China’s contributions and interests to PAME
Past, Present, and Future

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China’s contributions and interests to PAME Past, Present, and Future

1. China’s Arctic Policy White Paper
2. China’s contributions to PAME
3. China’s scientific efforts to understand Arctic
4. Polar Code and the new research vessel XUELONG 2
5. Conclusion
1. China’s Arctic Policy White Paper

I. The Arctic Situation and Recent Changes
II. China and the Arctic
III. China's Policy Goals and Basic Principles on the Arctic
IV. China's Policies and Positions on Participating in Arctic Affairs

- Deepening the exploration and understanding of the Arctic
- Protecting the eco-environment of the Arctic and addressing climate change
- Utilizing Arctic Resources in a Lawful and Rational Manner
- Participating Actively in Arctic governance and international cooperation
- Promoting peace and stability in the Arctic

Conclusion
1. China’s Arctic Policy White Paper

- China plays a constructive role in IMO, and makes solid efforts to fulfill its international responsibilities for ensuring maritime navigational security and preventing its ships from polluting the maritime environment.

- China advocates international cooperation in maritime technology and a globally coordinated solution to reducing greenhouse gas emissions from maritime transport under the IMO framework.

- China prioritizes scientific research, underscores the importance of environmental protection, rational utilization, law-based governance and international cooperation.
China attaches great importance to navigation security in the Arctic shipping routes. It has actively conducted studies on these routes and continuously strengthened hydrographic surveys with the aim to improving the navigation, security and logistical capacities in the Arctic.

China abides by the Polar Code, and supports the IMO in playing an active role in formulating navigational rules for the Arctic. China calls for stronger international cooperation on infrastructure construction and operation of the Arctic routes.
2. China’s contributions to PAME

CHINARE Arctic Cruise History and Yellow River Research Station in Ny-Alesund

Established at Ny-Alesund, Svalbard, in 2004

Organized by The SOA of China
2. China’s contributions to PAME

- Ministry of transport
- State of Ocean Administration
- Maritime Safety Administration
- Tongji University
- Polar Research Institute of China
- Dalian Maritime University
- First Institute of Oceanography
3. China’s scientific efforts to understand Arctic

- The Arctic holds great value for scientific research.

- To explore and understand the Arctic serves as the priority and focus for China in its Arctic activities. China actively promotes scientific expedition and research in the Arctic.

- China is actively involved in multi-disciplinary research including Arctic geology, geography, ice and snow, hydrology, meteorology, sea ice, biology, ecology, geophysics and marine chemistry.
3. China’s scientific efforts to understand Arctic

- **WINTER WEATHER PATTERNS OVER NORTHERN EURASIA AND ARCTIC SEA ICE LOSS**, East Asia may experience more frequent and/or intense winter extreme weather events in association with the loss of Arctic sea ice.

- In summer ice loss in the central Arctic would result in a high oceanic heat flux in autumn and delayed new ice growth.

- The oceanic heat flux increased rapidly once sea ice drifted into the Greenland Sea, resulting in ice melt in winter.


Lei et al., JGR, 2014, 2018
3. China’s scientific efforts to understand Arctic

- Chinese Yellow River Station on Svalbard and Zhongshan Station in the Antarctic are magnetically conjugate.

- Northern polar ionosphere convection during growth phase of a sub-storm

Published in Science, 29 March 2013
3. China’s scientific efforts to understand Arctic

- Scientific research programs in Ny-Alesund, 2018 summer season
3. China’s scientific efforts to understand Arctic

- **Scientific research programs in Chinese 9th Arctic Expedition, 2018 summer**
4. Polar Code and the new research vessel XUELONG 2
Overall Parameters

4. Polar Code and the new research vessel XUELONG 2

Main dimensions

- Length over all: 122.5m
- Width: 22.3m
- Draft: 8.3m
- GT (gross tonnage): 13,990
- Endurance: 20,000 miles
- Ratings: 90
- Self-supportability: 60
Ice-breaking Properties

Ahead performance

- 2-3 knots average speed in 1.5m of level ice with 20cm snow
- The ship can operate ahead in second-year ice which may include multi-year ice inclusions.
- To operate with ramming if needed.

Astern performance

- Ramming is not foreseen stern ahead.
- In multi-year ice conditions stern ahead operation is restricted.
- Momentarily 1.5m of level ice with 20cm snow.
- The ability to operate independently, without becoming stuck, in 20cm deep first year ice ridges having a 4m consolidation layer and 20cm snow cover.

4. Polar Code and the new research vessel XUELONG 2
Intelligent Vessel

The sensor is working.

- The “Xue long 2” is the first one of China that CCS issues with a intelligent vessel certificate.
- Effectively manage the relevant data of the hull structure.
- Monitor the life of the vessel.
- Automatically pre-alarmed.
4. Polar Code and the new research vessel XUELONG 2

Full-rotary Electric Propulsion

POD Propulsion
### 4. Polar Code and the new research vessel XUELONG 2

#### Wärtsilä 32

<table>
<thead>
<tr>
<th></th>
<th>IMO Tier II or III</th>
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<tbody>
<tr>
<td>Cylinder bore</td>
<td>320 mm Fuel specification: Fuel oil</td>
</tr>
<tr>
<td>Piston stroke</td>
<td>400 mm 700 cSt/50°C 7200 sR1/100°F</td>
</tr>
<tr>
<td>Cylinder output</td>
<td>580 kW/cyl ISO 8217, category ISO-F-RMK 700</td>
</tr>
<tr>
<td>Speed</td>
<td>750 rpm SFOC 178.8 g/kWh at ISO conditions, including engine driven pumps</td>
</tr>
<tr>
<td>Mean effective pressure</td>
<td>28.9 bar</td>
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<tr>
<td>Piston speed</td>
<td>10.0 m/s</td>
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#### Rated power

<table>
<thead>
<tr>
<th>Engine type</th>
<th>Rated power (580 kW/cyl)</th>
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<tbody>
<tr>
<td>6L32</td>
<td>3 480</td>
</tr>
<tr>
<td>8L32</td>
<td>4 640</td>
</tr>
<tr>
<td>9L32</td>
<td>5 220</td>
</tr>
<tr>
<td>12V32</td>
<td><strong>6 960</strong></td>
</tr>
<tr>
<td>16V32</td>
<td><strong>9 280</strong></td>
</tr>
</tbody>
</table>

#### Dimensions (mm) and weights (tonnes)

<table>
<thead>
<tr>
<th>Engine type</th>
<th>A*</th>
<th>A</th>
<th>B*</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
<th>Weight</th>
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<td>4 980</td>
<td>5 260</td>
<td>2 560</td>
<td>2 490</td>
<td>2 305</td>
<td>2 345</td>
<td>1 155</td>
<td>33.3</td>
</tr>
<tr>
<td>8L32</td>
<td><strong>5 960</strong></td>
<td><strong>6 245</strong></td>
<td><strong>2 360</strong></td>
<td><strong>2 295</strong></td>
<td><strong>2 305</strong></td>
<td><strong>2 345</strong></td>
<td><strong>1 155</strong></td>
<td><strong>43.4</strong></td>
</tr>
<tr>
<td>9L32</td>
<td>6 450</td>
<td>6 730</td>
<td>2 360</td>
<td>2 295</td>
<td>2 305</td>
<td>2 345</td>
<td>1 155</td>
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<tr>
<td>12V32</td>
<td>6 935</td>
<td>6 615</td>
<td>2 715</td>
<td>2 665</td>
<td>3 020</td>
<td>2 120</td>
<td>1 475</td>
<td>58.7</td>
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<tr>
<td>16V32</td>
<td>8 060</td>
<td>7 735</td>
<td>2 480</td>
<td>2 430</td>
<td>3 020</td>
<td>2 120</td>
<td>1 475</td>
<td>74.1</td>
</tr>
</tbody>
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* Turbocharger at flywheel end.
Environmental-friendly “Green” Vessel
Intelligent Engine Room

- Collect the operational data of engine room equipment.
- Effectively predict the operation of equipment and potential operating problems.
- Provides proper guidance about repairing and maintenance to equipment managers.
4. Polar Code and the new research vessel XUELONG 2

Main Science Expedition Equipment

- Photoelectric composite winch.
- 4000m Biological trawler winch.
- 2000m Vertical trawling winch.
- Auxiliary supporting frame.
4. Polar Code and the new research vessel XUELONG 2

Main Science Expedition Equipment

- Deep water multi beam system
- Ten thousand meter sounder
- Scientific fishing instrument
- ADCP
- Deep sea shallow stratigraphic profiler
- Ultrashort baseline
- CTD
- OB S
- ROV
- Marine gravimeter
- Automatic weather station system
- Multichannel seismic system
4. Polar Code and the new research vessel XUELONG 2

Intelligent Laboratory

- Laboratory - intelligent system
- Service Reporting
- Electronic medical record management module
- Intelligent service module
- Service progress query module
- Fixed assets inventory module
- Instrument information management module
- Local/cloud database
- Platform Manager Interface
- Multi-terminal
- Administrator
- User
- Instrument repair and maintenance
- Management Planned service
- Management Fixed asset
- Management Statistical analysis report
- Customized statistical analysis report

Handheld Terminal
5. Conclusions

- **The China's policy goals on the Arctic are:** to understand, protect, develop and participate in the governance of the Arctic, so as to safeguard the common interests of all countries and the international community in the Arctic, and promote sustainable development of the Arctic.

- **Establishing Long-term Observing and Monitoring System,** Carrying out assessment and evaluation on Arctic climate and environment, as well as research on usage of Arctic passages.

- **Enhancing International Cooperation with PAME and other International Organizations,** involving in Arctic flagship programs such as SAON/YOPP/MOSAIC/INTAROS/DBO to better understand the Arctic.
Acknowledgement to

- Chinese Arctic and Antarctica Administration, State Ocean Administration
- Polar Research Institute of China, Ministry of Natural Resources
- Tongji University, Ministry of Education

Thanks!