IHO NAVAREAS (areas for issuing navigation warnings)



IMO/WMO WorldWide Met-Ocean Information & Warning Service (WWMIWS)

Limits of metareas - 2017



FQNT21 ENMI 072300
HIGH SEAS BULLETIN FOR METAREA 19
Valid from 23:00 UTC on Wednesday 7
February 2018
BY TROMSO METEO, NORWAY

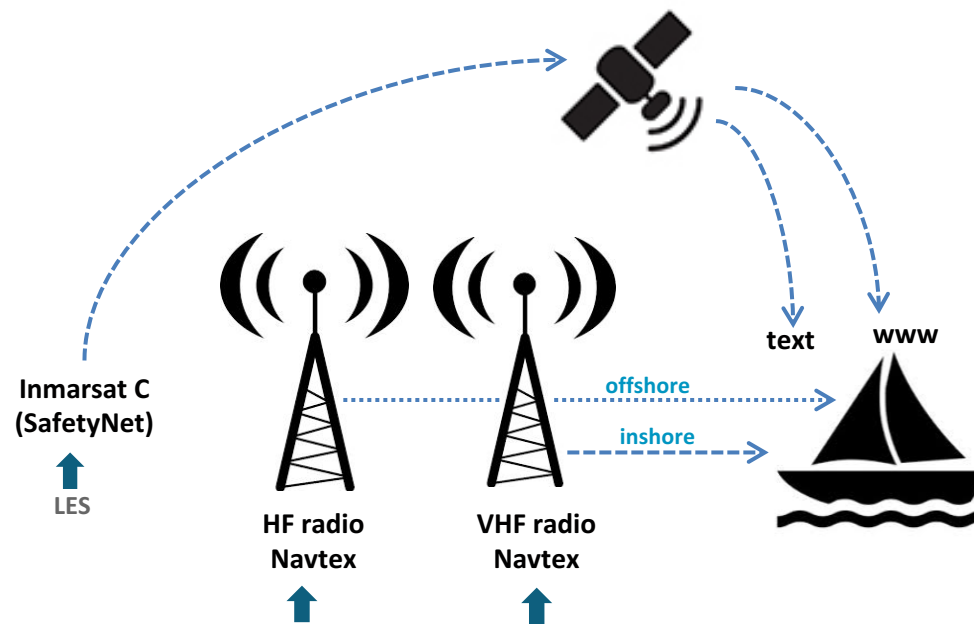
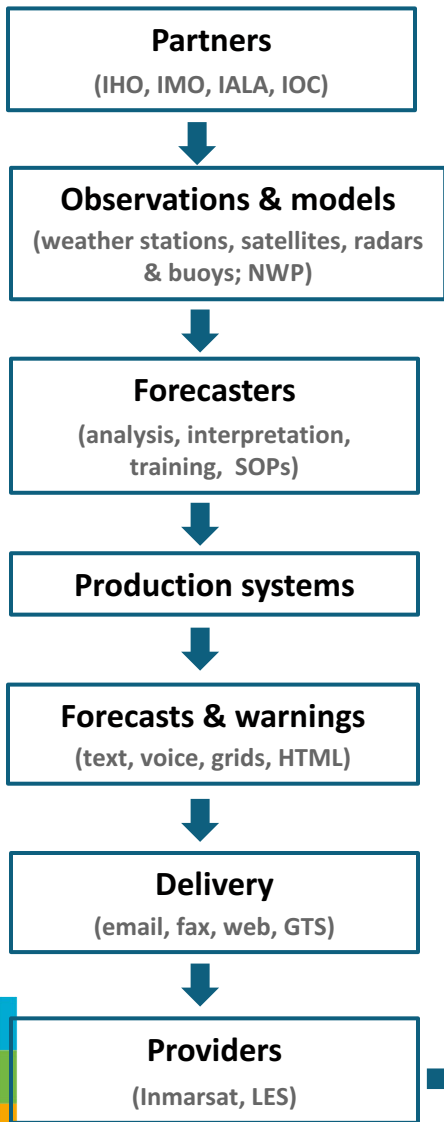
Gale 8 is EXP in areas: B1, B2, C2, D2, D3,
Deep D4, E3 and Deep E4, Banks outside
Nordland, Banks outside Troms,
Tromsoeflaket and Hjelmsøey bank, N
Cape bank, N bank and Kildinbank

Synoptic situation at 18 utc
Low 985 hPa 76 N 13 E Mov Ne, EXP 990
hPa at 79 N 27 E by THU 18 utc.
Low 977 hPa 69 N 17 W almost STNR,
EXP 967 hPa by THU 18 utc.

Marine Services provided by WMO

- *IMO/WMO WorldWide Met-Ocean Information & Warning Service (WWMIWS)*
 - Met-Ocean MSI text forecasts and warnings
(Hazards (warnings), winds, waves, weather, sea-ice)
 - Broadcast on SafetyNET, NAVTEX and HF Narrow Band Direct Printing (NBDP) of GMDSS
- Ice Charting
 - Producing Graphics of ice features using S-411 compatible outputs
(Only available on the Internet)
- Met-Ocean services
 - Graphics, text – available on internet and non-GMDSS systems
- WMO Standards and regulations: WMO publications: *Manual on Marine Meteorological Services* (WMO-No.558) and associated *Guide for Marine Meteorological Services* (WMO-No. 471) provide technical guidance for understanding and using the MSI

Value chain

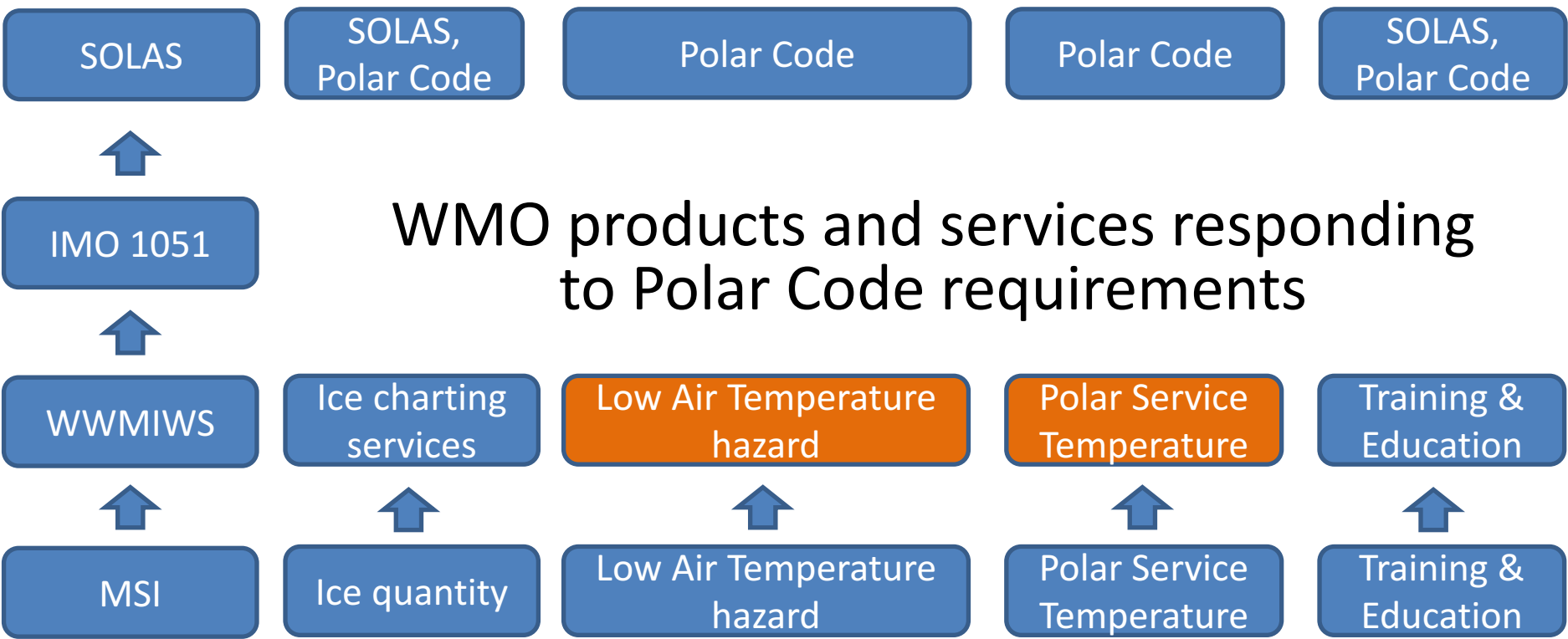


Communication challenges

- The GMDSS is essentially setup to transmit text products using SafetyNET and NAVTEX
- Ice charts and Met-ocean information are available in graphic form and provide rich detail
 - Essential for localized navigation in sea-ice
 - Only available on non-GMDSS communication systems such as the internet
 - Cost of satellite internet access is an issue
- This challenge is also applicable to IHO S-100 format compatible products covering **met info** (S-412) and **ice info** (S-411)



WMO/IMO Framework supporting Polar Shipping



Polar introduces new hazards and information requirements (orange)



Polar Code and WMO

- The Polar Code specifically targets safe ship operation and protection of the Polar environment by addressing risks present in Polar waters and not adequately mitigated by other instruments
- Chapters 9 and 11 most relevant to WMO, related to:
 - Safety of Navigation – ensuring ships are able to receive up to date marine weather and in particular sea-ice conditions
 - Voyage Planning – ensuring ship Master and crew have adequate information to plan a voyage, especially related to extent and type of ice and icebergs in the vicinity of the intended route; and statistical information on ice and temperatures from former years
- Training and capacity development for the shipping community, and how to interpret and understand met-ocean information is essential

Risks for Polar Certification process

Need for an authoritative information source provided by WMO

Ship needs to specify if operating in an area affected by:

- A specific Polar Service Temperature
- Low Air Temperature hazard

They are forced to source this information individually and without assurances of quality

Gap leading to increased risks

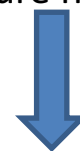
Certifying organization needs to confirm if ship will operate in an hazardous area:

- What Polar Service Temperature dataset do they check the application against?
- What dataset would confirm if the ship will operate in Ice waters or Low Air Temperature hazards?

Risks

Ship encounters conditions that are unexpected:

- Beyond the specified Polar Service Temperature
- Low Air Temperature hazard
- Ice waters



Ship wants to operate in polar waters

Ship applies for a polar certificate

Ship receives polar certificate

Ship starts operating in polar waters



Polar Code: challenges

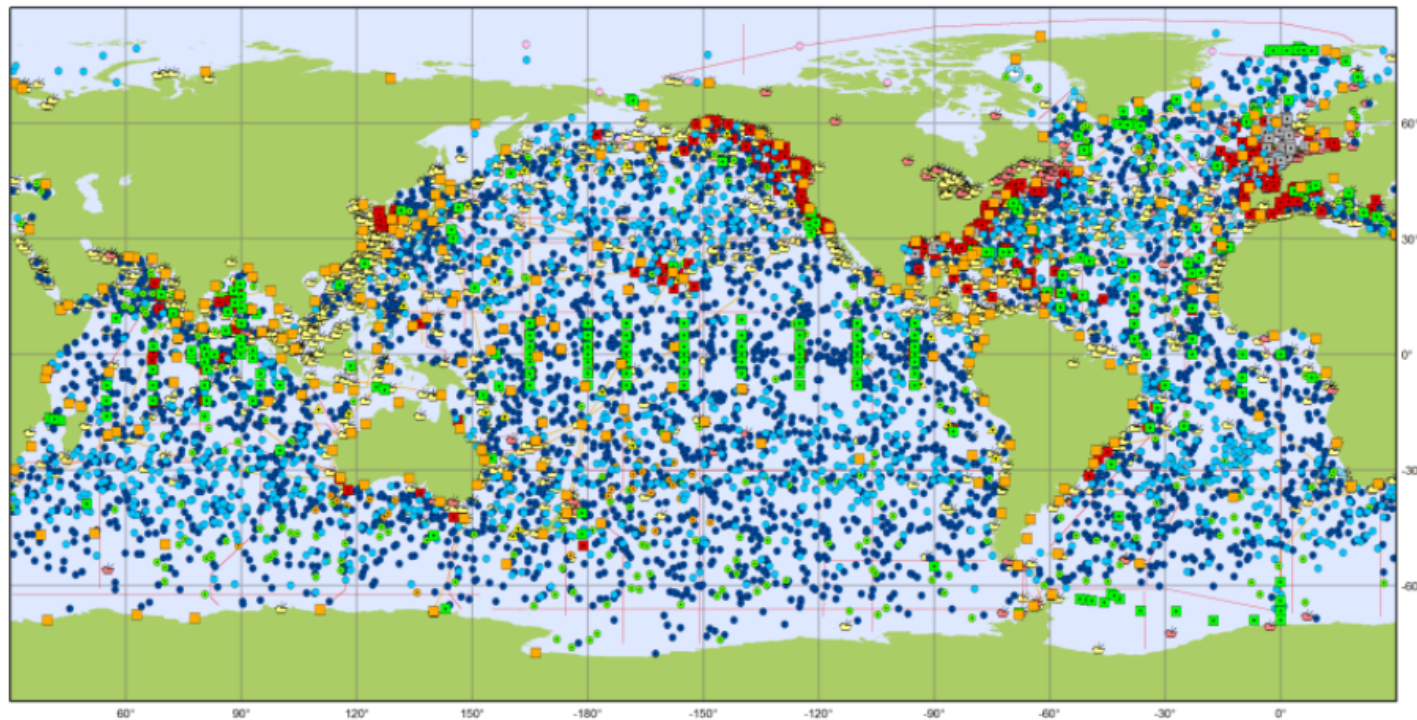
- Should Polar Code introduce **competency standards for ice-navigation**, WMO could contribute with its marine forecasting competency standards, since marine forecasting products are used for ice-navigation
- The area of the Polar Code is geographically limited and **could be extended to include other areas of high traffic density, also subject to ice-conditions**
- **Independent communication systems and data accessibility should be harmonized** to ensure the best and most up to date met-ocean (especially sea-ice) information is available to all ships in the Polar Region
- **The making of observations from ships** sailing in Polar regions should be made mandatory



WMO Proposed Changes to Polar Code

Polar regions are data sparse, while playing a key role in climate system, and weather & marine forecasts

In order to improve services provided by WMO Members to society, e.g. support to maritime transportation and safety, WMO welcomes changes that could be introduced in the polar code to promote (or make mandatory) the making of **cryosphere and weather observations from ships sailing in polar regions**



Main in situ Elements of the Global Ocean Observing System

December 2017

Profiling Floats (Argo)

- Core (3887)
- Deep (43)
- BioGeoChemical (300)

Data Buoys (DBCP)

- Surface Drifters (1317)
- Offshore Platforms (102)
- Ice Buoys (12)
- Moored Buoys (378)
- ▲ Tsunameters (34)

Timeseries (OceanSITES)

- Interdisciplinary Moorings (332)
- Repeated Hydrography (GO-SHIP)
- Research Vessel Lines (61)

Sea Level (GLOSS)

- Tide Gauges (252)

Ship based Measurements (SOT)

- Automated Weather Stations (249)
- Manned Weather Stations (1609)
- Radiosondes (17)
- eXpendable BathyThermographs (37)



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Thank you Merci



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