

China's contributions and interests to PAME

Past, Present, and Future



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February 5th, 2019

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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.



1. China's Arctic Policy White Paper

- 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.



China and the Arctic

<https://www.maritime-executive.com>



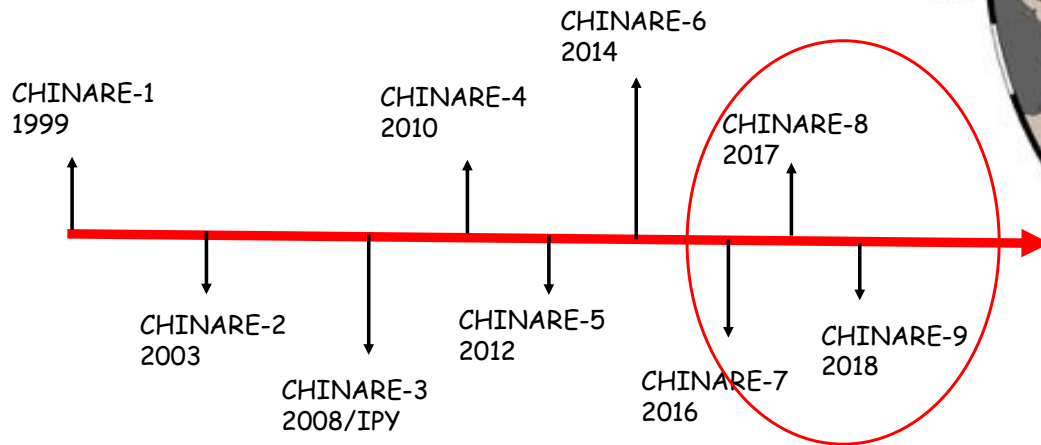
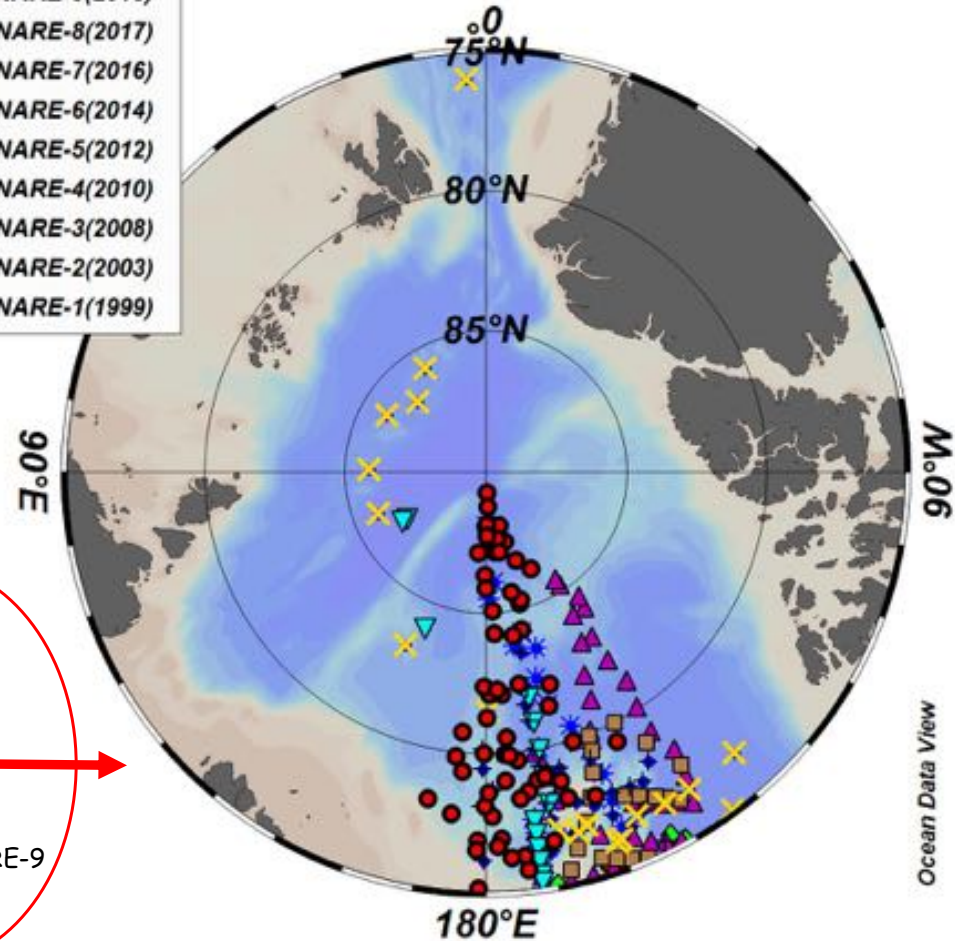
The Tian'en cargo ship at the port of Lianyungang in east China's Jiangsu Province on August 4, 2018. 新华网

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



PAME-I 2015
FEBRUARY 3RD-5TH
AKUREYRI - ICELAND

WORKING GROUP MEETING REPORT



PAME-I 2016
FEBRUARY 1ST - 3RD
STOCKHOLM - SWEDEN

WORKING GROUP MEETING REPORT



PAME
Protection of the Arctic Marine Environment

PAME II-2017
SEPTEMBER 18-20
HELSINKI - FINLAND

WORKING GROUP MEETING REPORT



PAME II-2018
OCTOBER 1-4
VLADIVOSTOK - RUSSIA
WORKING GROUP MEETING REPORT

PAME
Protection of the Arctic Marine Environment



International Science and Policy Conference:
Ecosystem Approach to Management: Status of Implementation
Conference Summary
23-25. August 2016
Fairbanks, Alaska

PAME
Protection of the Arctic Marine Environment



Arctic Marine Litter Workshop
Summary Report
Akureyri - Iceland
5-6 June 2018

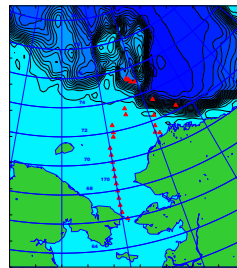
PAME
Protection of the Arctic Marine Environment

- Ministry of transport
- State of Ocean Administration
- Maritime Safety Administration
- Tongji University
- Polar Research Institute of China
- Dalian Maritime University
- First Institute of Oceanography

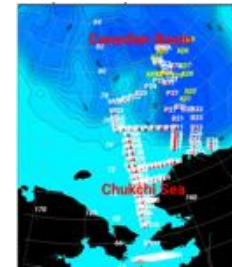
3. China's scientific efforts to understand Arctic

- 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.**

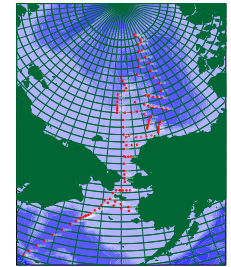
- China is actively involved in multi-disciplinary research including **Arctic geology, geography, ice and snow, hydrology, meteorology, sea ice, biology, ecology, geophysics and marine chemistry.**



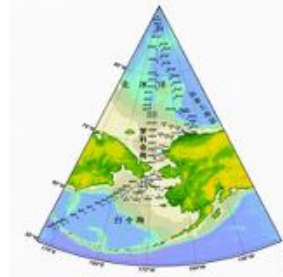
CHINARE-1(1999.7-9)



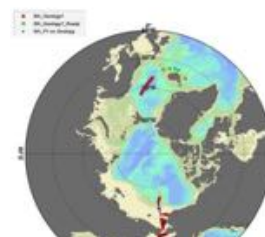
CHINARE-2(2003.7-9)



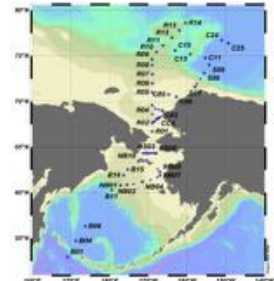
CHINARE-3 (2008.7-9)



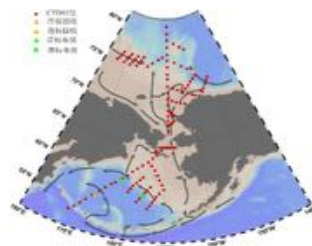
CHINARE-4 (2010.7-9)



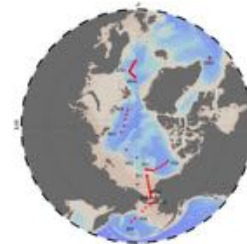
CHINARE-5 (2012.7-9)



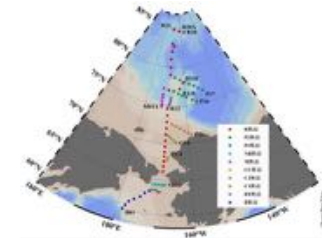
CHINARE-6 (2014.7-9)



CHINARE-7 (2016.7-9)

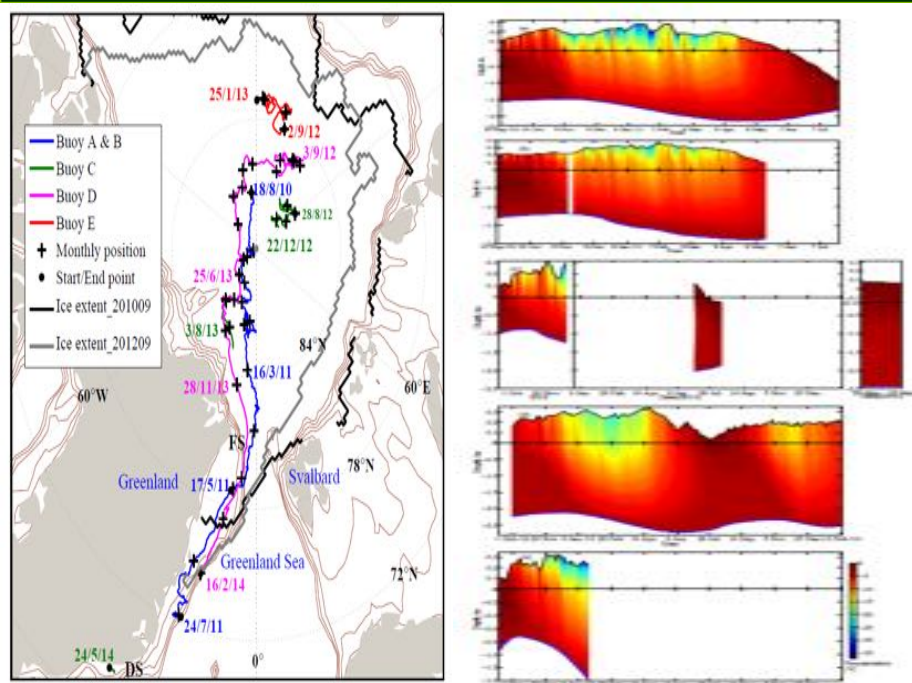


CHINARE-8 (2017.7-10)



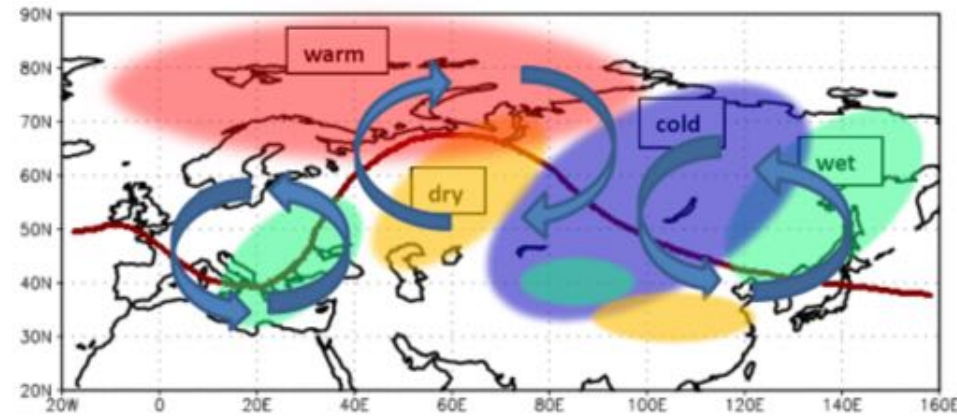
CHINARE-9 (2018.7-9)

3. China's scientific efforts to understand Arctic



Lei et al., JGR, 2014, 2018

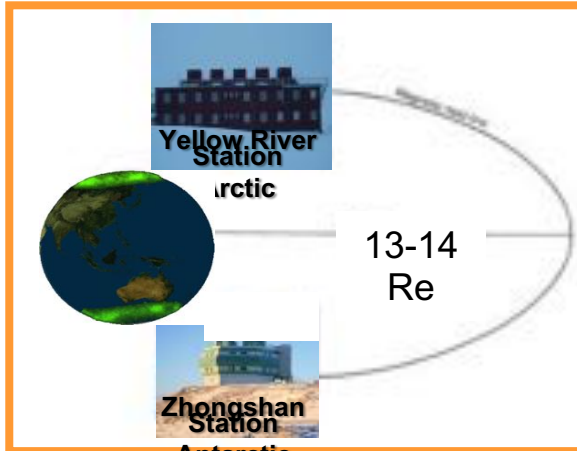
- WINTER WEATHER PATTERNS OVER NORTHERN EURASIA AND ARCTIC SEA ICE LOSS, East Asia may experience more frequent and/or intense winter extreme weather events in association with the loss of Arctic sea ice,



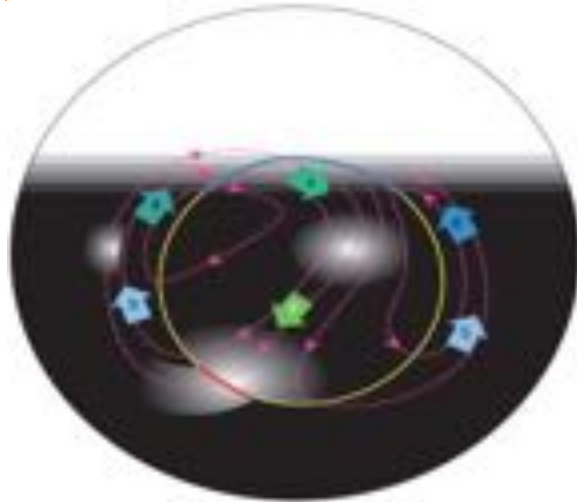
Wu Bingyi, et al., Monthly Weather Review, 2013.

- 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.

3. China's scientific efforts to understand Arctic



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



Direct Observations of the Evolution of Polar Cap Ionization Patches
Qing-He Zhang et al.
Science 339, 1597 (2013);
DOI: 10.1126/science.1231487

Direct Observations of the Evolution of Polar Cap Ionization Patches

Qing-He Zhang,^{1*} Bei-Chen Zhang,¹ Michael Lockwood,² Hong-Qiao Hu,¹ Jøran Moen,³ J. Michael Ruohoniemi,⁴ Evan G. Thomas,⁴ Shun-Rong Zhang,⁵ Hui-Gen Yang,¹ Rui-Yuan Liu,¹ Kathryn A. McWilliams,^{6,2} Joseph B. H. Baker⁴

Published in Science, 29 March 2013

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

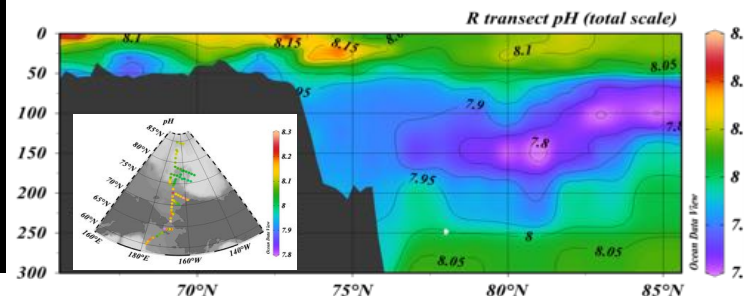
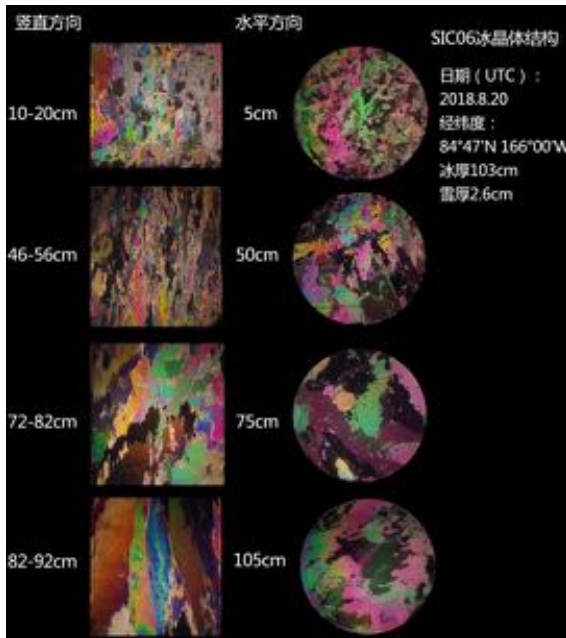
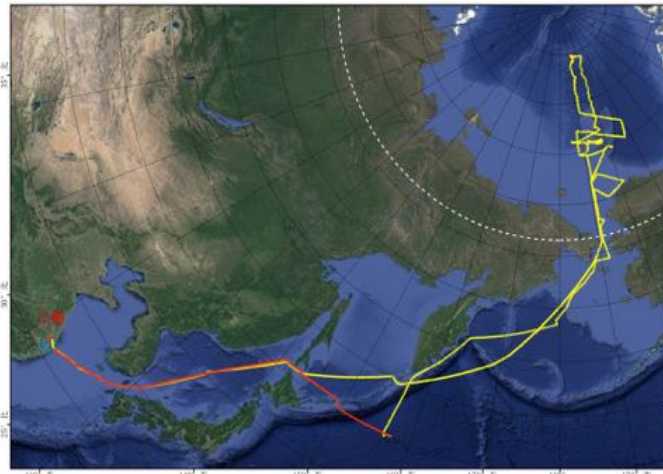
3. China's scientific efforts to understand Arctic



● Scientific research programs in Ny-Alesund, 2018 summer season

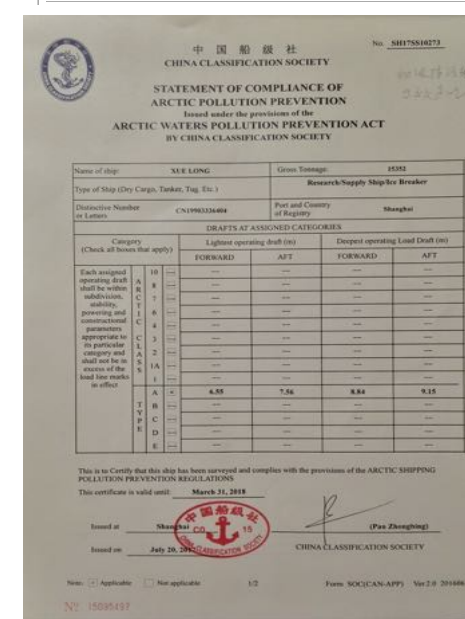
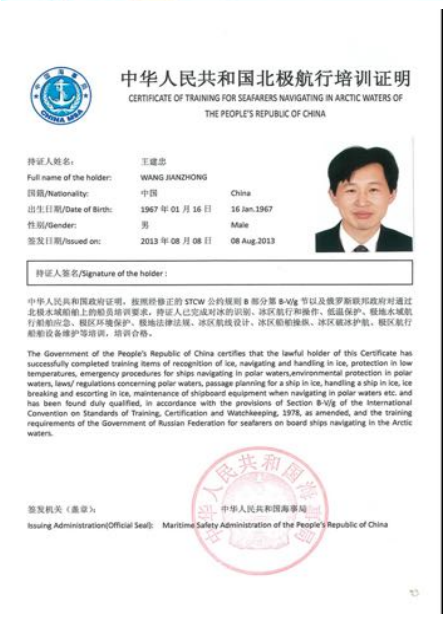
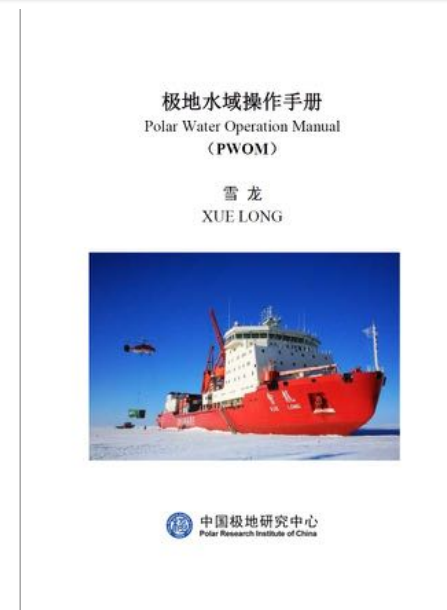
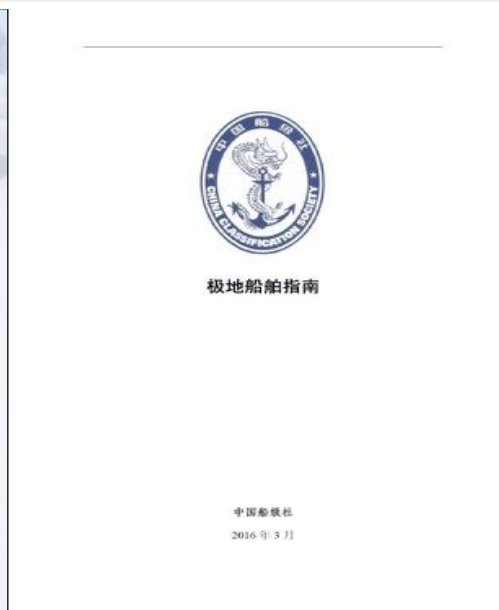
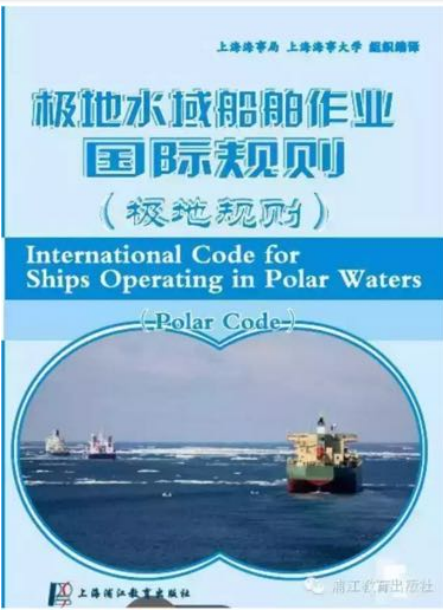
3. China's scientific efforts to understand Arctic

中国第九次北极科学考察关键时间点 (2018年7月20日—2018年9月26日)



● Scientific research programs in Chinese 9th Arctic Expedition, 2018 summer

4. Polar Code and the new research vessel XUELONG 2



4. Polar Code and the new research vessel XUELONG 2

Overall Parameters



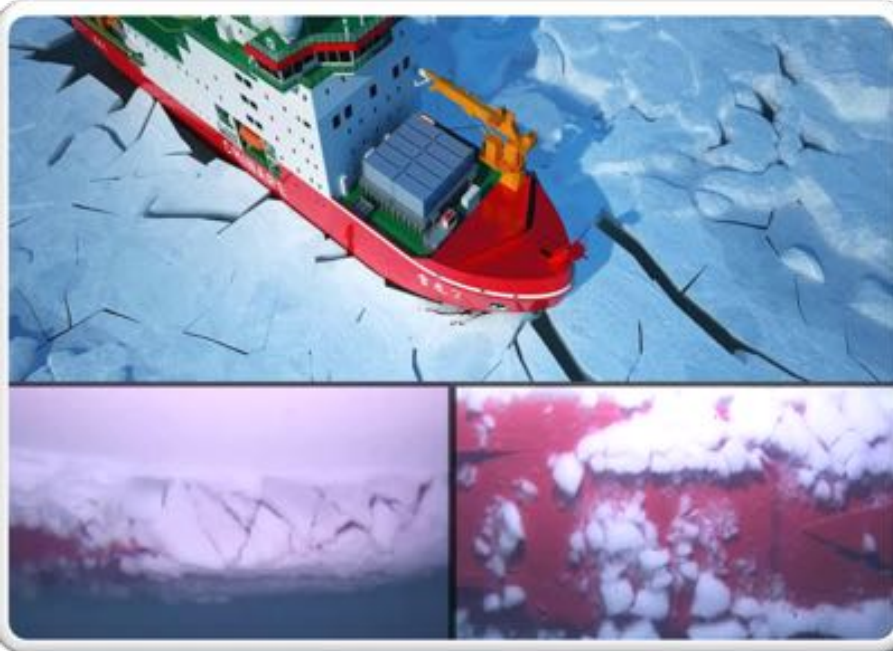
Main dimensions

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

4. Polar Code and the new research vessel XUELONG 2

Ice-breaking Properties

Ahead performance



- 2-3knots 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.

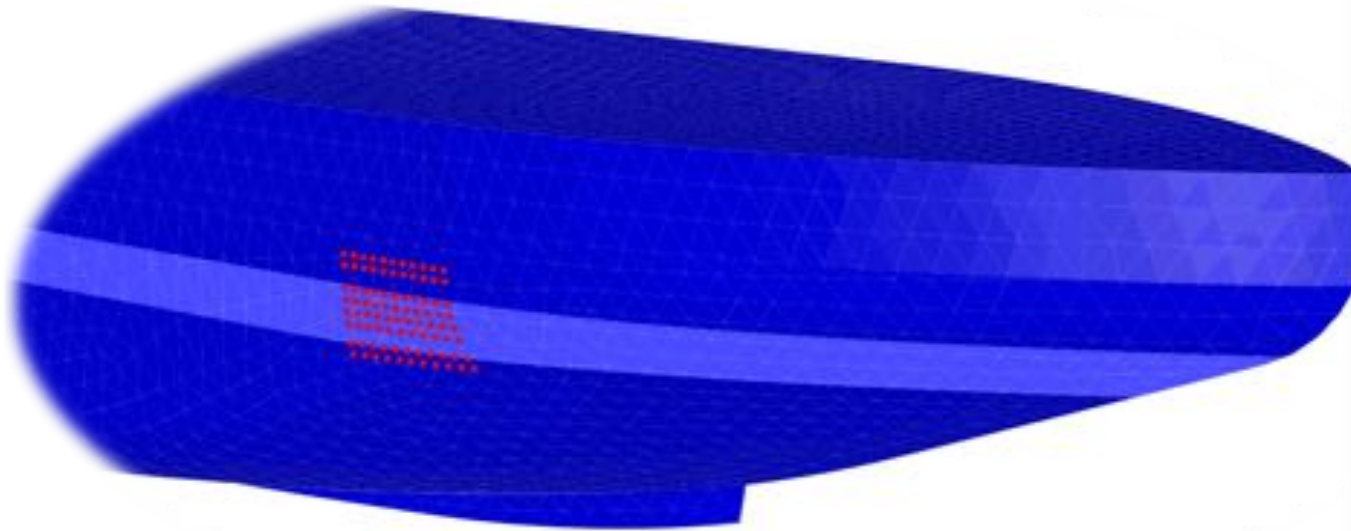
Astern performance



- 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.

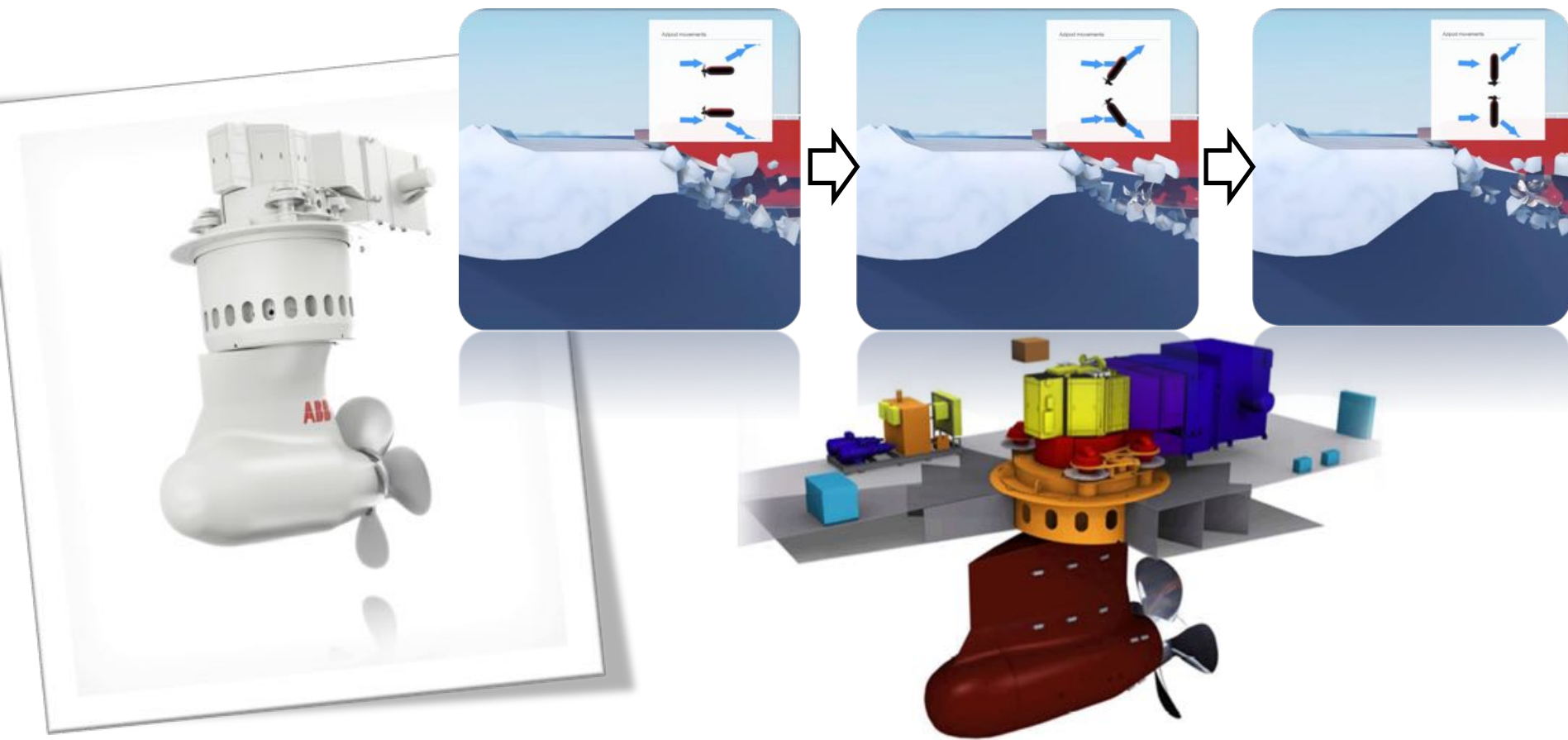
-Effectively manage the relevant data of the hull structure.

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

Rated power	
Engine type	580 kW/cyl
6L32	3 480
8L32	4 640
9L32	5 220
12V32	6 960
16V32	9 280

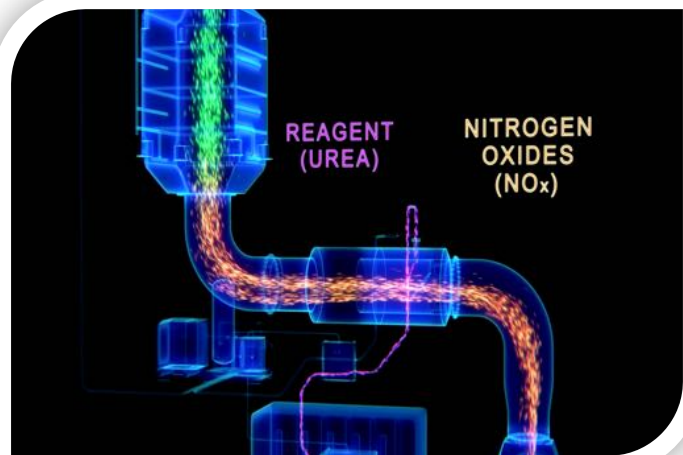
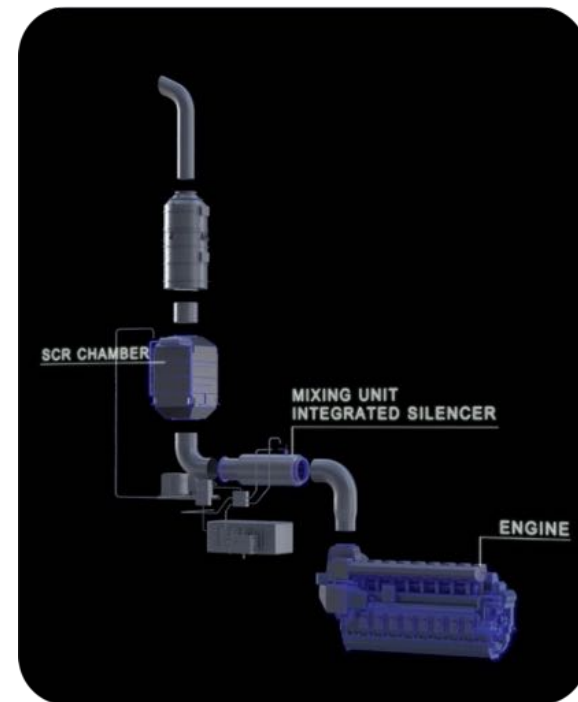
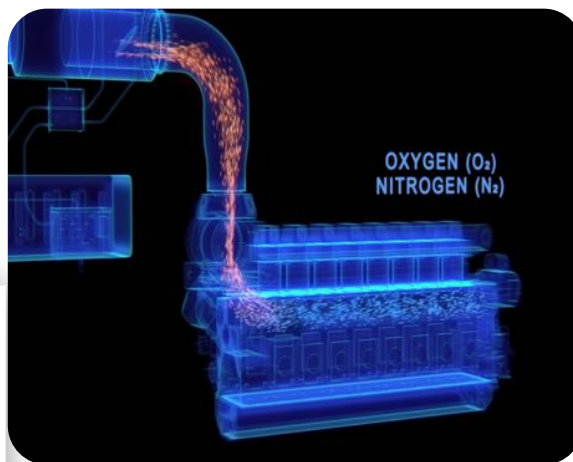
Dimensions (mm) and weights (tonnes)								
Engine type	A*	A	B*	B	C	D	F	Weight
6L32	4 980	5 260	2 560	2 490	2 305	2 345	1 155	33.3
8L32	5 960	6 245	2 360	2 295	2 305	2 345	1 155	43.4
9L32	6 450	6 730	2 360	2 295	2 305	2 345	1 155	46.8
12V32	6 935	6 615	2 715	2 665	3 020	2 120	1 475	58.7
16V32	8 060	7 735	2 480	2 430	3 020	2 120	1 475	74.1

* Turbocharger at flywheel end.



4. Polar Code and the new research vessel XUELONG 2

Environmental-friendly “Green” Vessel



SCR

4. Polar Code and the new research vessel XUELONG 2

Intelligent Engine Room



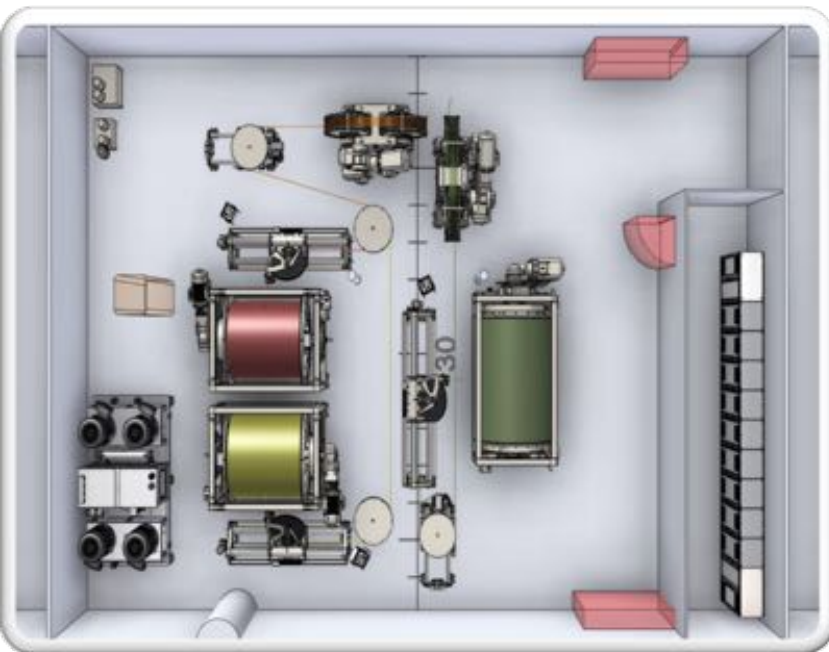
-Collect the operational data of engine room equipment.

-Effectively predict the operation of equipment and potential operating problems.

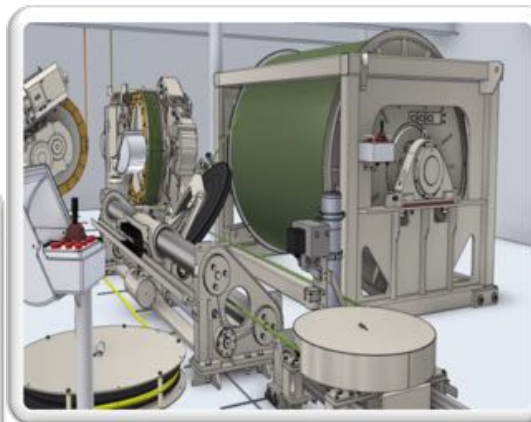
- Provides proper guidance about repairing and maintenance to equipment managers

4. Polar Code and the new research vessel XUELONG 2

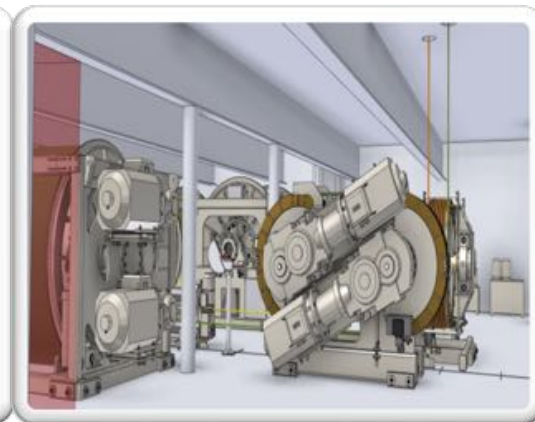
Main Science Expedition Equipment



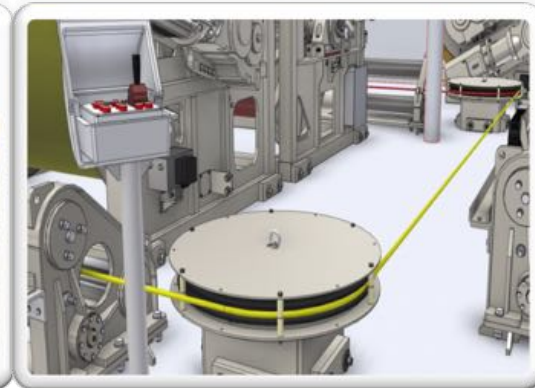
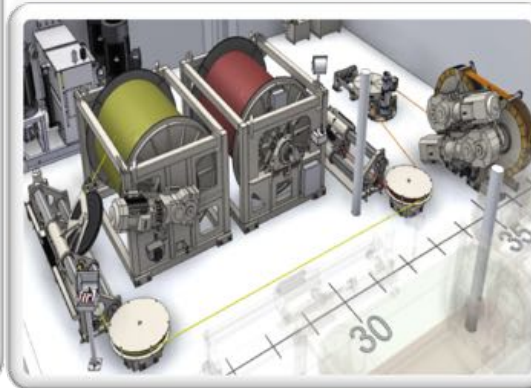
Photoelectric composite winch.



4000m Biological trawler winch.



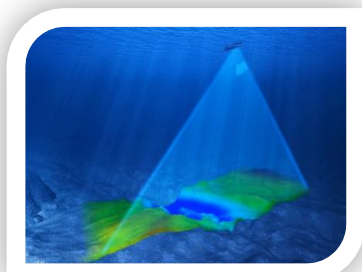
2000m Vertical trawling winch.



Auxiliary supporting frame.

4. Polar Code and the new research vessel XUELONG 2

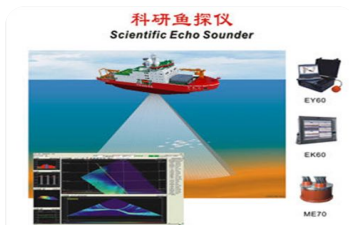
Main Science Expedition Equipment



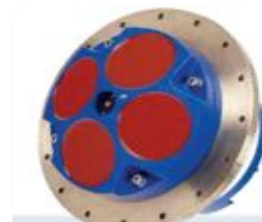
Deep water multi beam system



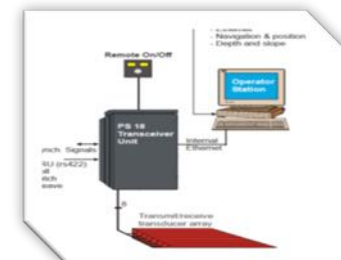
Ten thousand meter sounder



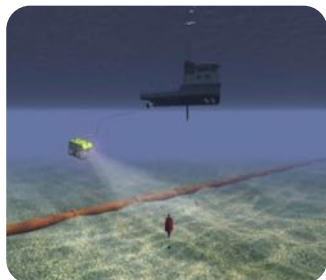
Scientific fishing instrument



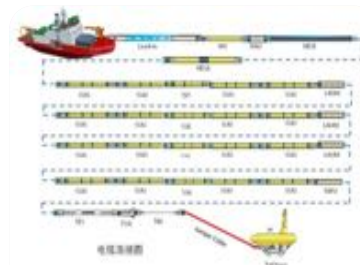
ADCP



Deep sea shallow stratigraphic profiler



Ultrashort baseline



Multichannel seismic system



CTD



OB
S



ROV



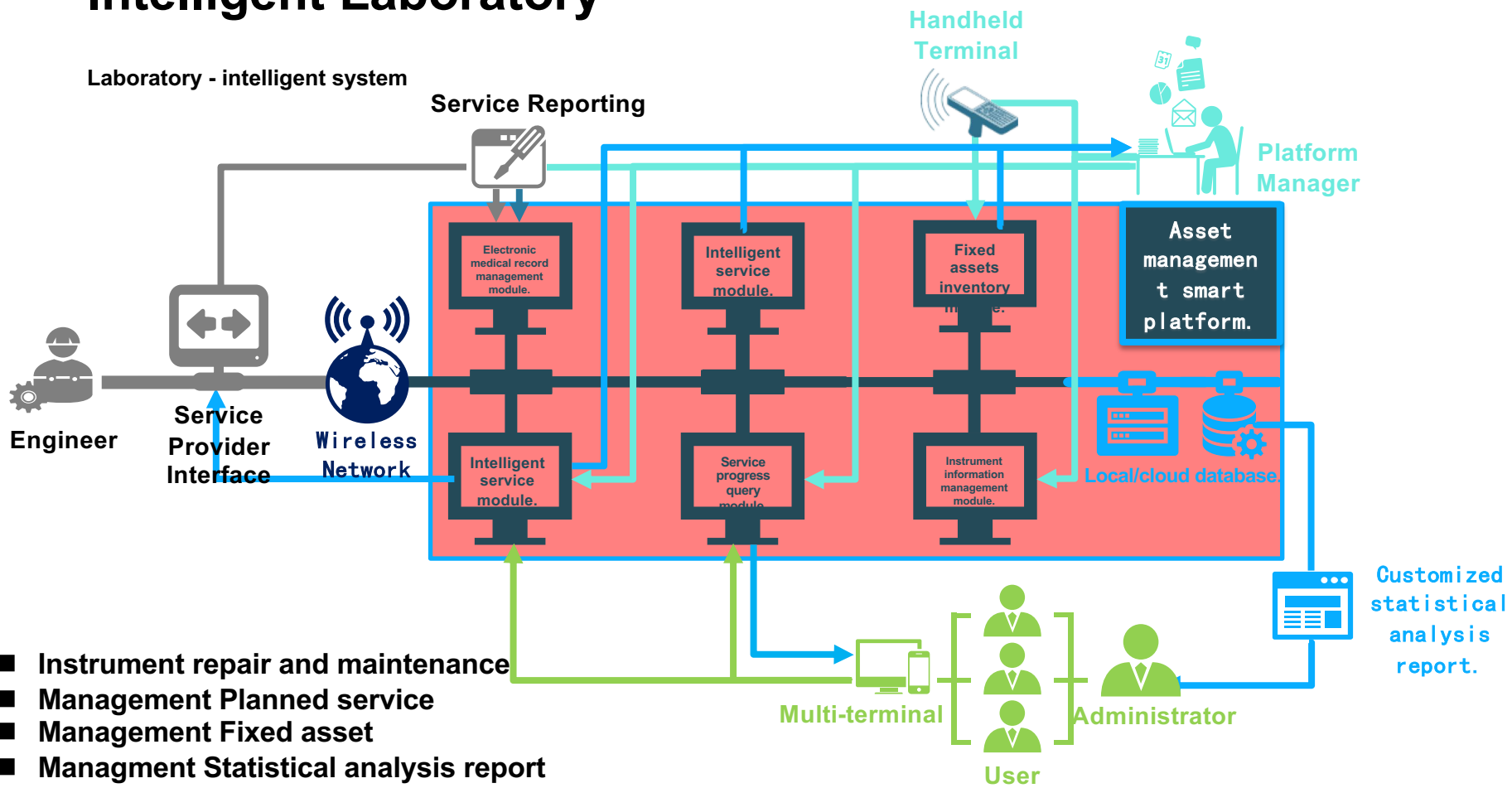
Marine gravimeter



Automatic weather station system

4. Polar Code and the new research vessel XUELONG 2

Intelligent Laboratory



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!

