PAG 2020 spring meeting

# CHINARE 11 plan
## — Xuelong 2 Arctic cruise

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Polar Research Institute of China

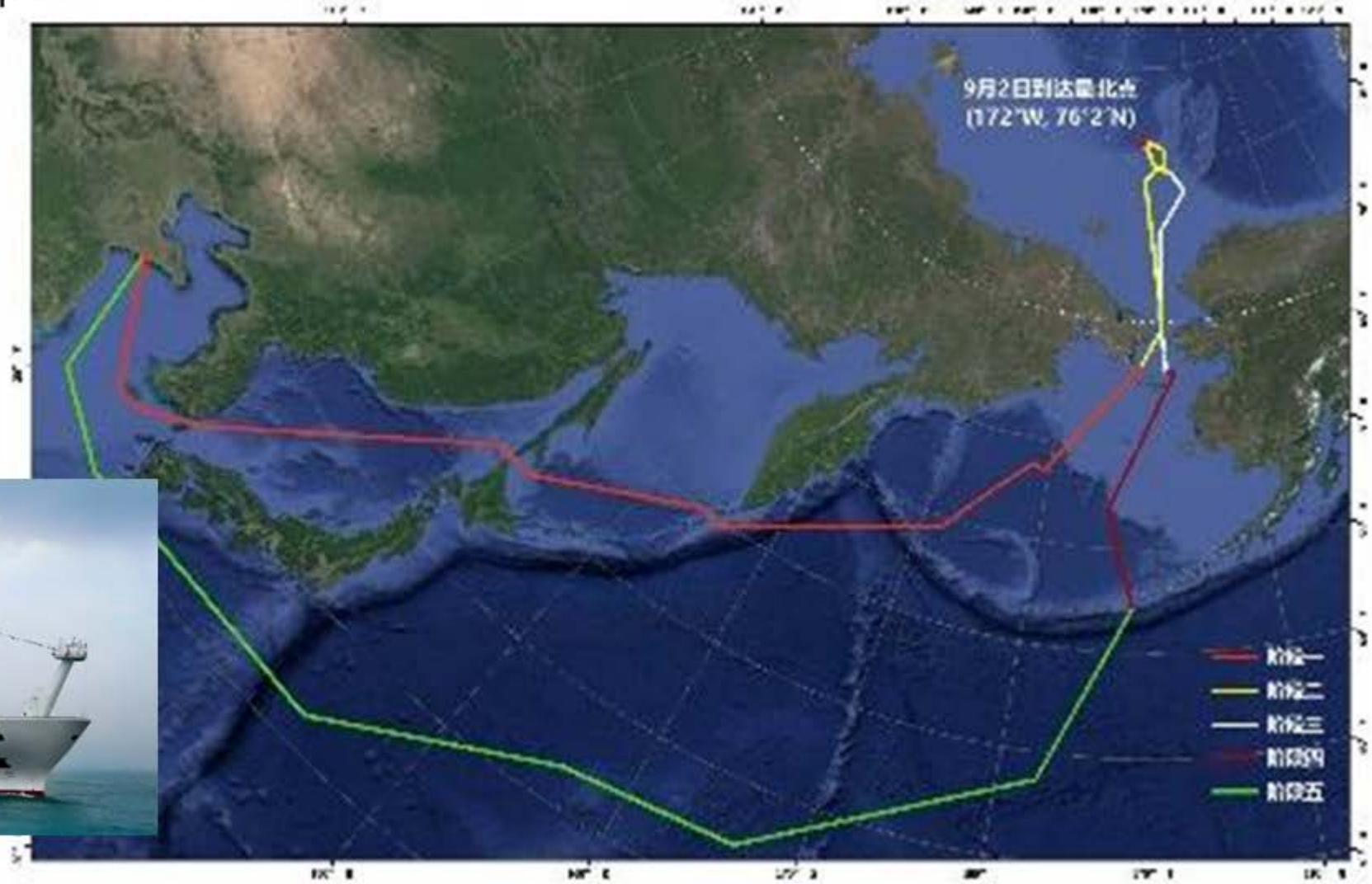
March 30, 2020

# CHINARE 10 in 2019

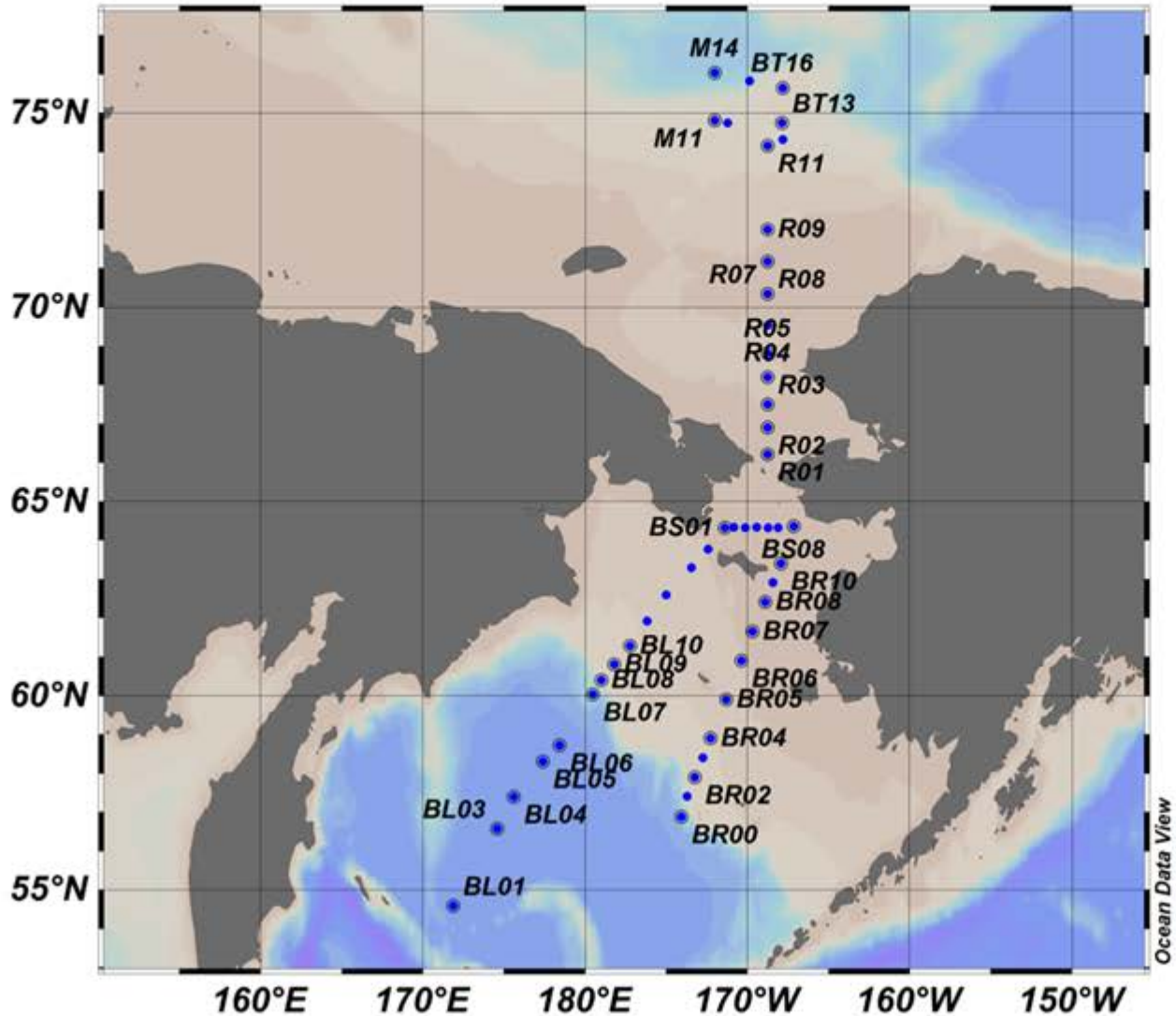
# 1. CHINARE 10

✓13 Institutes 44 Scientists+ 34 Crews

✓Aug.10~Sept.27 2019



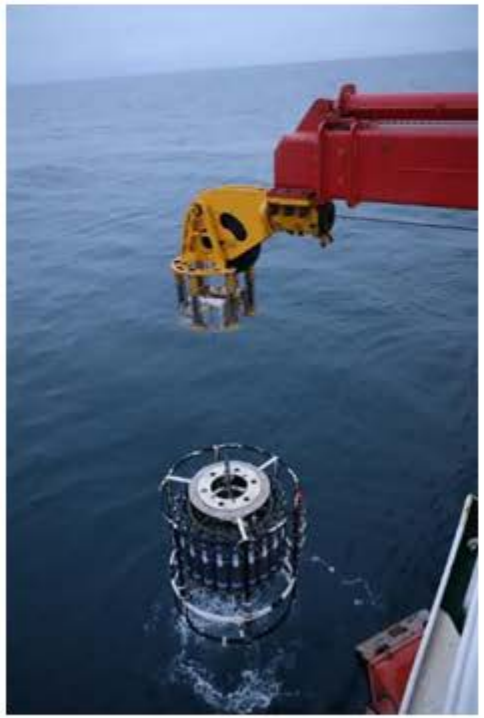
# 2. Stations

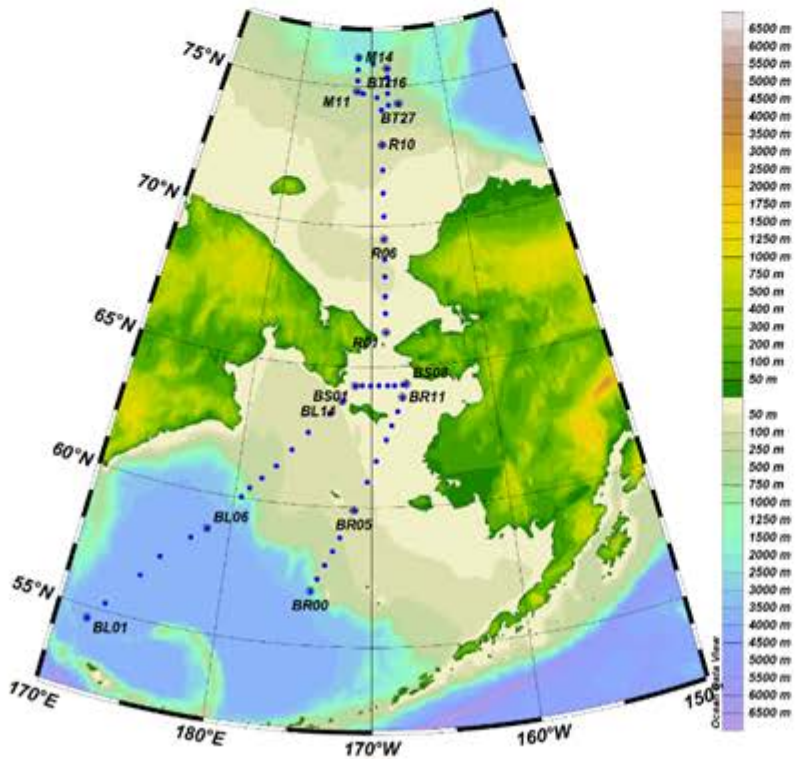


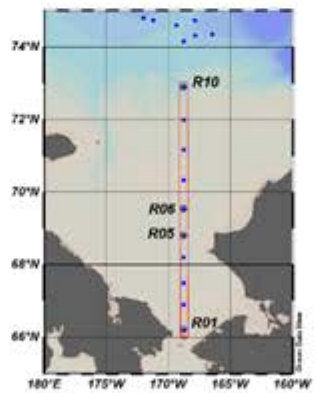

✓58 CTD stations

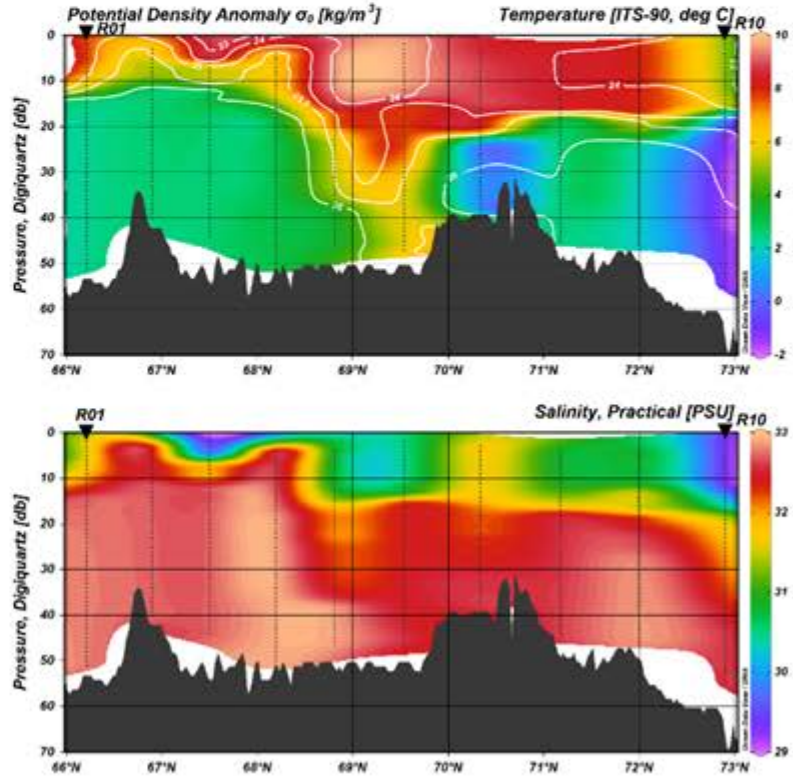
# 5. Physical Oceanography

(1) CTD/LADCP/SVP： 6 Transects, 58 Stations。





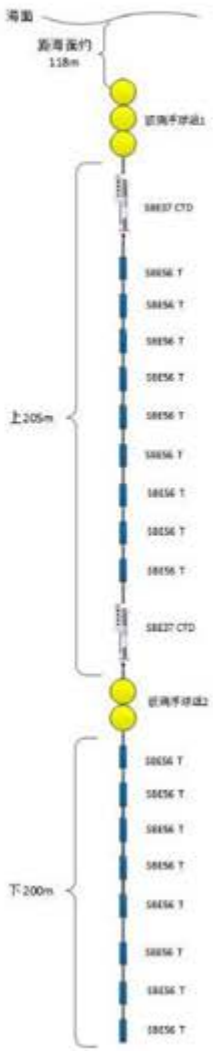



# 5. Physical Oceanography

## (2) Mooring systems

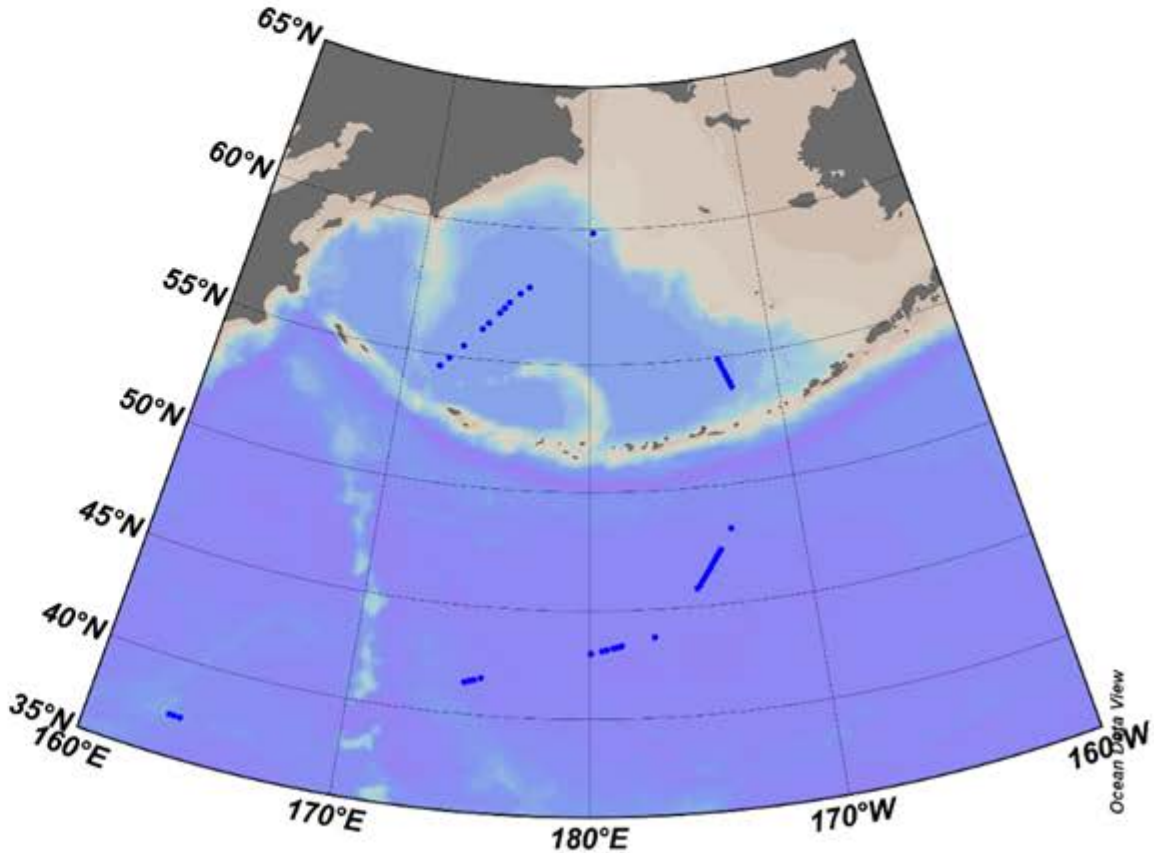
Chukchi Sea： 1 set

Bering Sea: 1 set



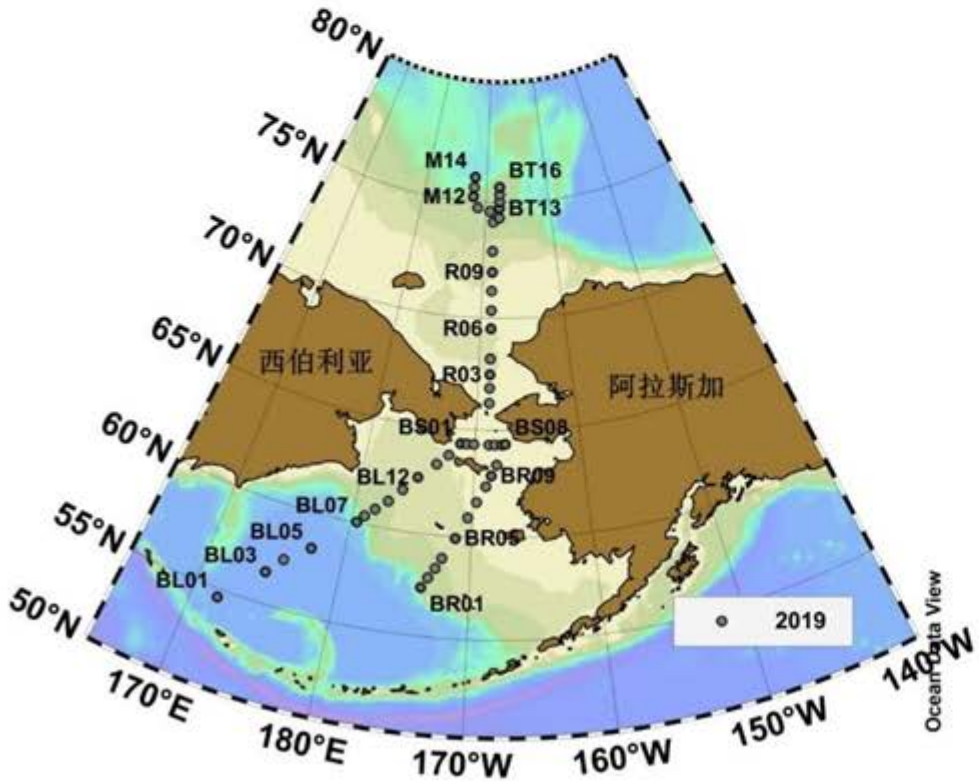
# 5. Physical Oceanography

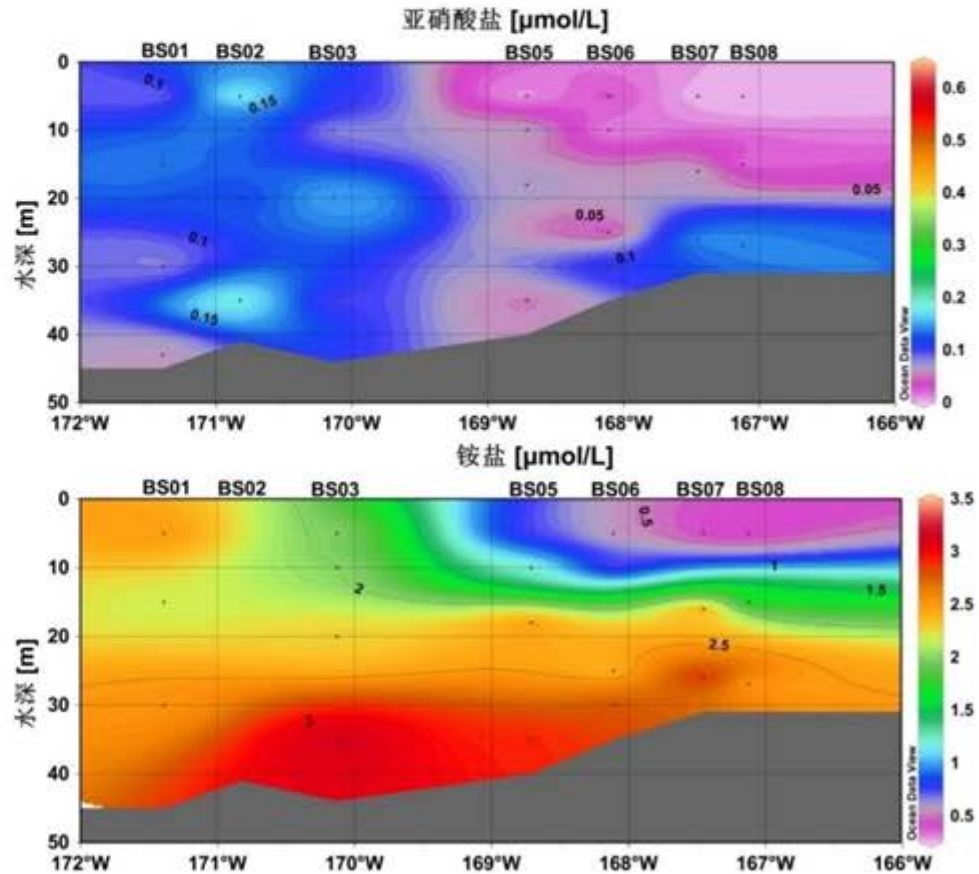
(3) XCTD 18, XBT 36, Argos 3



# 6. Chemical Oceanography

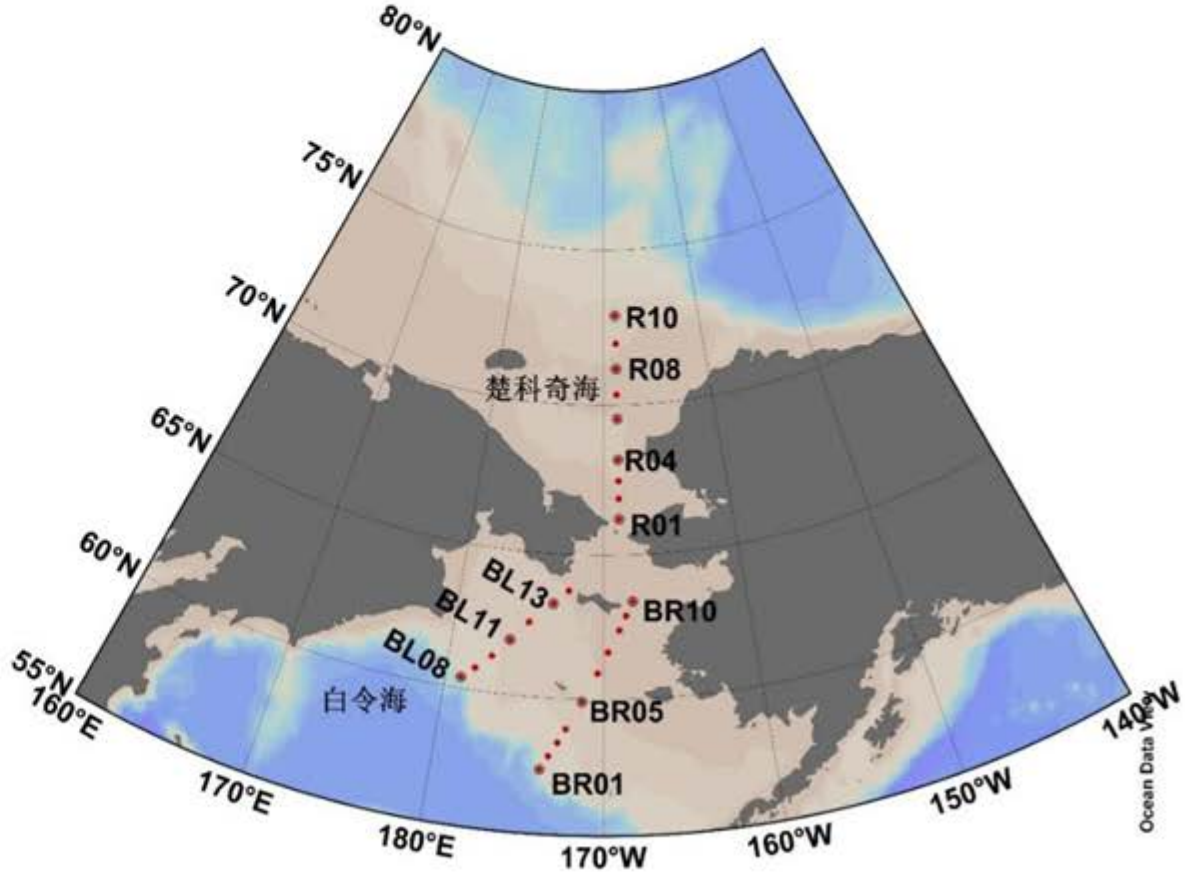
(1) Sea water sampling: 50 stations (nutrients, DIC, DOC,POC,DMS)



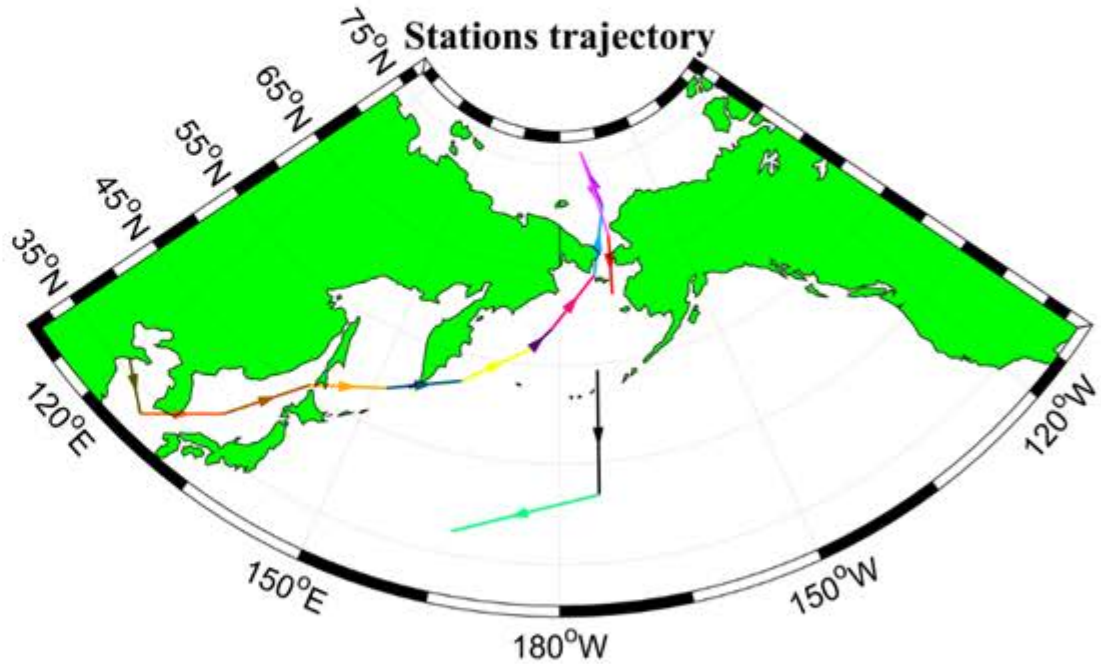
# 6. Chemical Oceanography

(2) Sediment sampling: 27 stations



# 6. Cheical Oceanography

(3) Aerosol sampling: 14



# 6. Chemical Oceanography

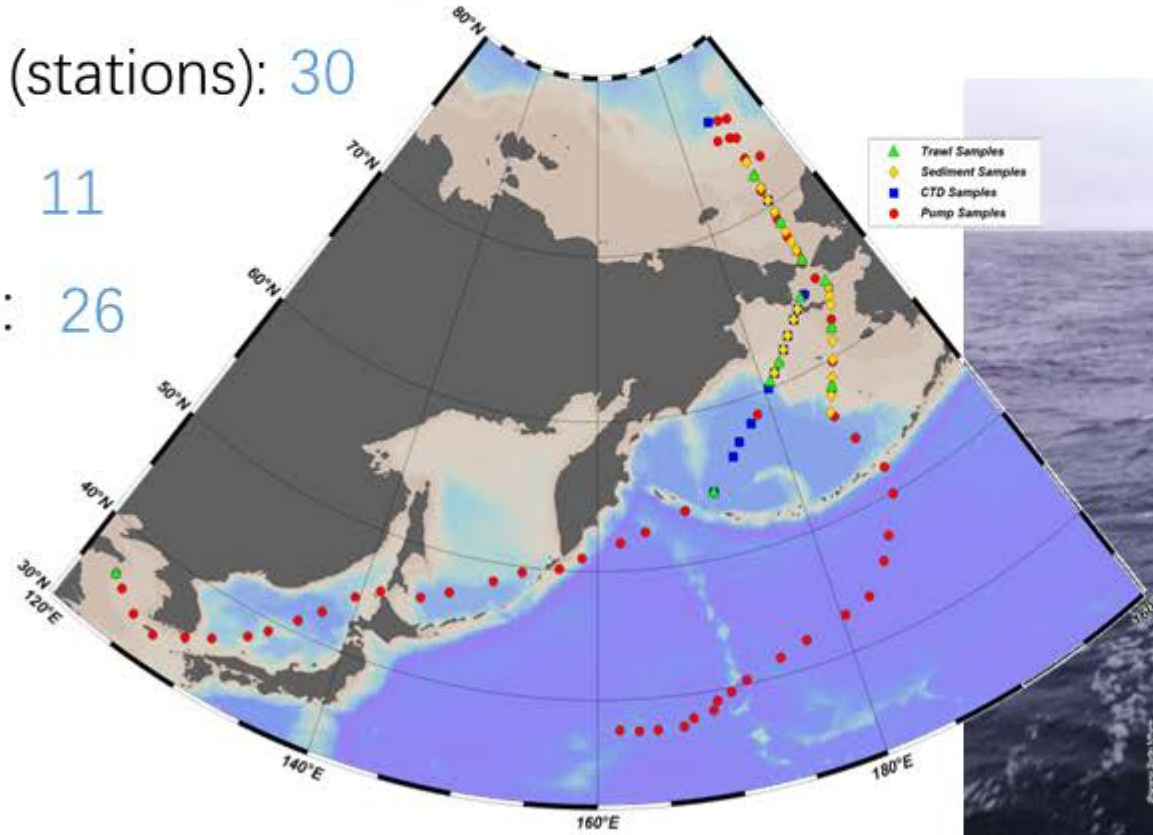
(4) Microplastic:

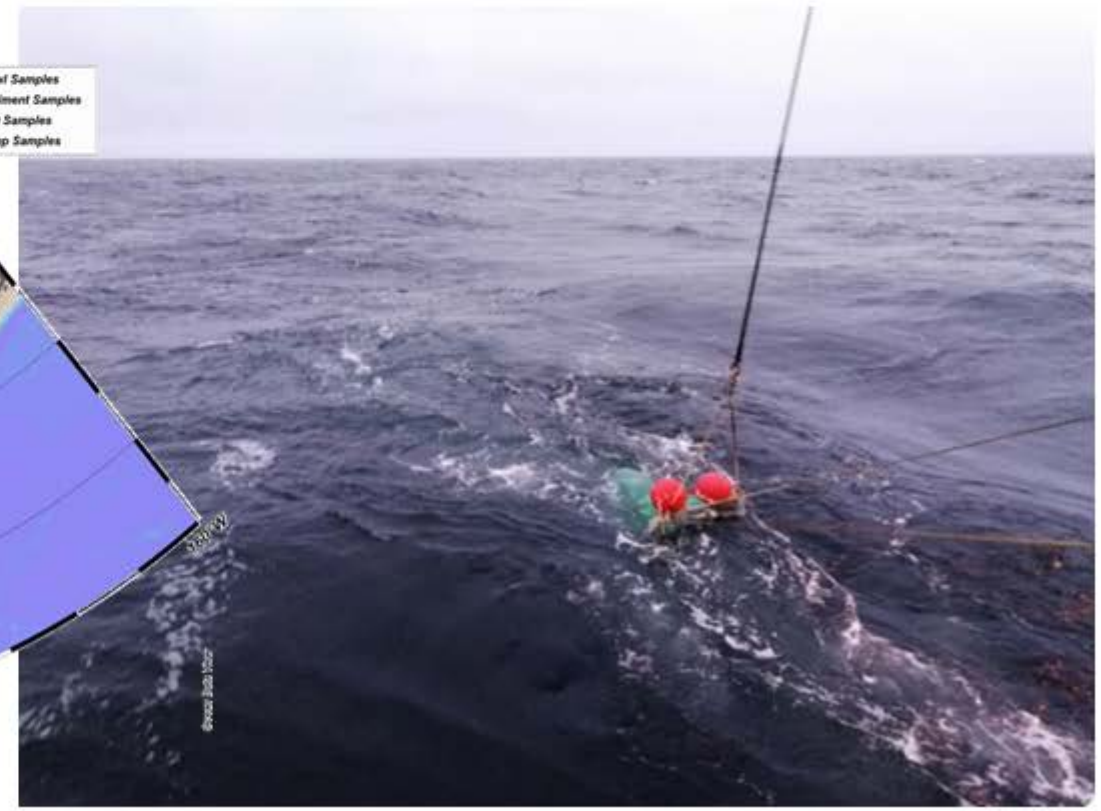
Sea water (surface) : 67

Sea water (stations): 30

Net trawl: 11

Sediment:: 26



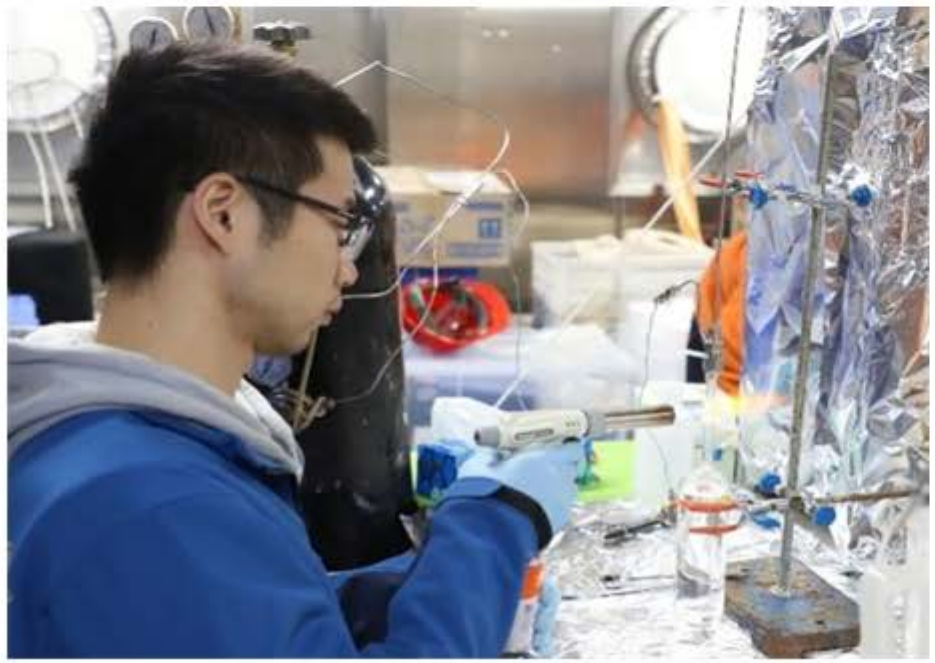
# 6. Chemical Oceanography

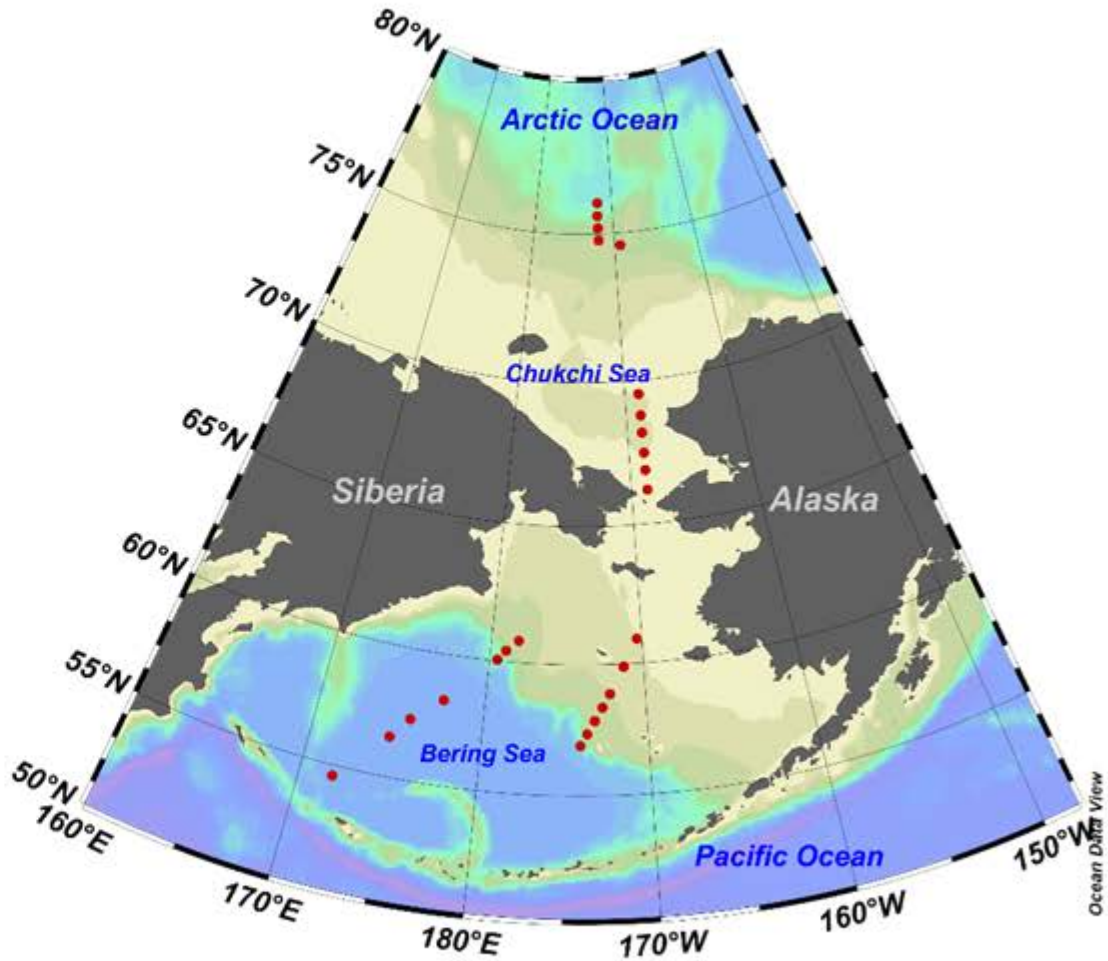
(5) Organic pollutant sampling:

POPs water samples: 13 stations

POPs sediment samples: 17 stations

CFCs/$SF_6$ water samples: 25 stations



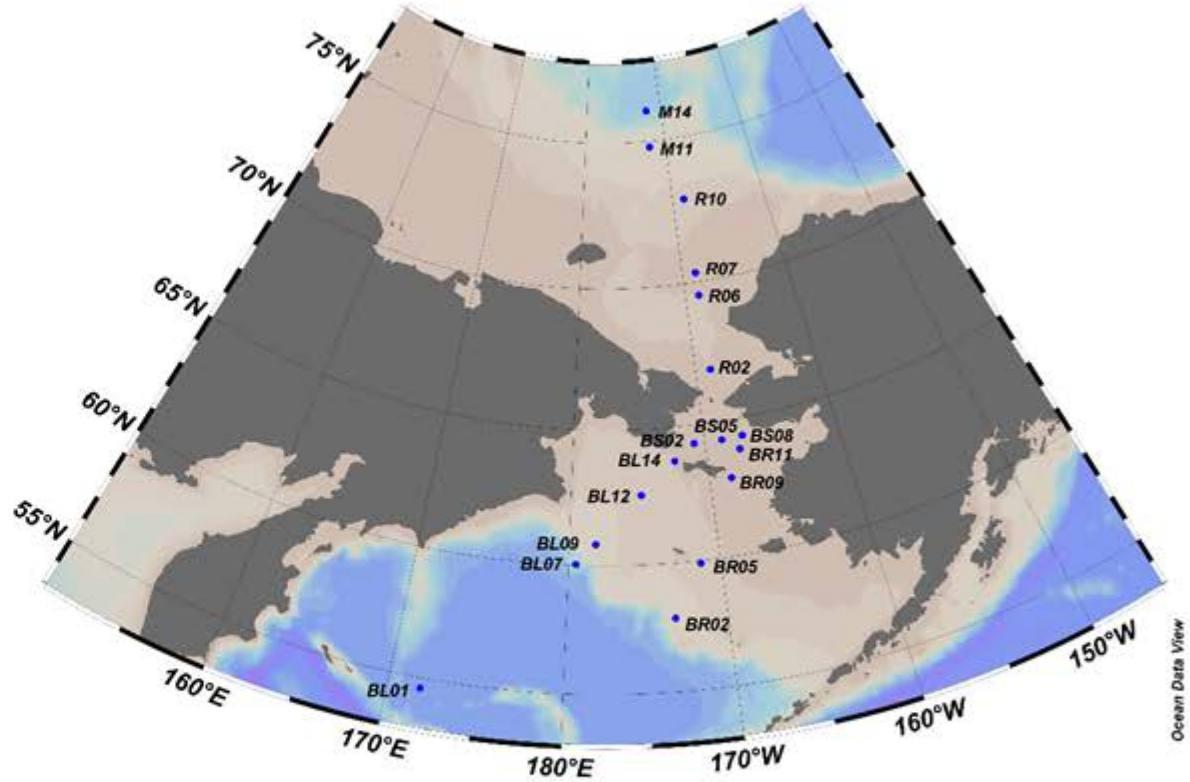


# 7. Biological Oceanography

(1) Vertical trawl:

Phytoplankton: 18

Zooplankton: 18



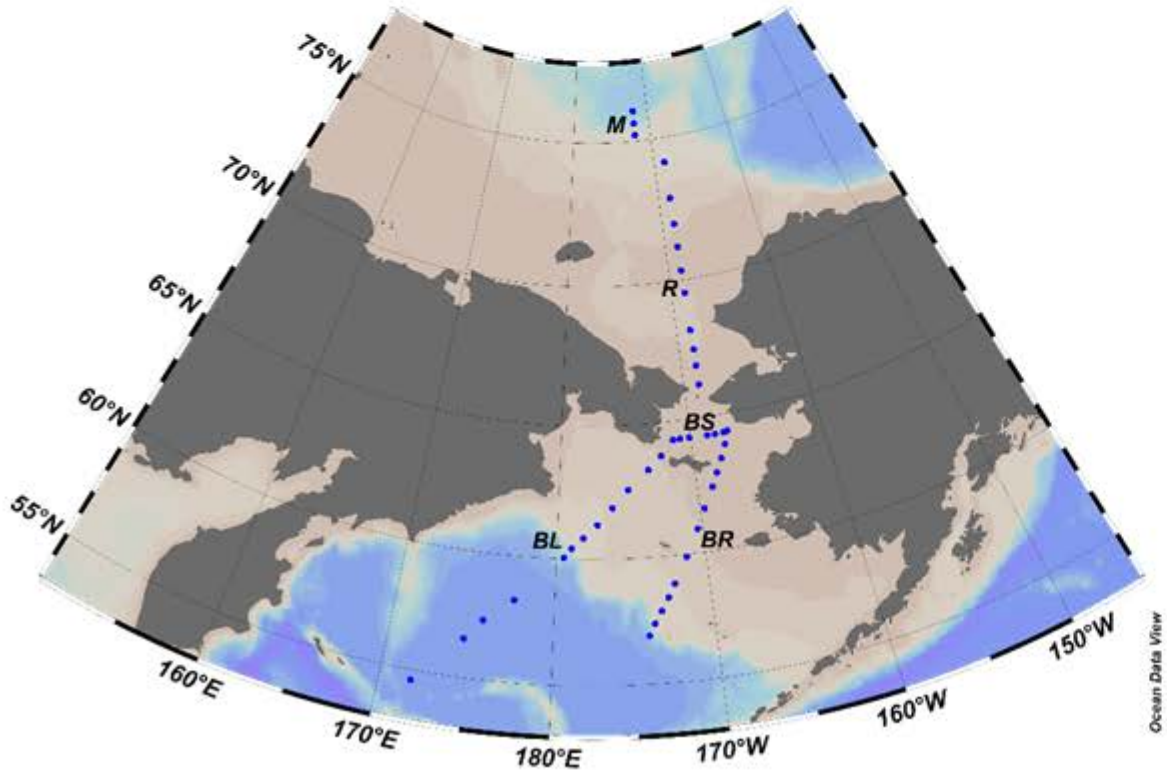
# 6. Biological Oceanography

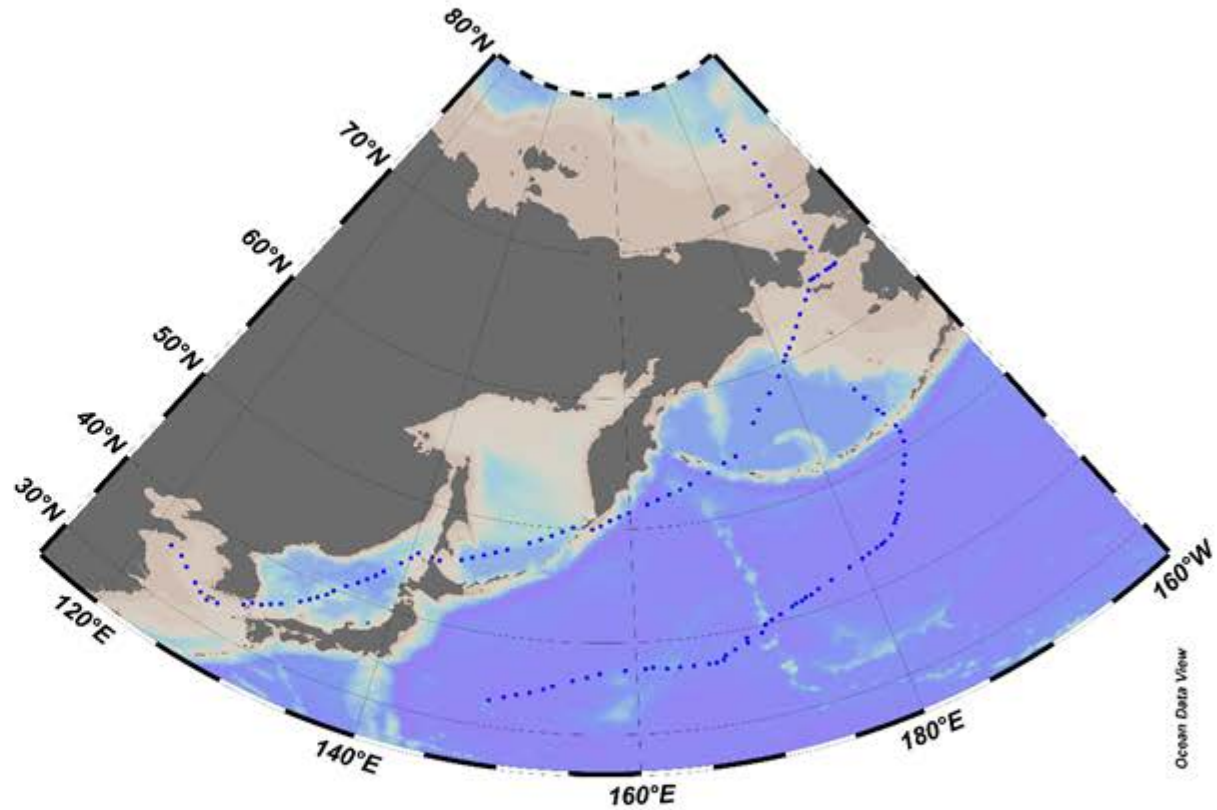
(2) Benthic sampling:

26 stations

# 7. Biological Oceanography

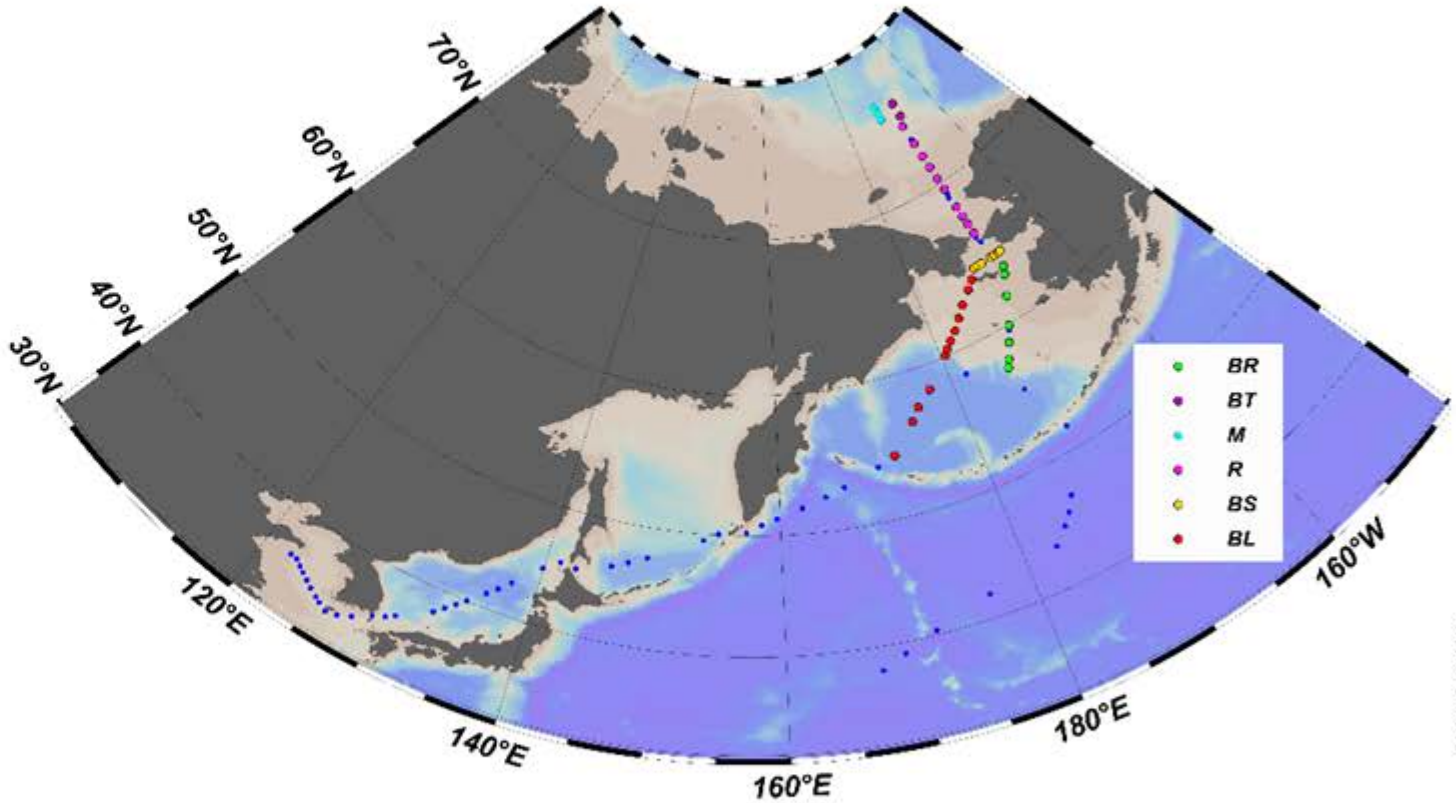
(3) Microzooplankton sampling : 44 stations



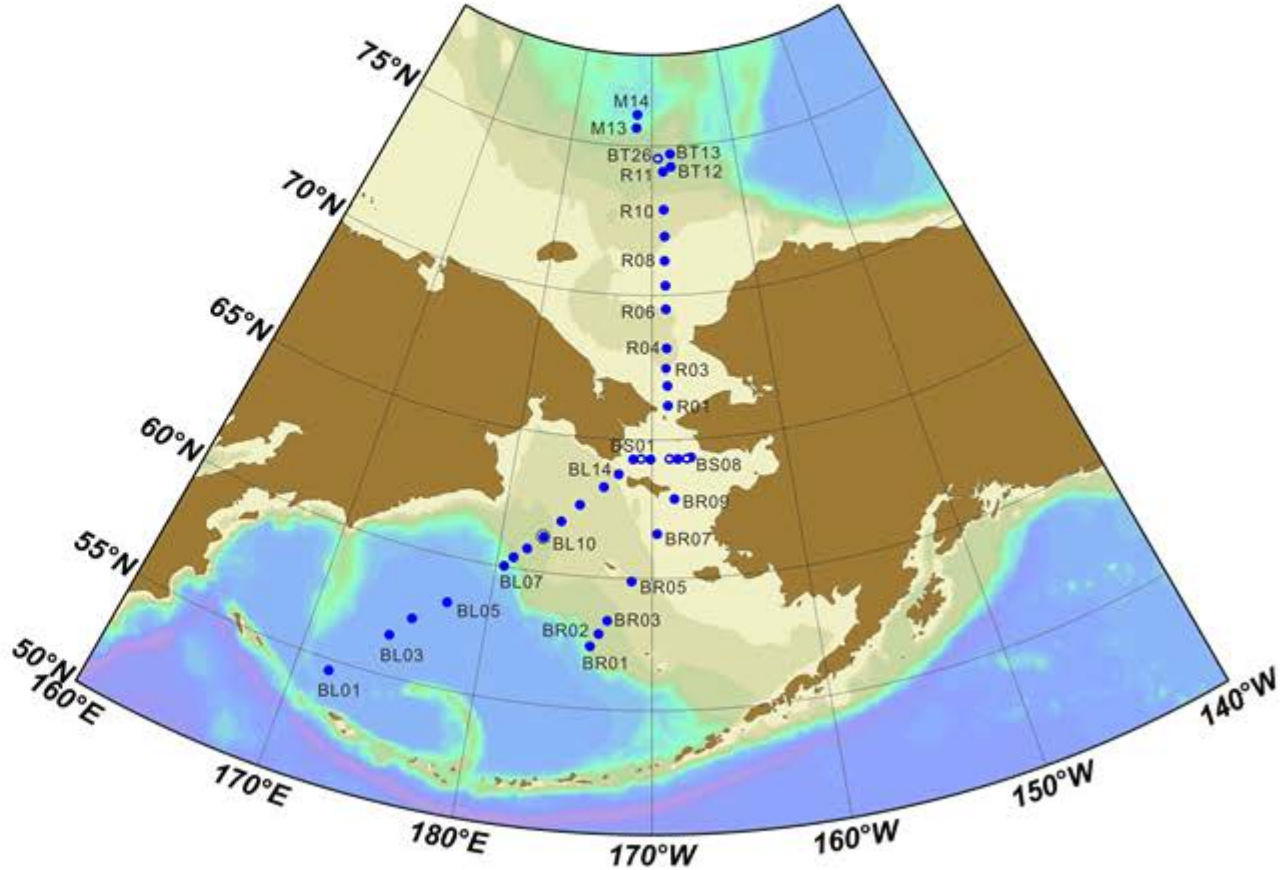
# 7. Biological Oceanography

(4) Chlorophyll： 248 samples



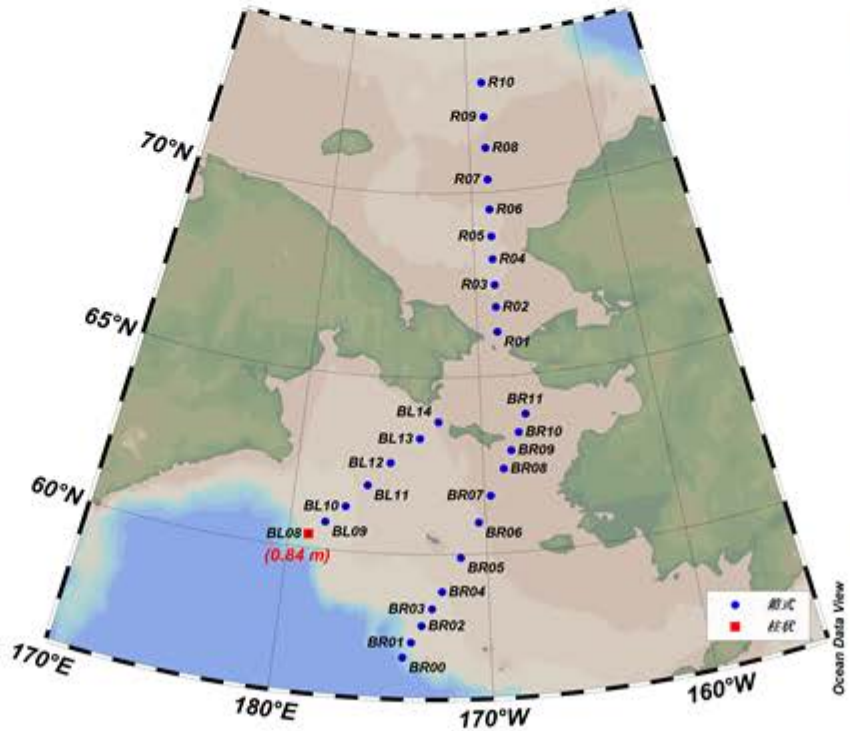
# 7. Biological Oceanography

(5) Microbial biodiversity: 40 stations



# 8. Marine geology

Sediment sampling: 29 stations




# CHINARE 11 in 2020


雪龍 2
XUE LONG 2
CHINA

# CHINARE 11 Legs:

- ✓ **Leg 1: 1st July __ 27th July**

  **Shanghai-Northeast Passage-Tromsø**

- ✓ **Leg 2: 30th July __ 21st Aug.**

  **Tromsø-ice station(MOSAiC)-Kirkenes**

- ✓ **Leg 3: 23rd Aug. __30th Sept. (opening cruise)**

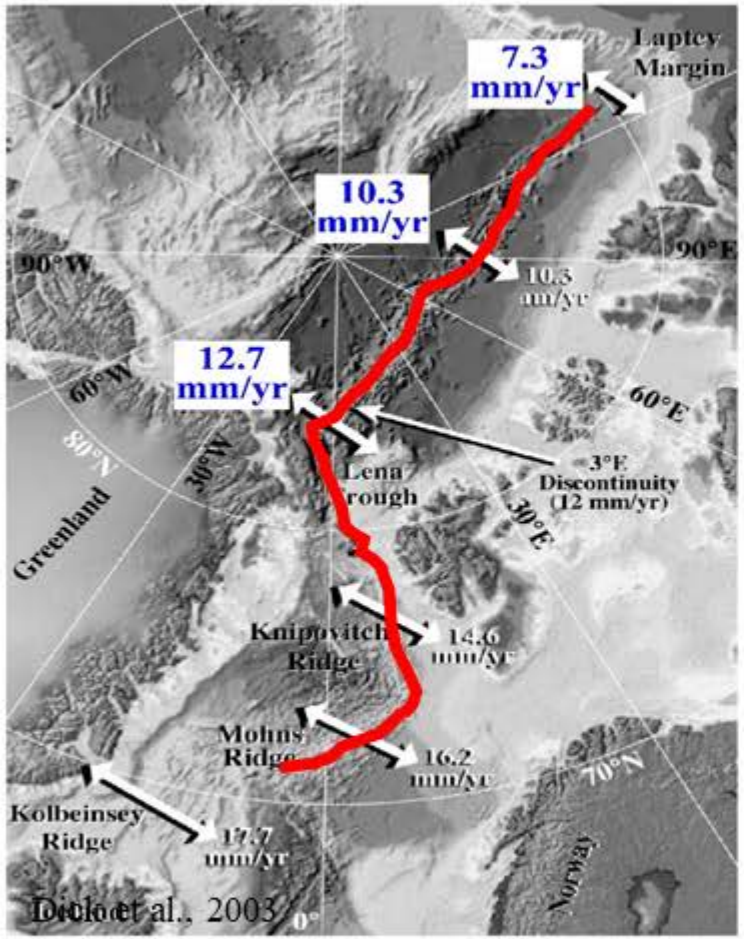
  **Kirkenes-Central AO-Shanghai**

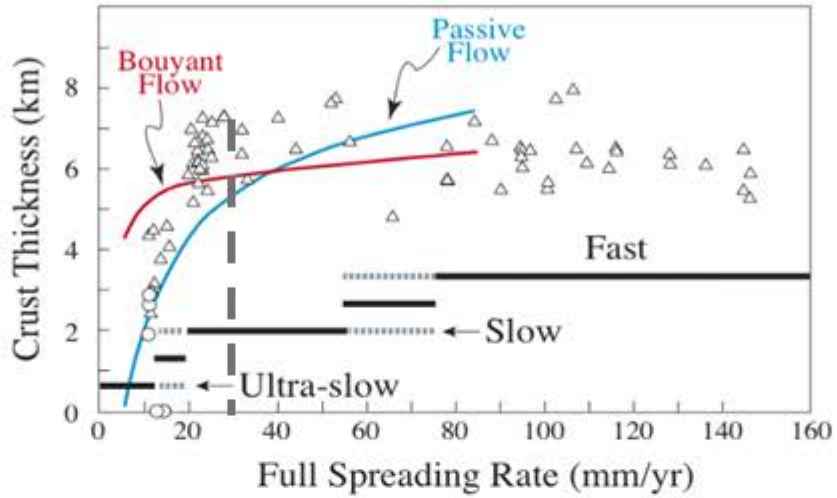
# Main tasks:

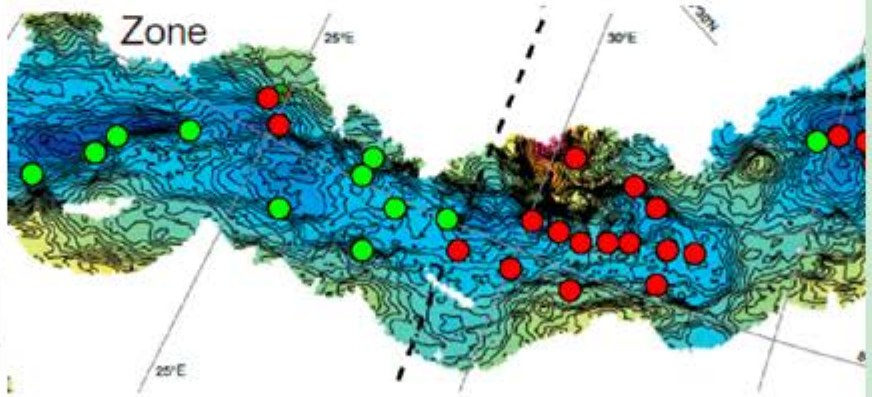
- ✓ **To support MOSAiC**
- ✓ **To Carry out Gakkel 2020 project (opening cruise)/**

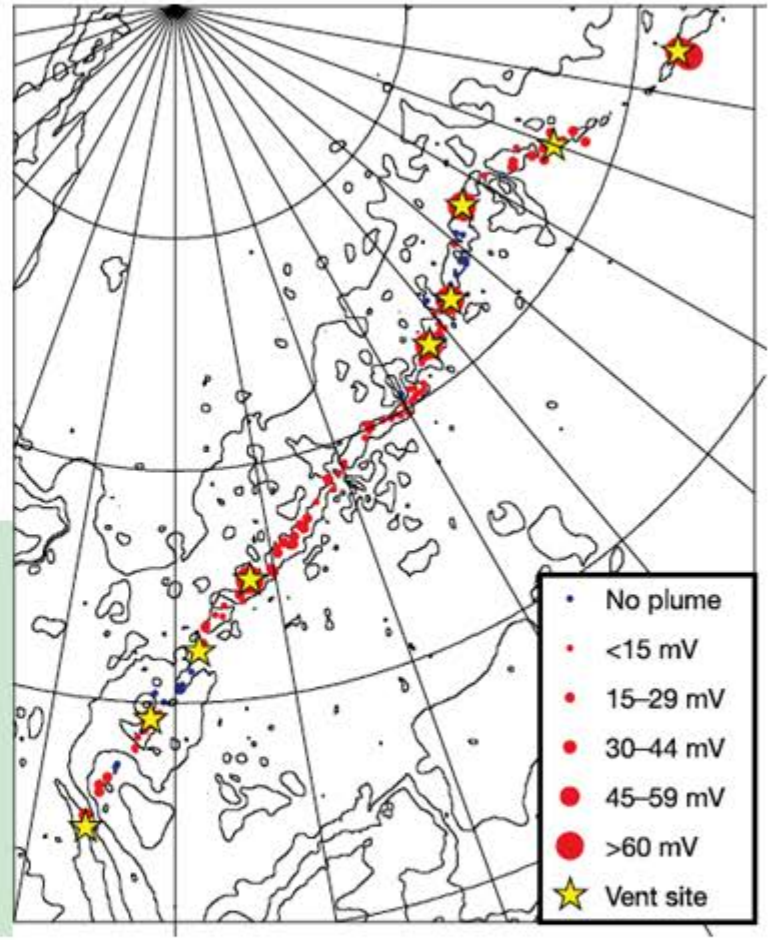
  **To support SAS**

# Gakkel Ridge: the slowest MOR



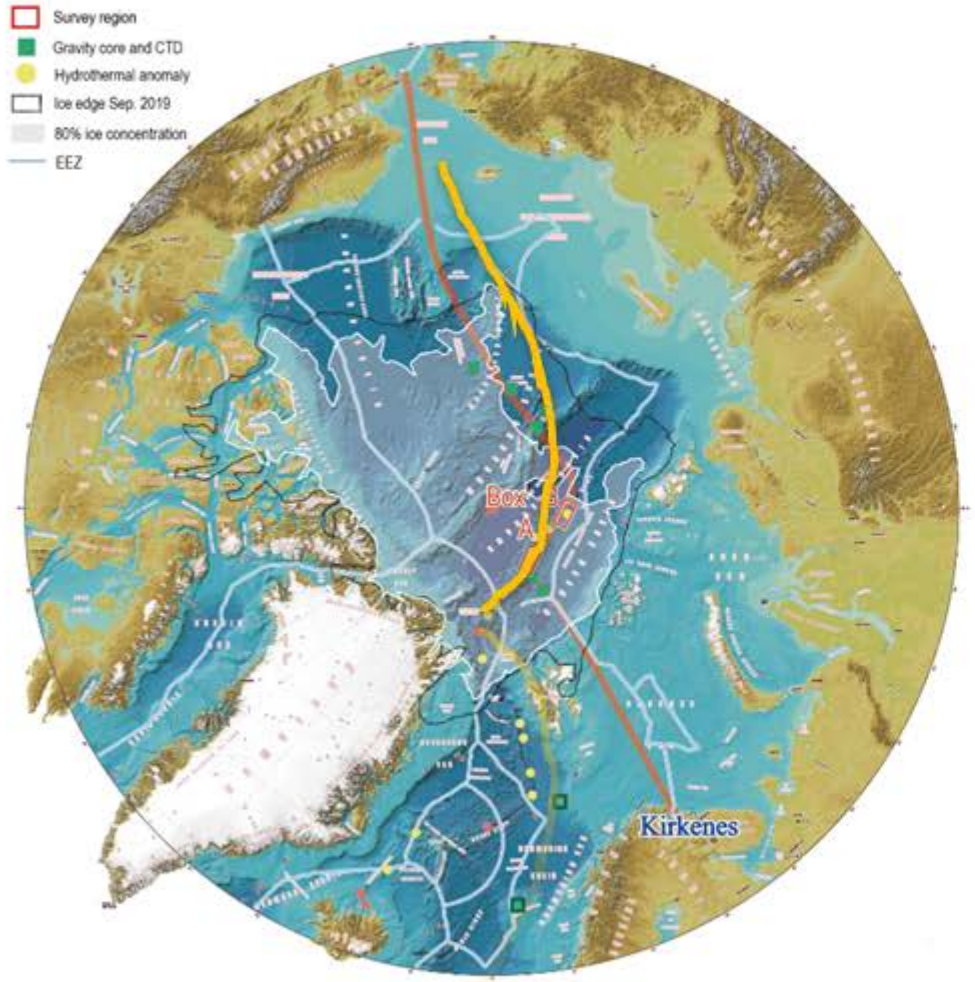



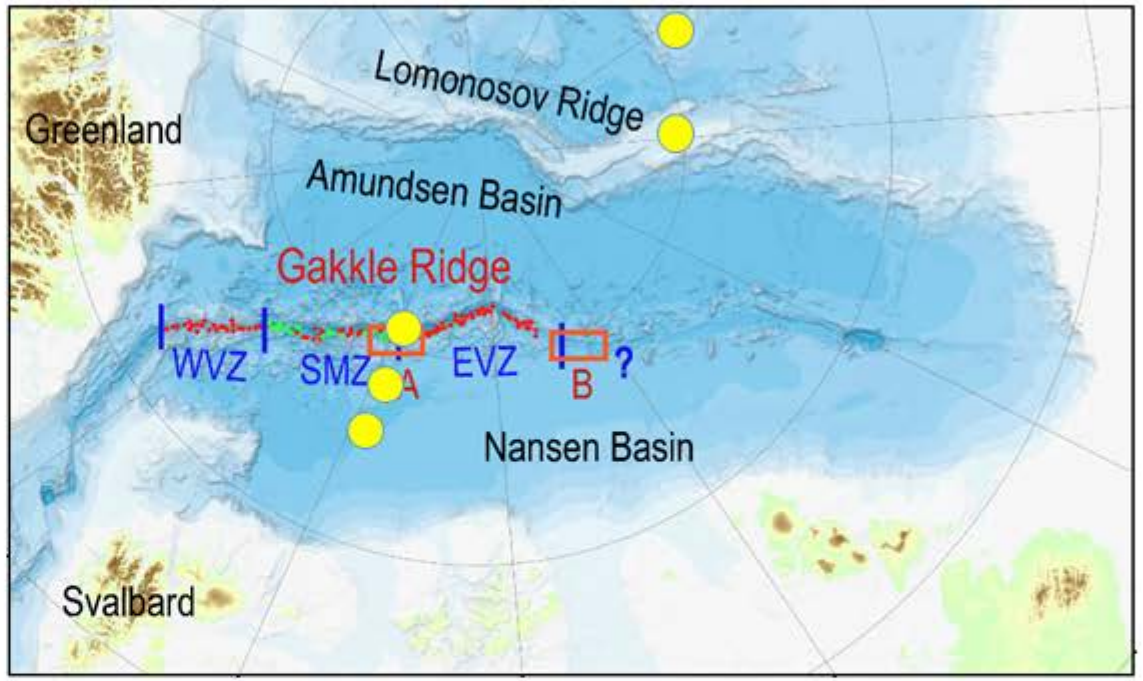




The morphology, lithospheric structure, composition, tectonic behaviors, and hydrothermal activities are unique at the ultraslow spreading Gakkel Ridge

# Gakkel 2020 project!




Leg 3 of the 11th Chinese Arctic expedition

23th Aug.----30th Sep., 2020

Kirkenes----Shanghai

Geophysics survey; Hydrothermal exploration; Geological sampling, and CTD

# Scientific objective 1: Define the "Hess" crust ?

**Penrose model:** Geology; Petrology; Seismic wave; Density; Magnetization

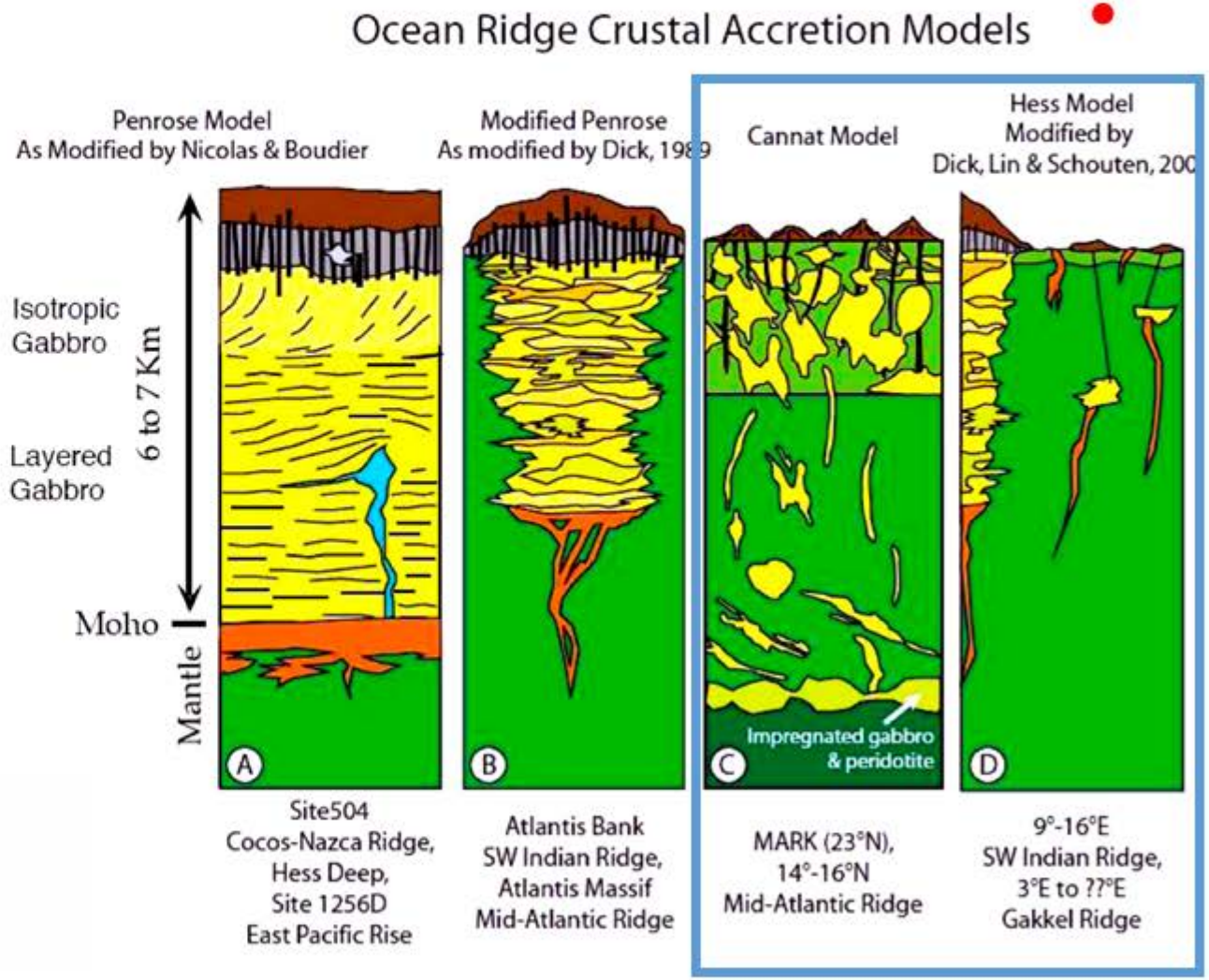
"The oceanic crust seemed to be dramatically thinner than along the rest of the global midocean ridge system. The crust was so thin, in fact, that the very concept of a "crust" had to be called into question." (Snow and Edmonds, 2007)

**"Hess crust":**

what is the extent and volume of serpentinized peridotites?

what is the configuration of melts and serpentinized peridotites?

how the melts transported along axis?

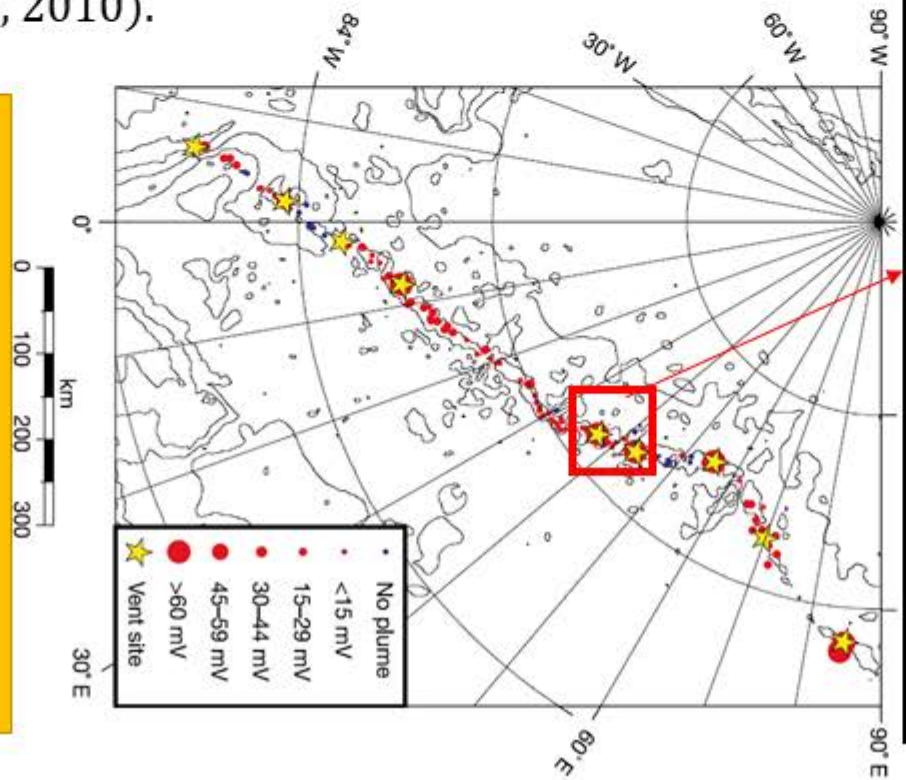


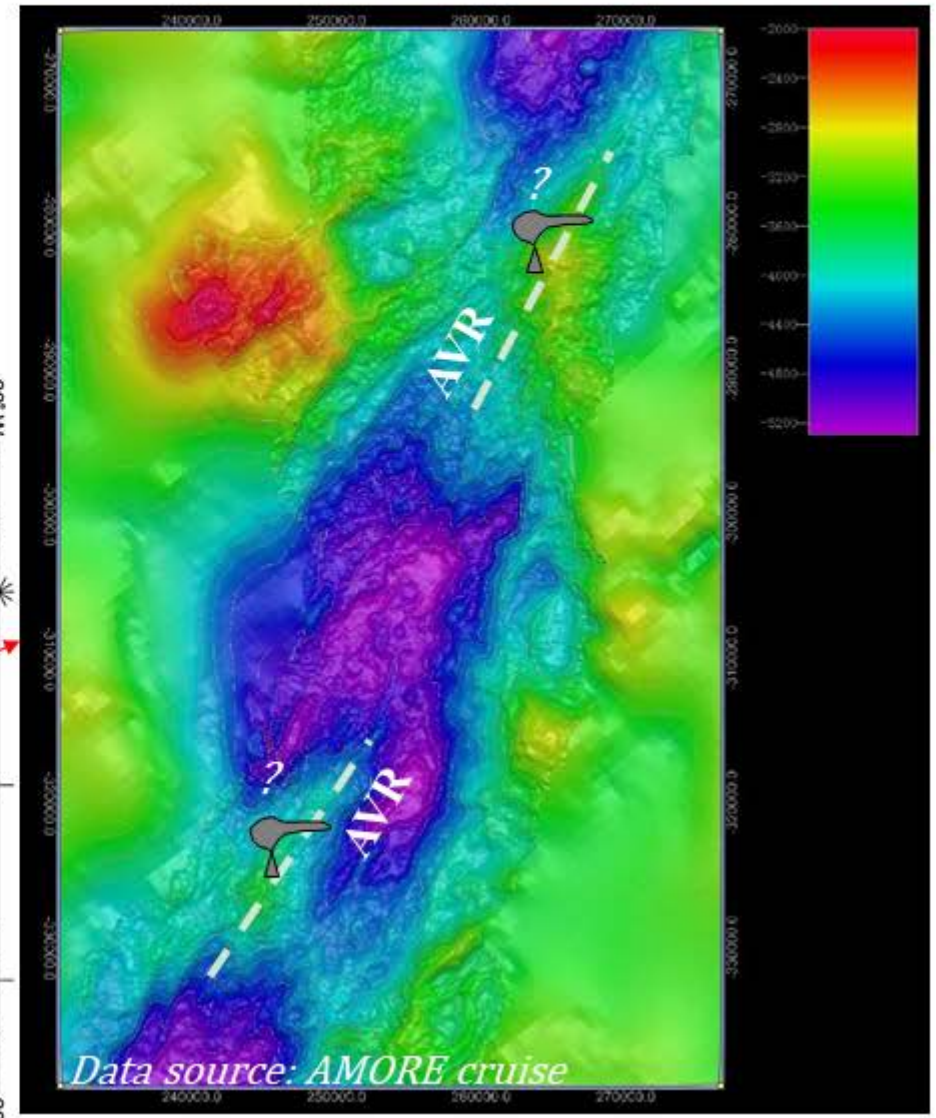
# Objective 2: To test the seafloor massive sulfide (SMS) deposit prediction model

To date, only one seafloor massive sulfide (SMS) deposit (Aurora) and a number of hydrothermal plume sites were discovered on **axial neovolcanic highs** along the 2000 km long Gakkel Ridge (Edmond et al., 2003; Baker et al., 2004; Stranne et al., 2010).

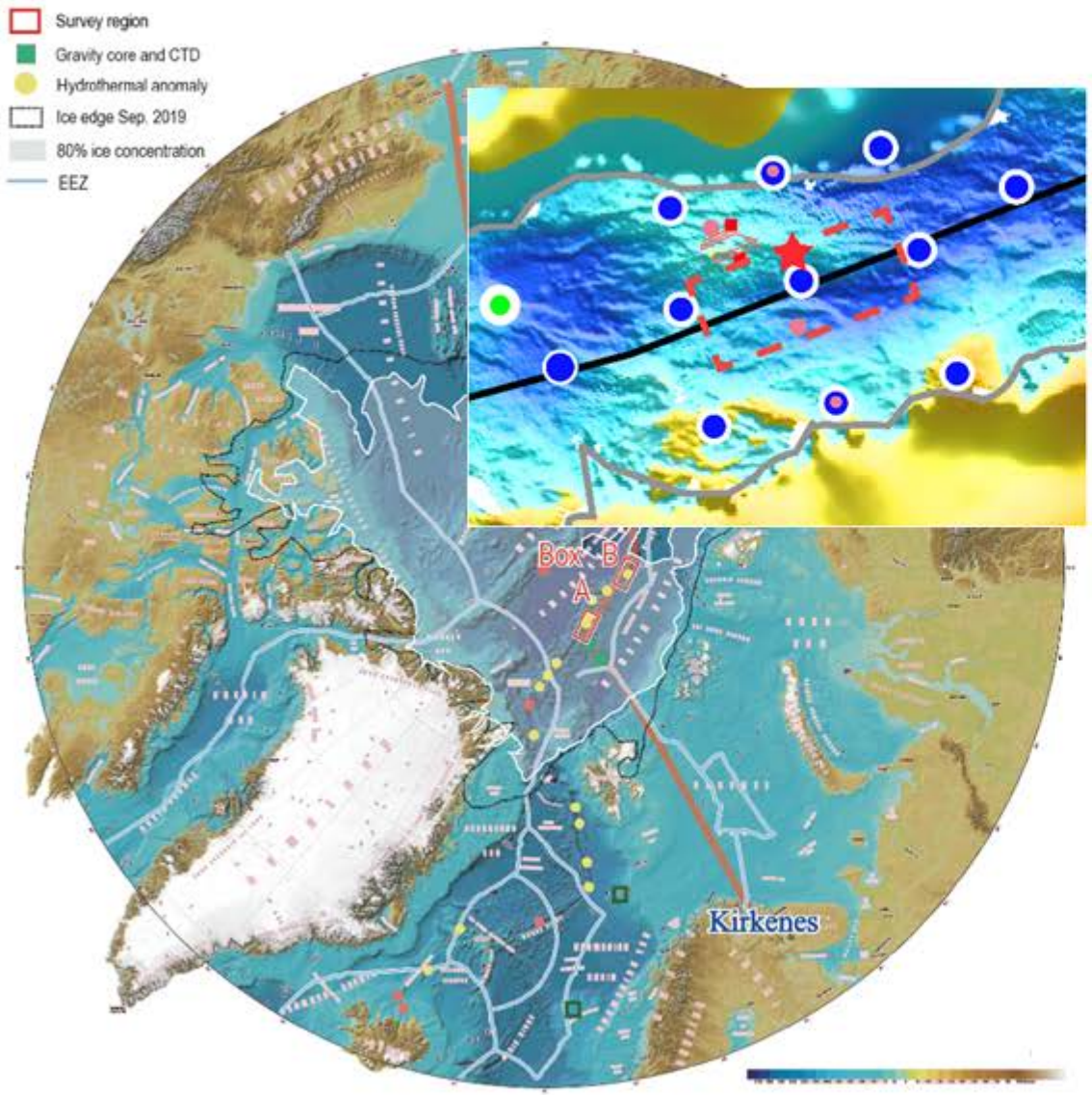
**Are AVR-related SMS deposits along the Gakkel Ridge larger and Cu-Au-rich?**

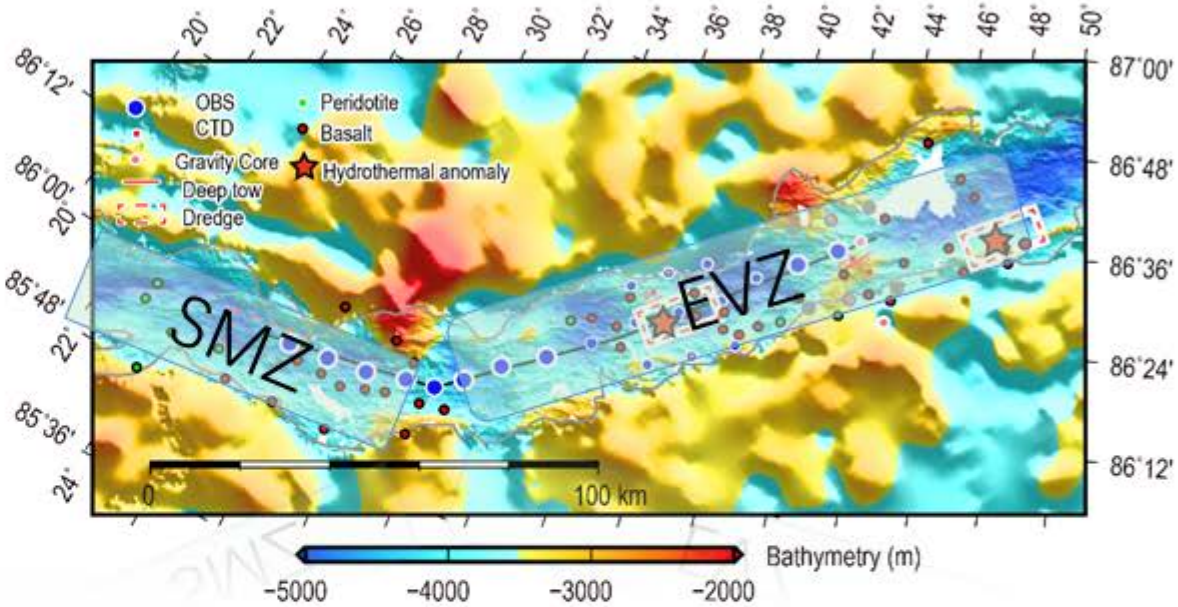
**What's the linkage between SMS deposits and "thin" ocean crust?**



# Brief survey plan

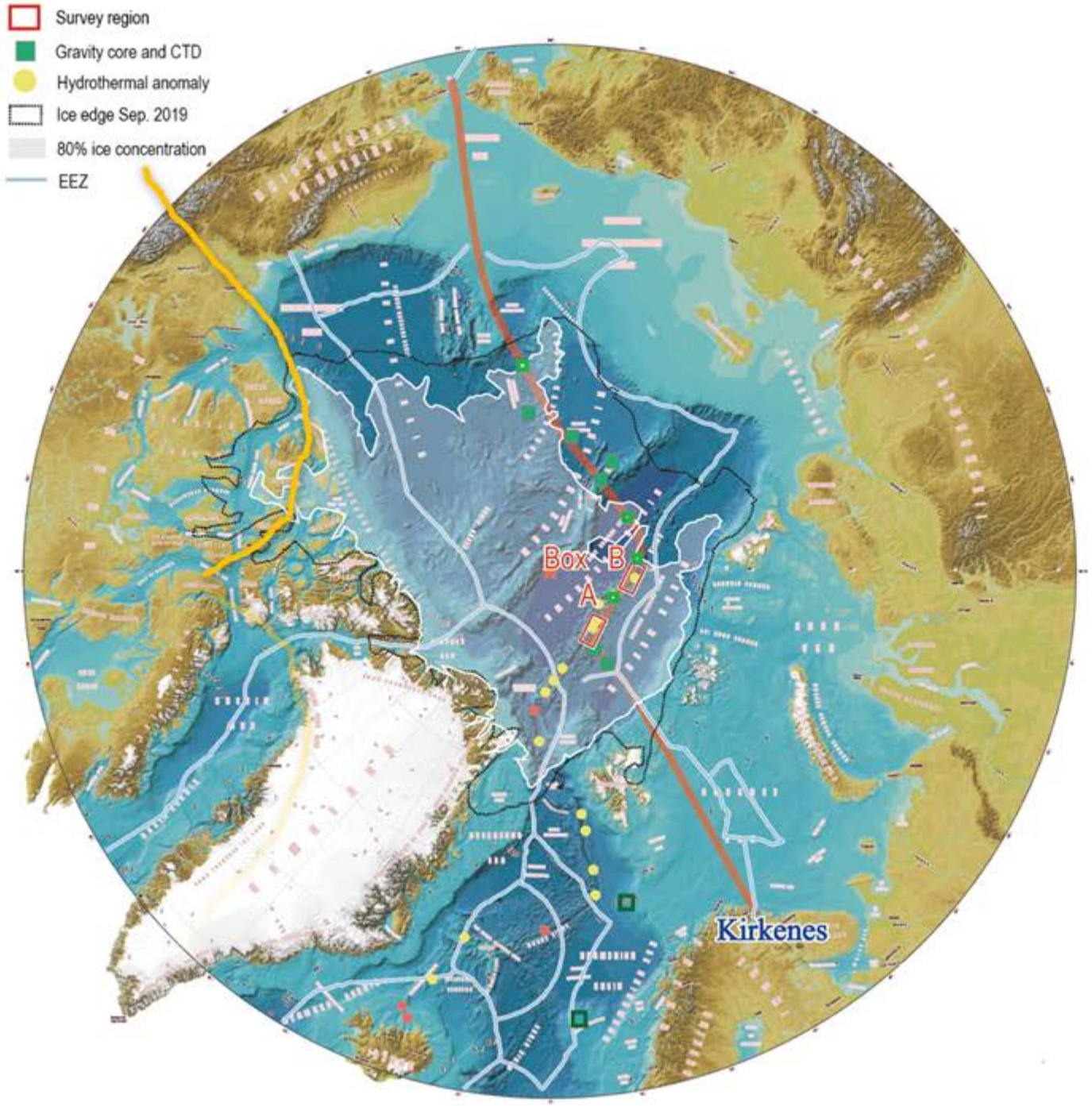


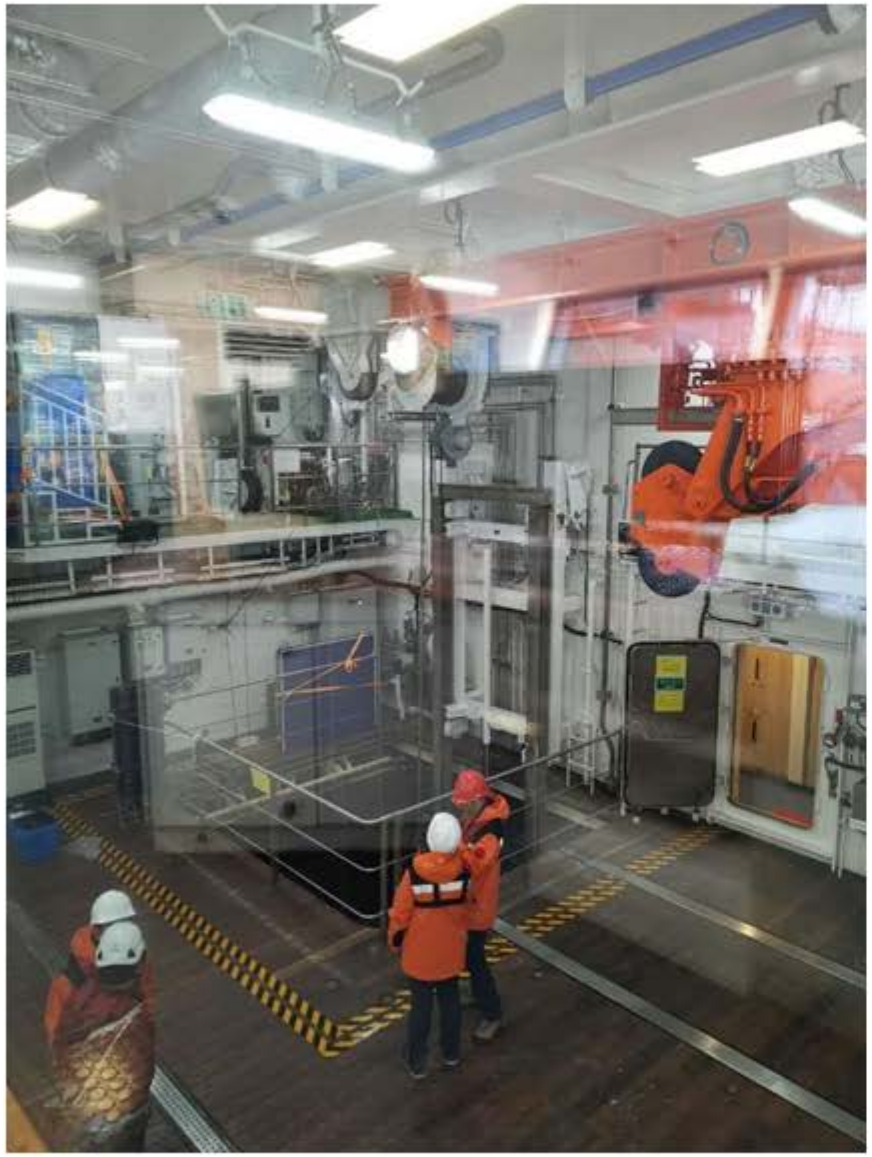

150 km profile, 22 OBSs, profile across axis?

2 rock dredges; 2 TVGs, 1 GPC, 4 CTD

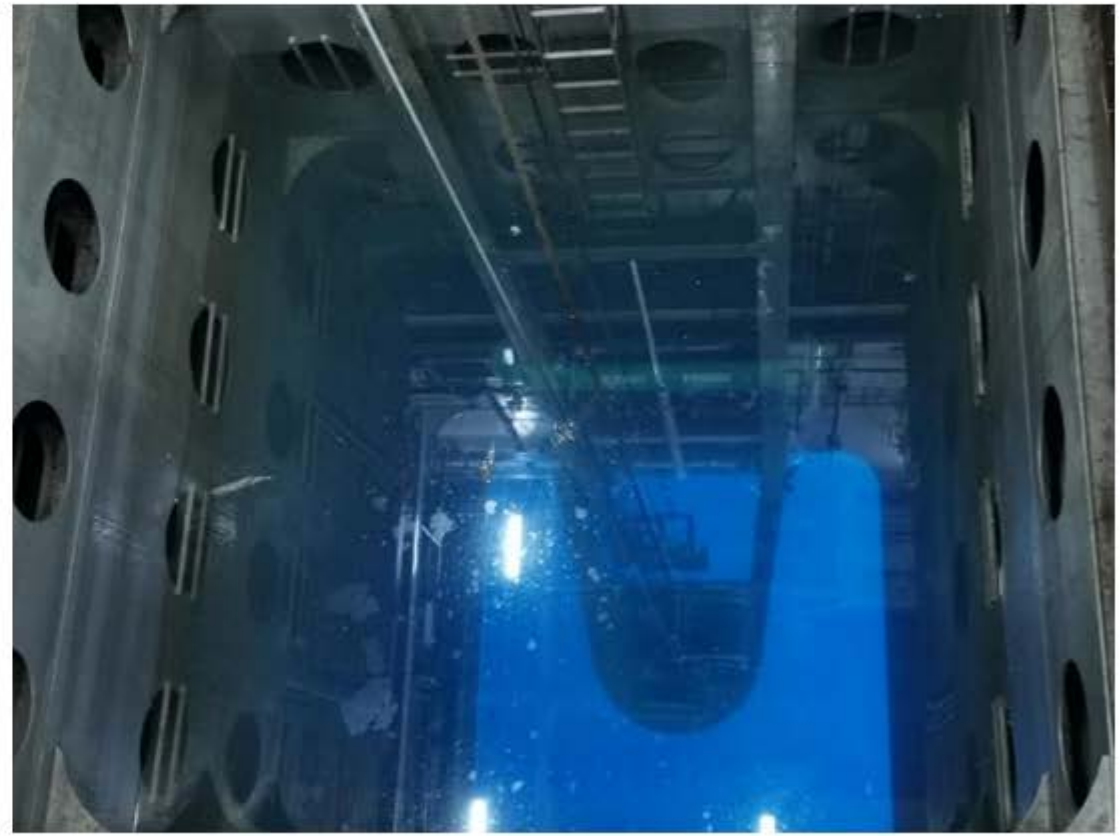
Another 6 gravity cores and CTD stations on the way across the Arctic




~10 CTD stations
along the track
(support the SAS)



# Moon pool



# Thanks!