Japan's new research ice-breaker for the Arctic Ocean

Takashi KIKUCHI

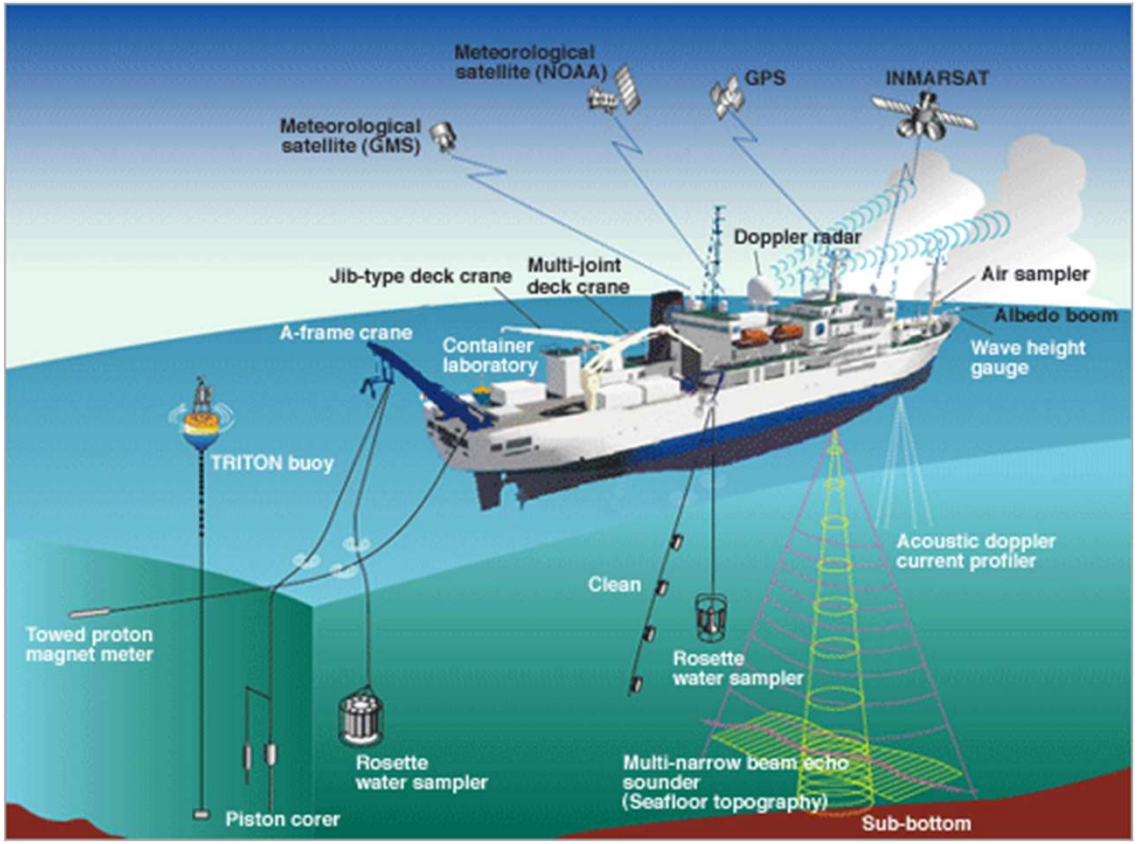
Inst. Arctic Climate and Environment Res.,
Research Inst. Global Change,
Japan Agency for Marine-Earth Science and Technology
(IACE/RIGC/JAMSTEC)



Japan's Arctic Ocean research activities

Research Vessel Mirai (R/V Mirai)

R/V MIRAI is one of the highest performance research vessel to be able to measure the whole of the world ocean, including the Arctic Ocean. In collaboration with national & international research institutions & universities, JAMSTEC have been conducting R/V Mirai Cruise in the Pacific sector of the Arctic Ocean since 1998.





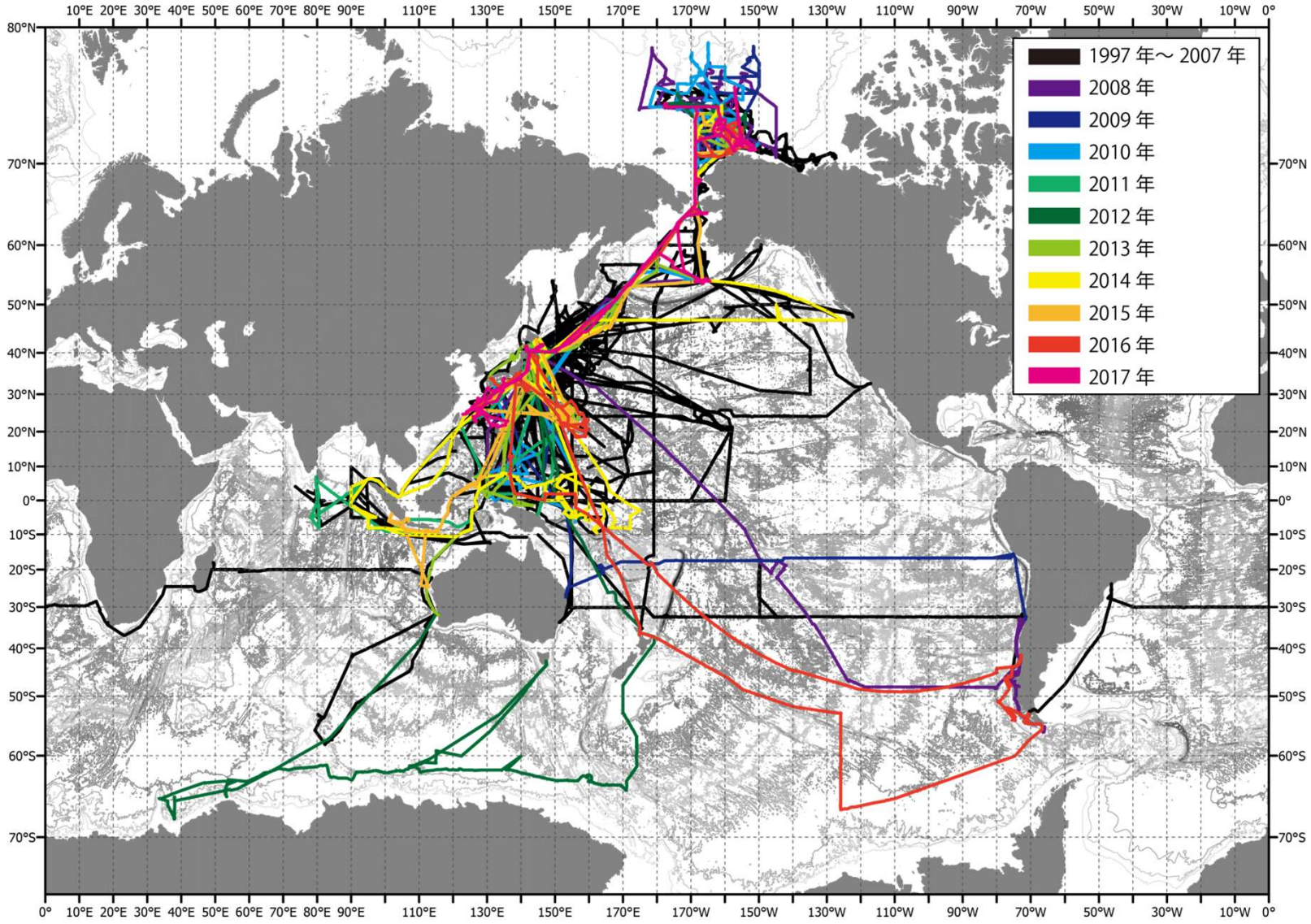
R/V Mirai in the Arctic Ocean

Principal specifications

Length	128.5 m
Beam	19.0 m
Depth	10.5 m
Draft	6.9 m
Gross tonnage	8,706 tons
Cruising speed	Approx. 16 knots
Range	Approx. 12,000 nautical miles
Accommodation	80 (34 crew, 46 research personnel)
Main propulsion system	Diesel engines: 1,838kW × 4
	Electric propulsion systems: 700kW × 2
Main propulsion method	Controllable pitch propeller × 2

Japan's Arctic Ocean research activities

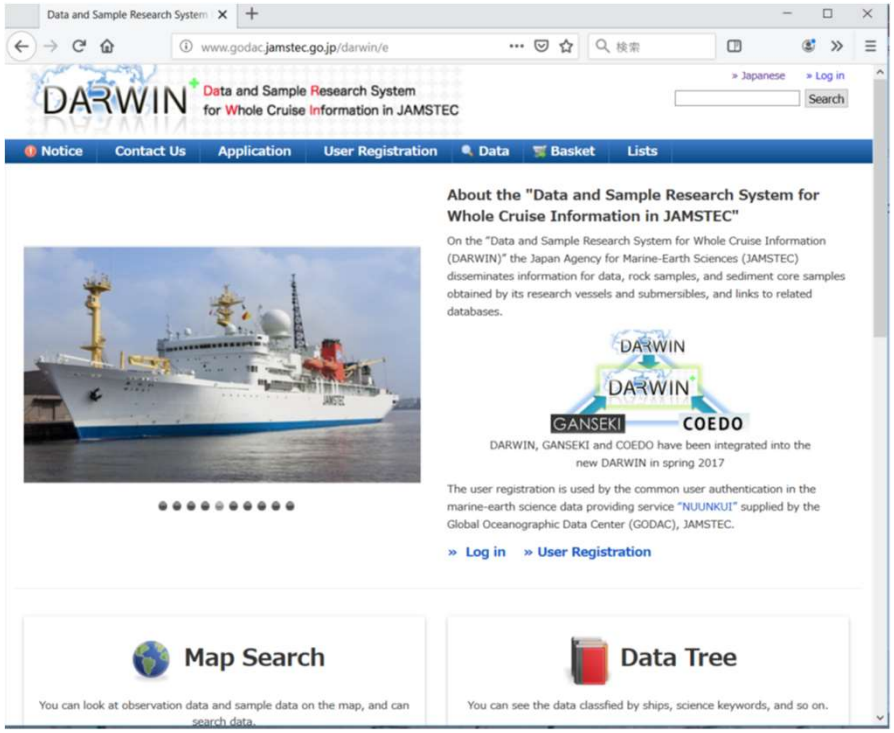
Cruise track of R/V Mirai between 1997 and 2017



Japan's Arctic Ocean research activities

Arctic Ocean Observation Research by R/V Mirai since 1998

- R/V Mirai Arctic Ocean has been working in **sea-ice reduction area** of the Pacific sector of the Arctic Ocean. We have observed consequences of sea ice reduction due to global warming and published many articles, which show ocean warming, freshening, acidification, enhanced ocean mixing/eddy activities and their impacts to marine ecosystem and so on. In other words, we found scientific evidences of "Pacification" in that area.
- Note that the observation data collected by R/V Mirai Arctic Ocean cruise are available from JAMSTEC data website, "DARWIN (http://www.godac.jamstec.go.jp/darwin/e)".



We published lots of new findings and knowledges using the data obtained by R/V Mirai. But her working area are limited in ice-free area because she is not an icebreaker.



Tracks of R/V Mirai Arctic cruises in 1998-2019

http://www.godac.jamstec.go.jp/darwin/e

Japan's first research icebreaker for Arctic Science

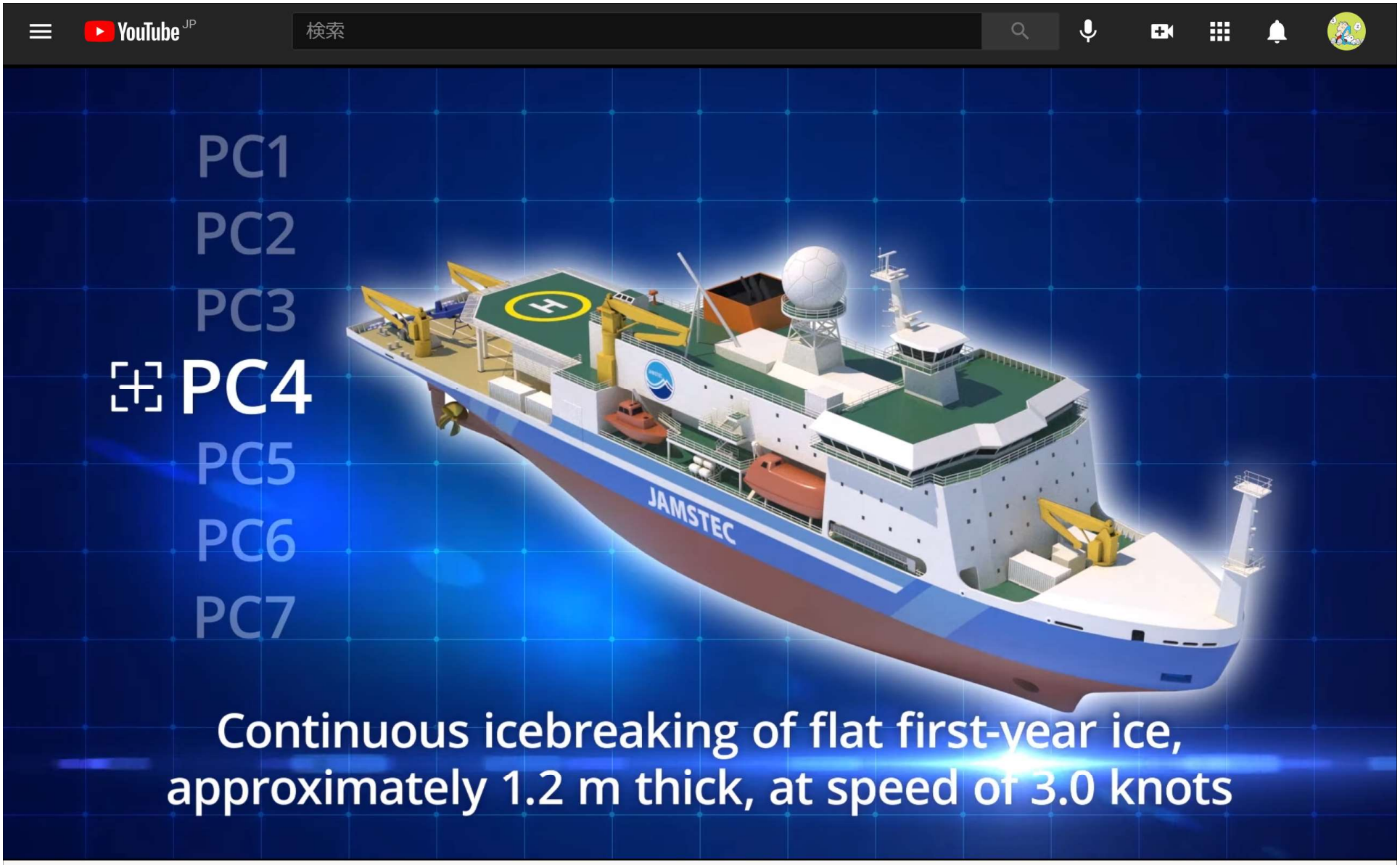
Recent changes of background related to (Japan's) Arctic research

- Rapid changes on Arctic environment and the impact to society were recognized as not only Arctic local but also global issues.
- Japan was granted observer status at the Arctic Council, in 2013.
- Japan's Arctic Policy was presented in October 2015. And then, it was the first time that "to promote Japan's Arctic Policy" was included as one of the main measures in the Third Basic Plan on Ocean Policy which was adopted in May 2018.

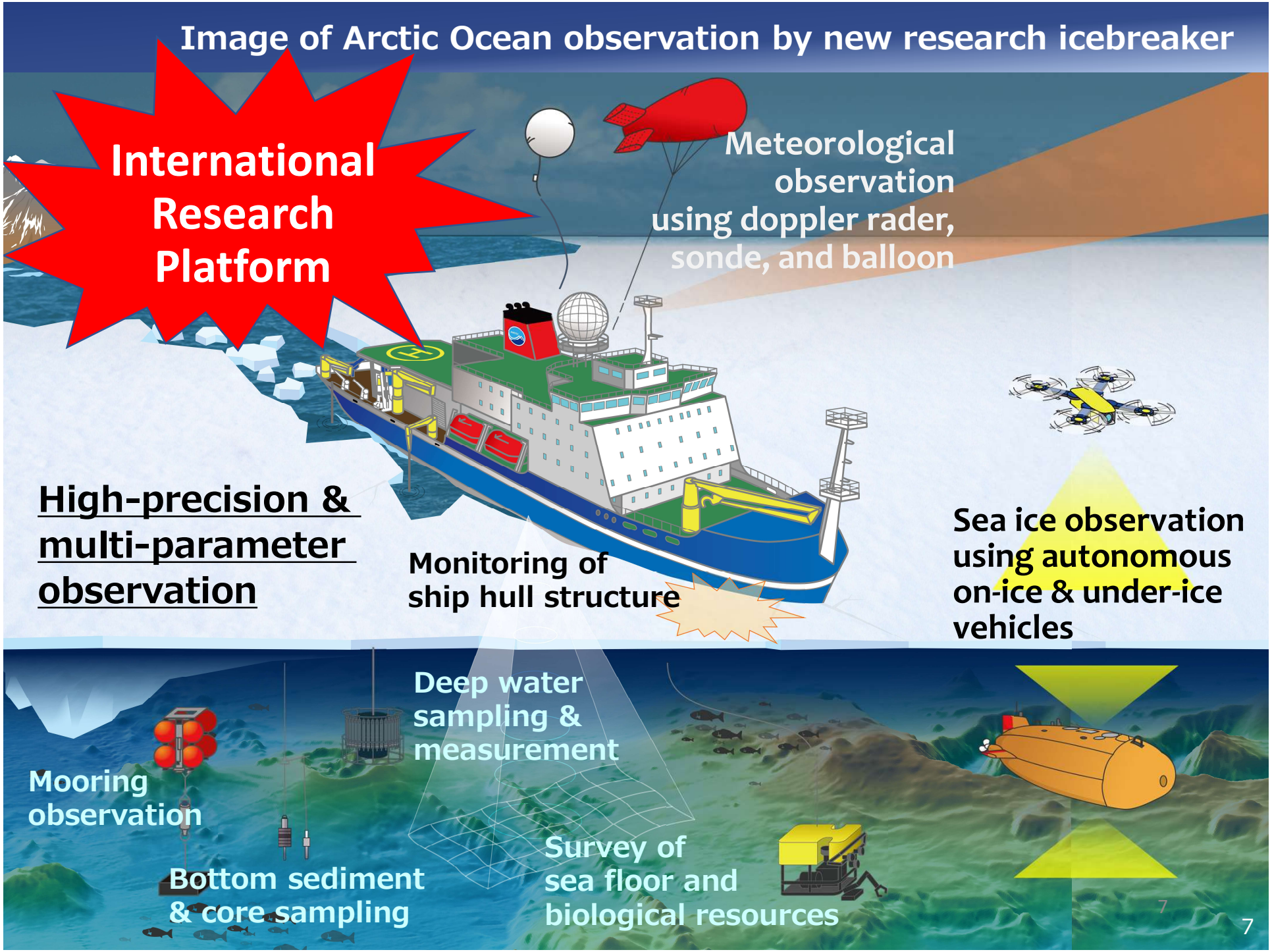
  "… study the construction of the Arctic research vessel with the capacity of ice breaker. …" (after "Outline of the Third Basic Plan on Ocean Policy ")

JFY2021: Start Construction of new research icebreaker

→ JFY2026: Scheduled to be available for ocean observation



Youtube jamstecchannel (https://www.youtube.com/watch?v=DcH_UA4cf8k)


Image of Arctic Ocean observation by new research icebreaker
International Research Platform
Meteorological observation using doppler rader, sonde, and balloon
High-precision & multi-parameter observation
Monitoring of ship hull structure
Sea ice observation using autonomous on-ice & under-ice vehicles
Deep water sampling & measurement
Mooring observation
Bottom sediment & core sampling
Survey of sea floor and biological resources

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Thank you very much for your attention.

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