

# A Lagrangian study on the structure and pathways of the Irminger Current

Nora Fried , Caroline A. Katsman , M. Femke de Jong

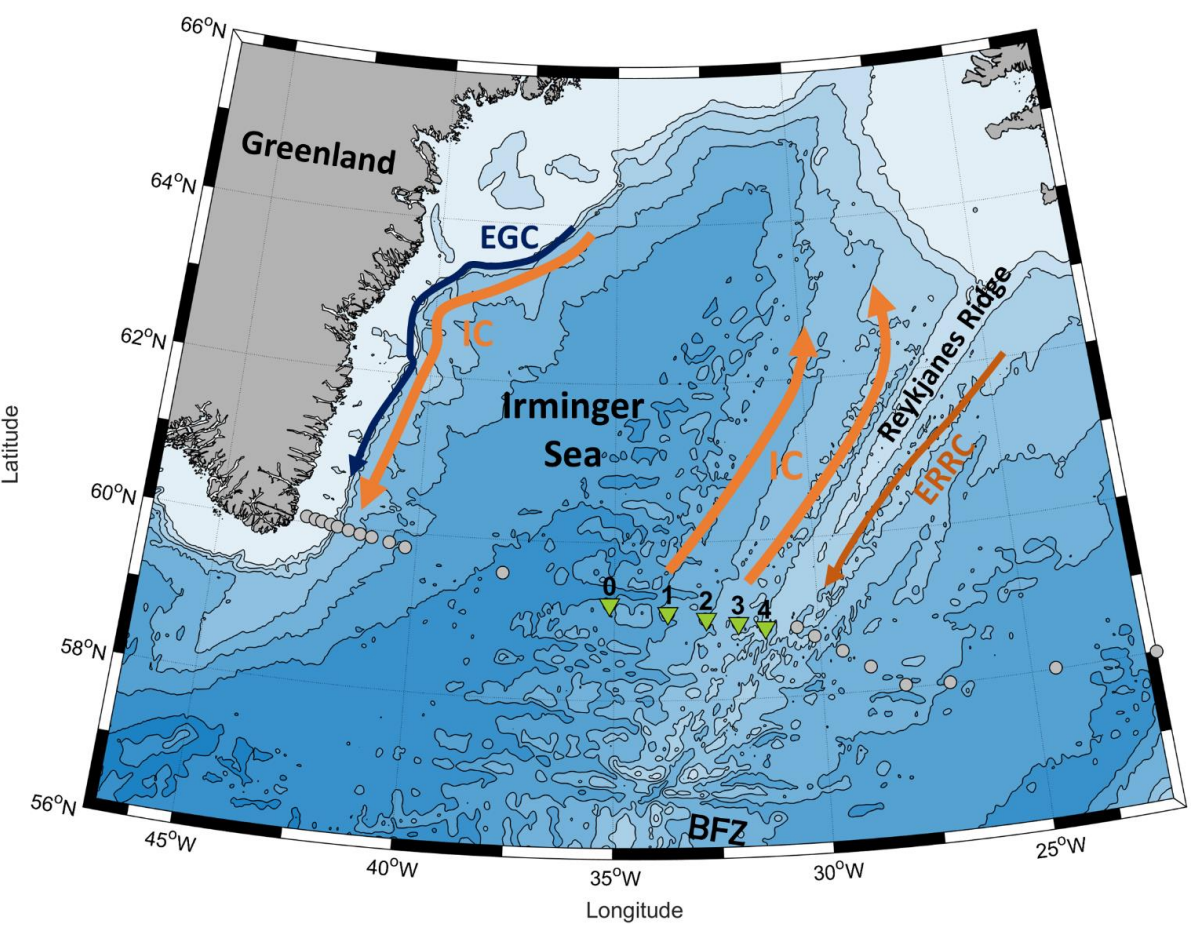


Royal Netherlands Institute  
for Sea Research

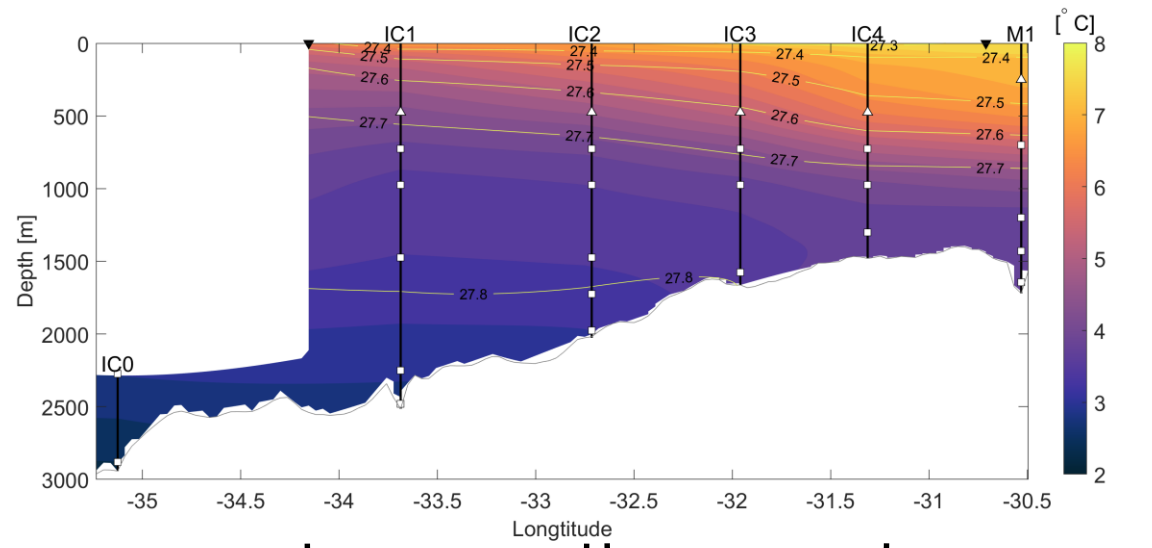
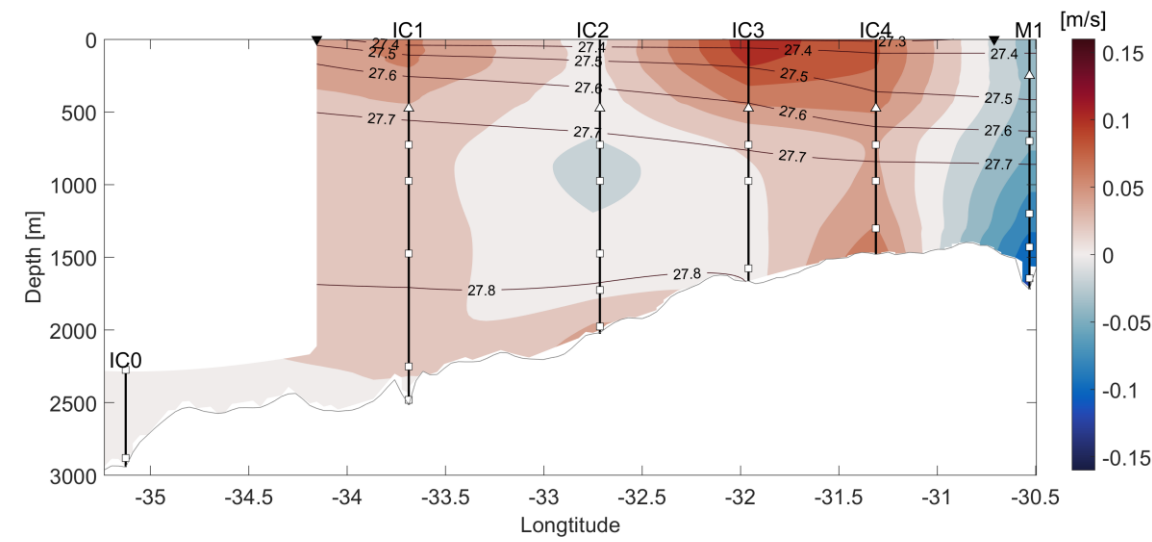
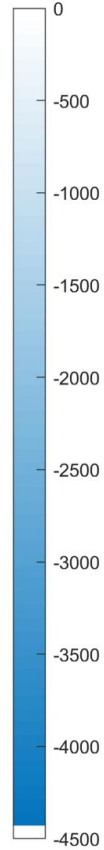
[nora.fried@nioz.nl](mailto:nora.fried@nioz.nl)



# Circulation in the Irminger Sea and the Irminger Current

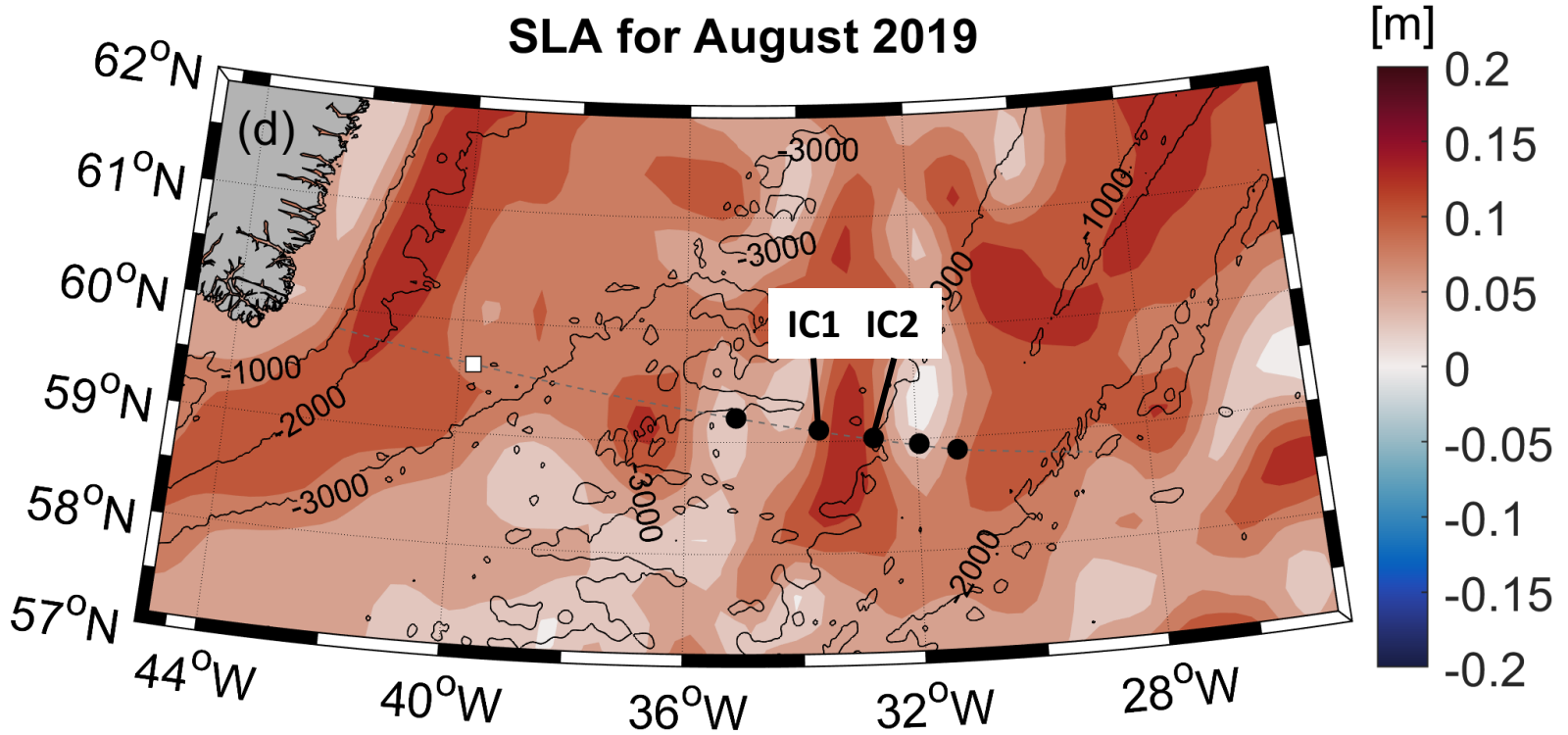


**ERRC: East Reykjanes Ridge Current**  
**IC: Irminger Current**  
**EGC: East Greenland Current**  
**BFZ: Bight Fracture Zone**



western core    eastern core  
 cold & fresh    warm & salty

# Variability at the Irminger Current mooring array (Fried and de Jong, 2022)



- Interannual to decadal variability of the Irminger Current's volume transport is controlled by basin-wide changes in the density field
- The transport can be impacted locally by **mesoscale activity** within the mooring array

→ What is the origin of water masses feeding the IC at the mooring array and making its cores so distinct in properties?

→ What is the influence of mesoscale variability in shaping the current?

**Approach:** Lagrangian Particle tracking backwards in time using OceanParcels in POP

model  
set-up



Horizontal resolution:  
0.1° (~ 6km)



42 vertical layers  
(5-250m)



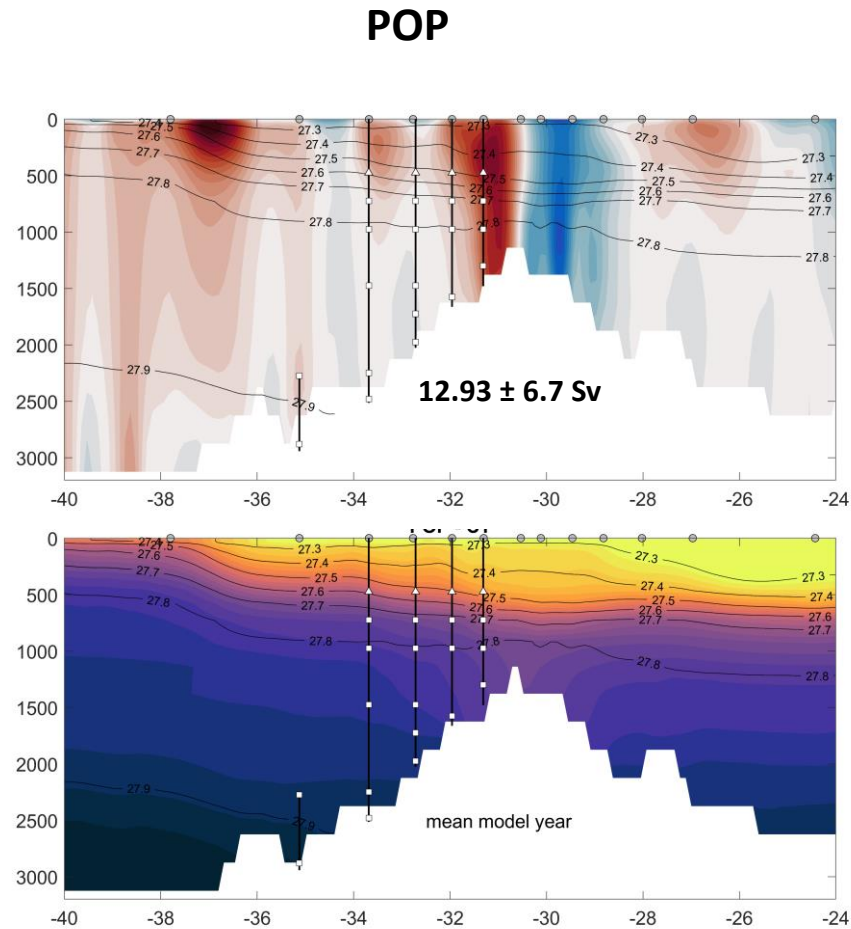
COReV2-NYF forcing



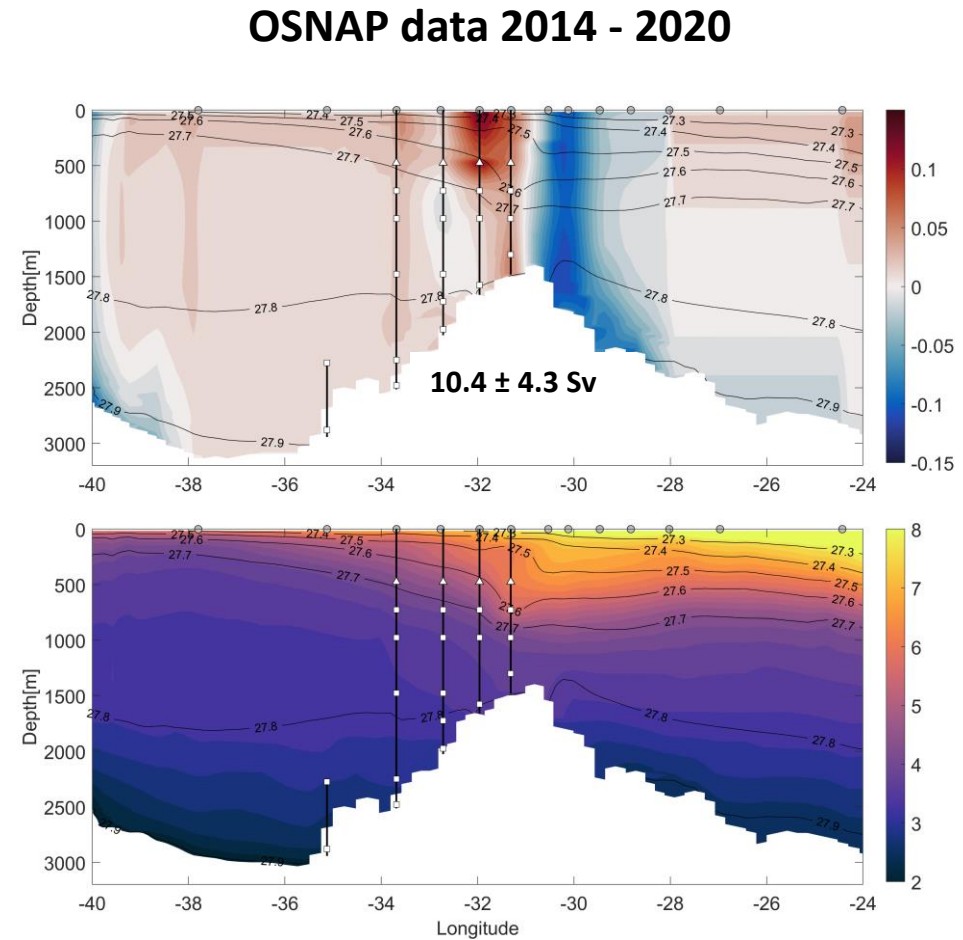
1 year of daily data

nora.fried@nioz.nl

# Model validation



- ✓ Two-core structure
- ✓ Surface intensified velocities



- ✓ Total transport
- ✓ Distinct TS properties for both cores

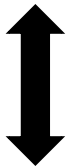
# Lagrangian Particle tracking with Ocean Parcels



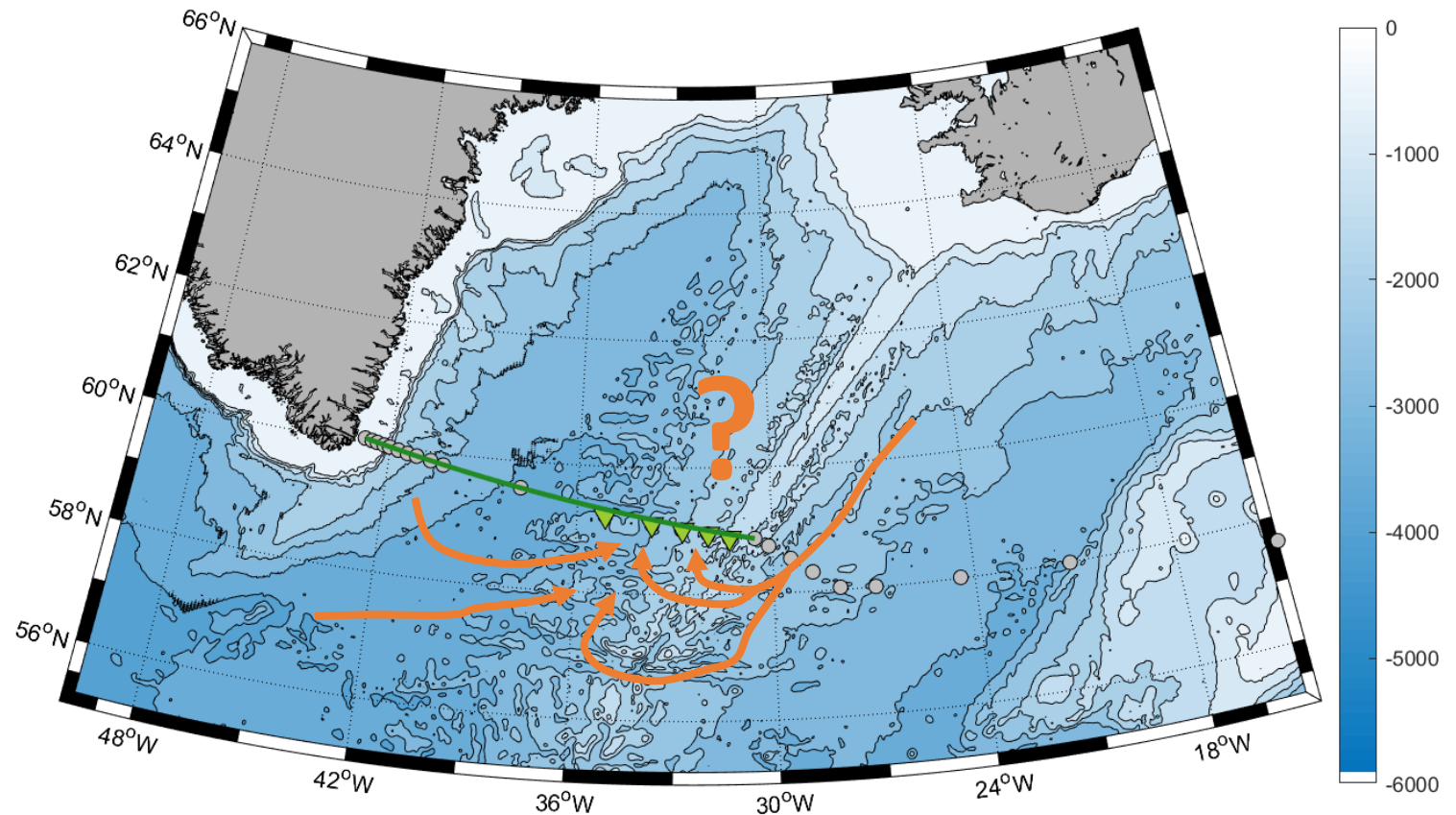
**1,795,800** particles released  
for 365 days and **backtracked**  
for **5 years**



Horizontal resolution: **~6km**



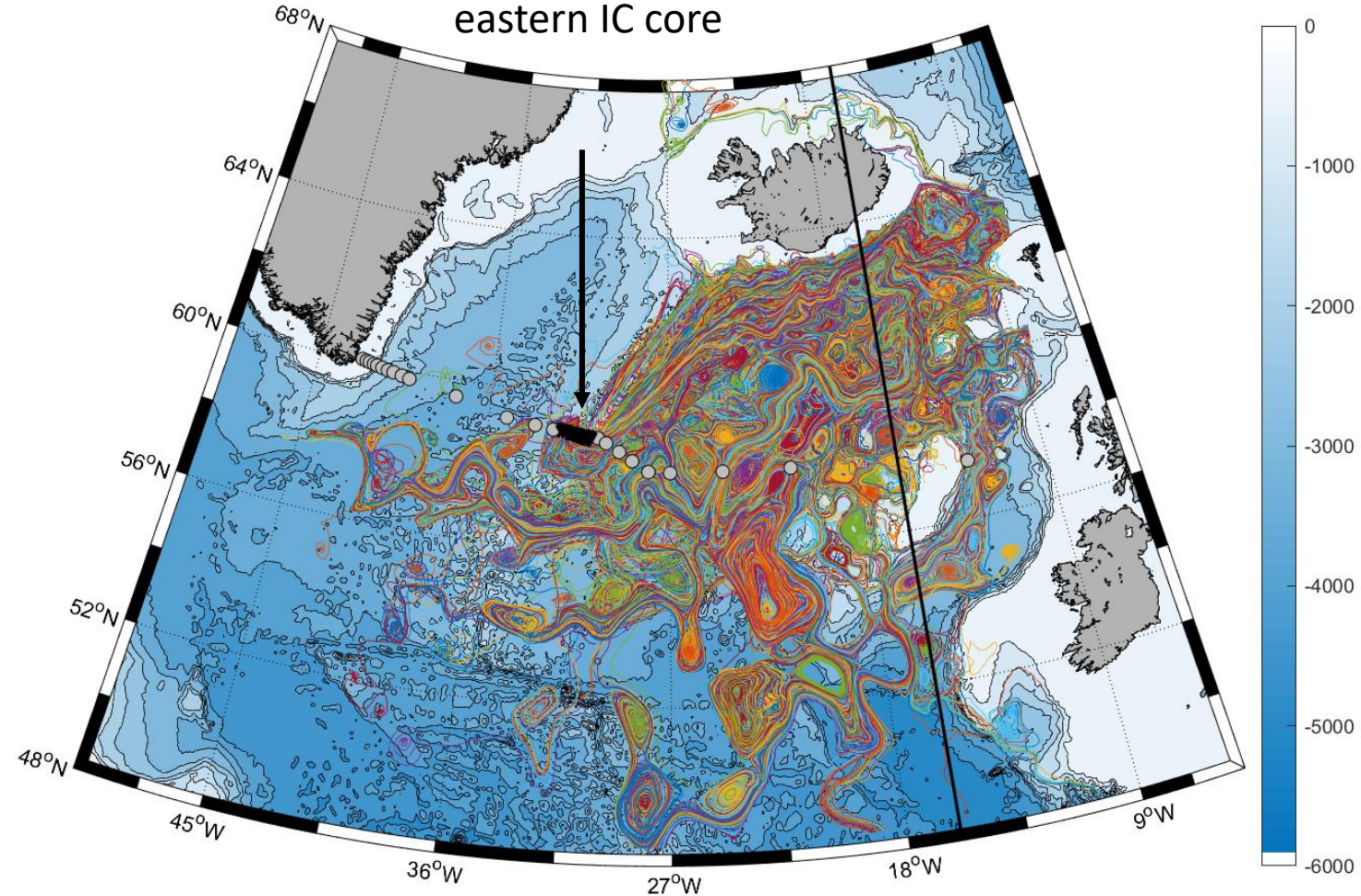
Vertical resolution: **50m** from  
surface to 2000m depth



# The IC eastern core (122640 particles)

Focus on the upper 1000m and selection  
of that particles resided east of 16W

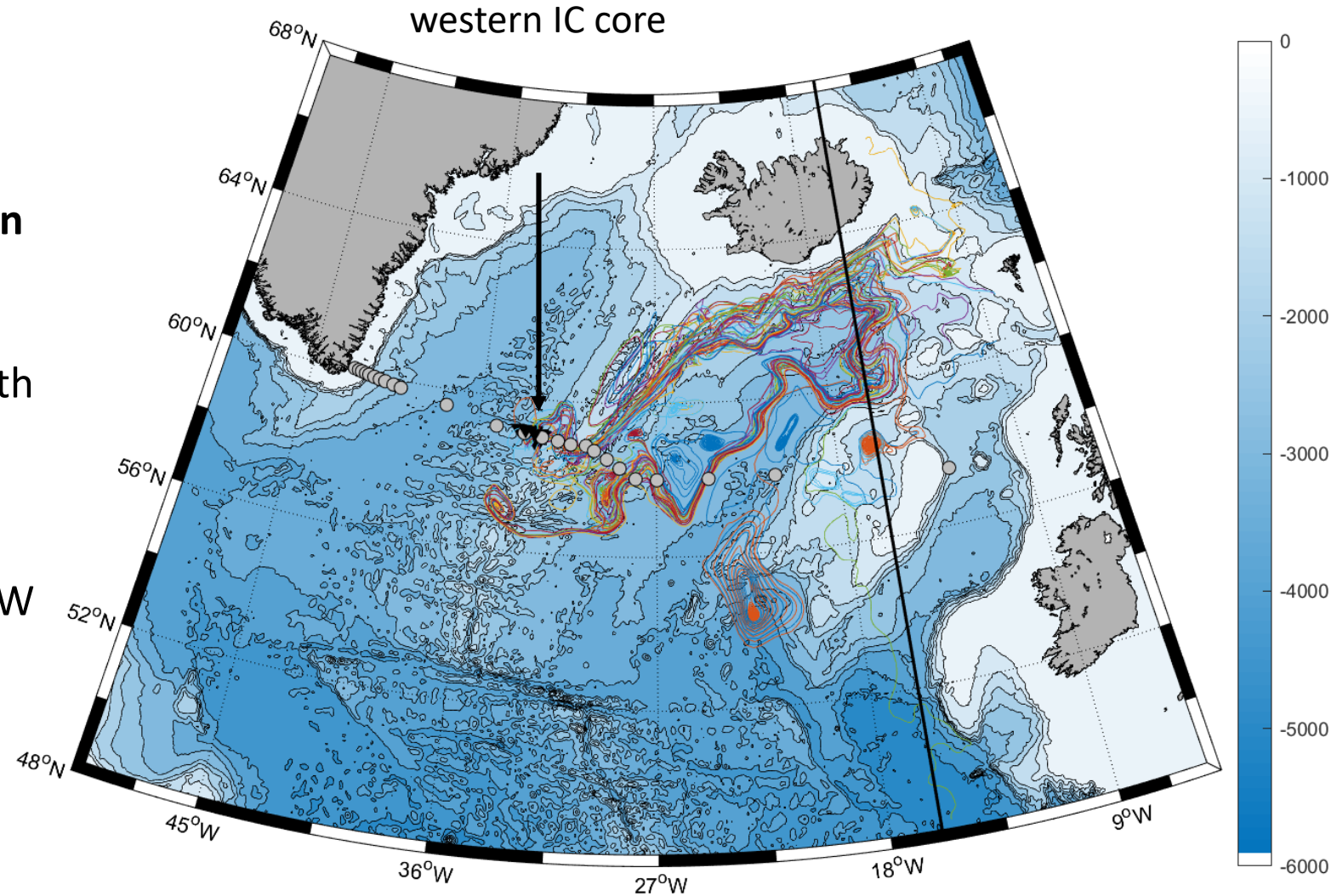
- Particles cross the ridge just south of OSNAP East
- **Eastern core:**  
(partly) fed by waters from the Iceland Basin (6%)



# The IC western core (107310 particles)

Focus on the upper 1000m and selection  
of that particles resided east of 16W

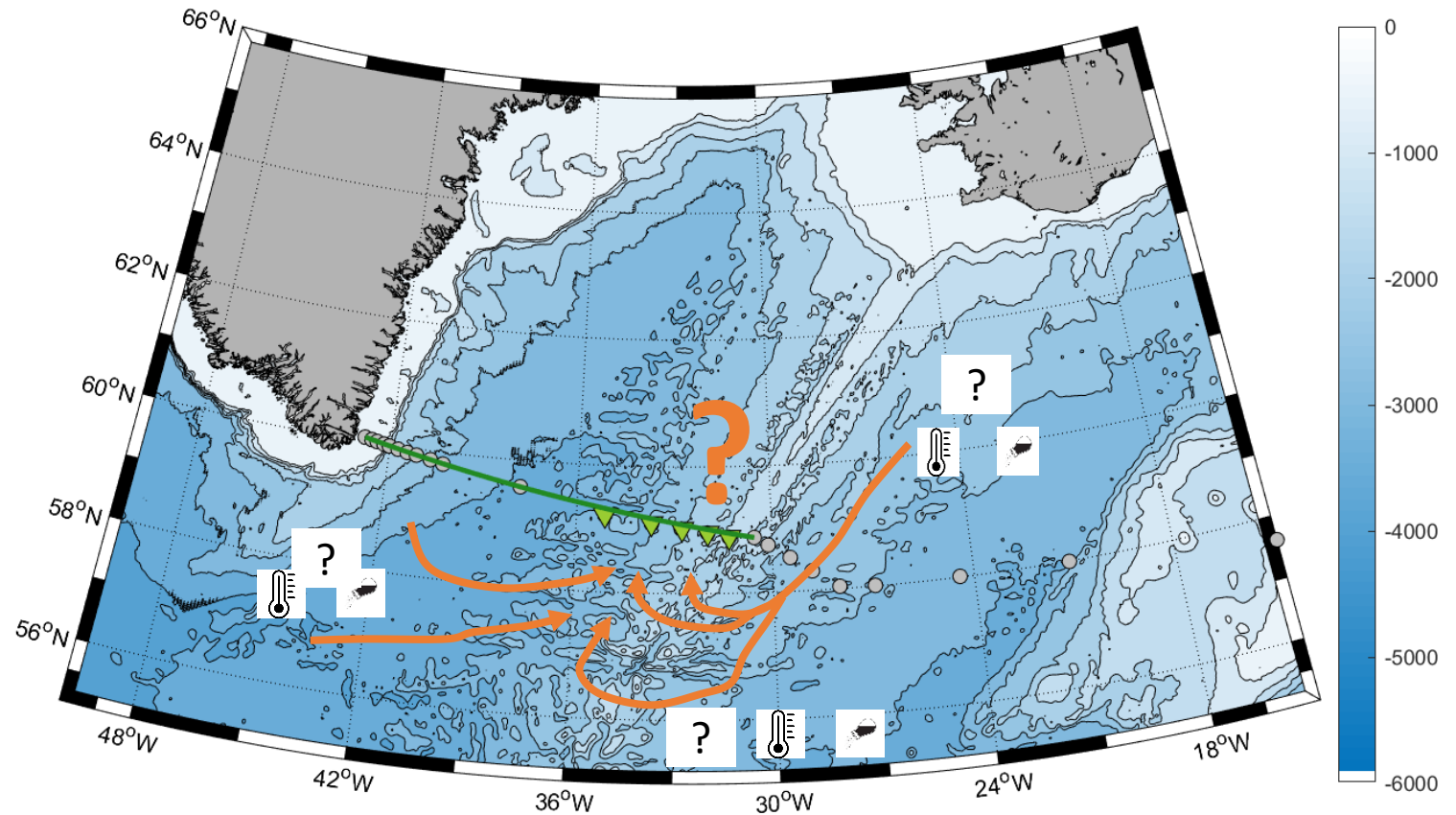
- Particles cross the ridge just south of OSNAP East
- **Western core:**  
Only 0.5% originate from east of 16W in the Iceland Basin





# Conclusion and moving forward

What is the origin of water masses feeding the IC at the mooring array and making its cores so distinct in properties?



→ Quantify different origins of eastern and western core of the IC