

R.V. Oceania cruise report AREX 2002

Ship master: kpt. Andrzej Mendygrał

Chief scientist: prof. Jan Piechura

Time: June 10 till August 16, 2002

Area: Norwegian, Barents and Greenland Seas, west Spitsbergen Fjords.

(see chart, fig.1).

Cruise execution:

1. Timing:

June 10 leaving Gdańsk – start

June 20-21 call Tromsø, fuel & water supply scientific crew join the ship

June 21 leaving Tromsø

June 21 - July 10: research, first leg: area Norway – Spitsbergen; program: standard meteo, marine aerosols, hydrography (CTD, ADCP), optics-solar radiation, acoustics, plankton sampling

July 10 - 11 call Longyearbyen, fuel & water supply.

July 11- 20 : research second leg: area Soerkapp – Fram Strait, program the same as leg 1.

July 21- 21 call Longyearbyen, exchange of scientific team

July 21- August 4: research, third leg, area West Spitsbergen fjords: Hornsund and Kongsfjord: program hydrography (CTD, ADCP), biological sampling (fito, zooplankton and bentos) primary production,

August 4 - 5, call Longyearbyen, fuel & water supply, disembarkation of scientific crew

August 5- 16 way back to Gdańsk.

2. Measurements and sampling (summery):

2.1. Meteo and aerosols:

- Continues record of meteo by automatic weather stations + 76 standard observation SHIP for control
- Collection of marine aerosols - 11 samples
- Measurement by laser particle counter at different height above the sea surface (8,11,14,17, 20 m) – 12 series
- Registration of the state of sea surface (white caps) by photo camera – 100 images
- Aerosol concentration by lidar – 118 measurements.

2.2. Hydrography

Full, surface to bottom (2 m above) CTD cast at 205 stations forming 14 transects at the high sea (fig.1) and 21 stations in fjords were done, as well as 11 high resolution transects by towed CTD.

Continues recording of currents in the upper 250 m surface layer by ship mounted, 150 kHz ADCP when on transects.

2.3. Physics/chemistry

- Marine optics/primary production continues registration of solar radiation, chlorophyll "a" concentration (50 measurements), primary production.
- acoustics: measurements of gas bubbles in surface layer at 59 stations and plankton concentration at 5 transects in fjords.

Chemistry: 17 samples of marine organisms (plants and mollusk) and bottom sediments to analyze concentration of mercury.

2.4. Biology

Sampling of phytoplankton (40 samples), zooplankton (84 samples) and benthos (58 samples) and suspended matter.

3. Some preliminary results.

Temperature and salinity distribution at 100 m depth (core of Atlantic Water fig. 2, 3) show transport of warm salty waters towards the Barents Sea and Fram Strait. The main branch of Atlantic Water (AW) moves along the shelf break and continental slope (fig. 2,3,4,5), another one is located close to Mohn's and Knipowich Ridges. Both branches come together in the northern part of the investigated area. Some amount of AW turns to the west forming Return Atlantic Current (RAC) and some, exceptionally big this summer amount flowing into the Arctic Ocean along the slope. The free of ice sea surface as far as 81°N was the probably results of this intensive flow of warm. Water.

Fig.1. AREX 2002, stations grid

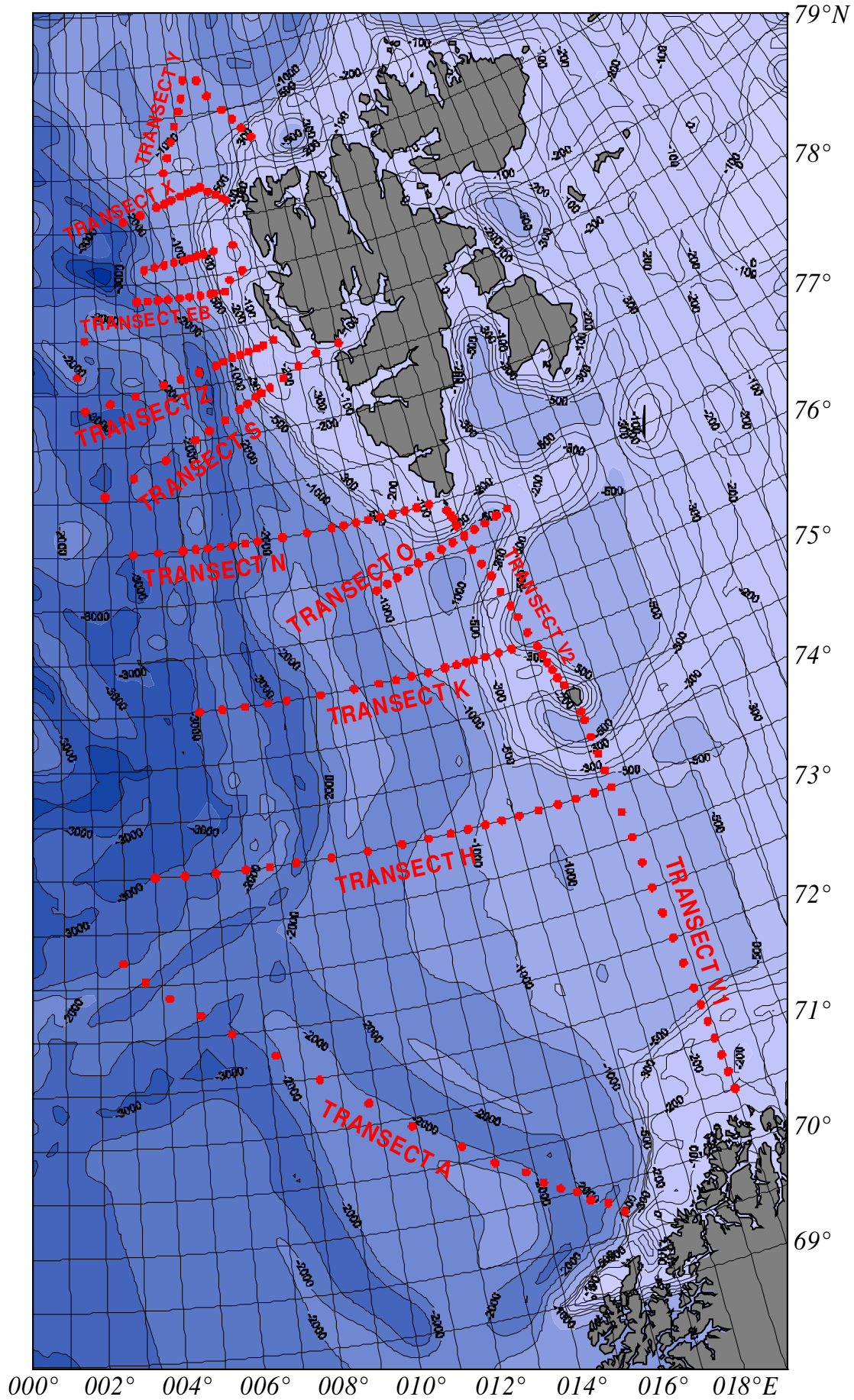


Fig.2 Potential temperature [$^{\circ}\text{C}$] distribution at the depth of 100 m
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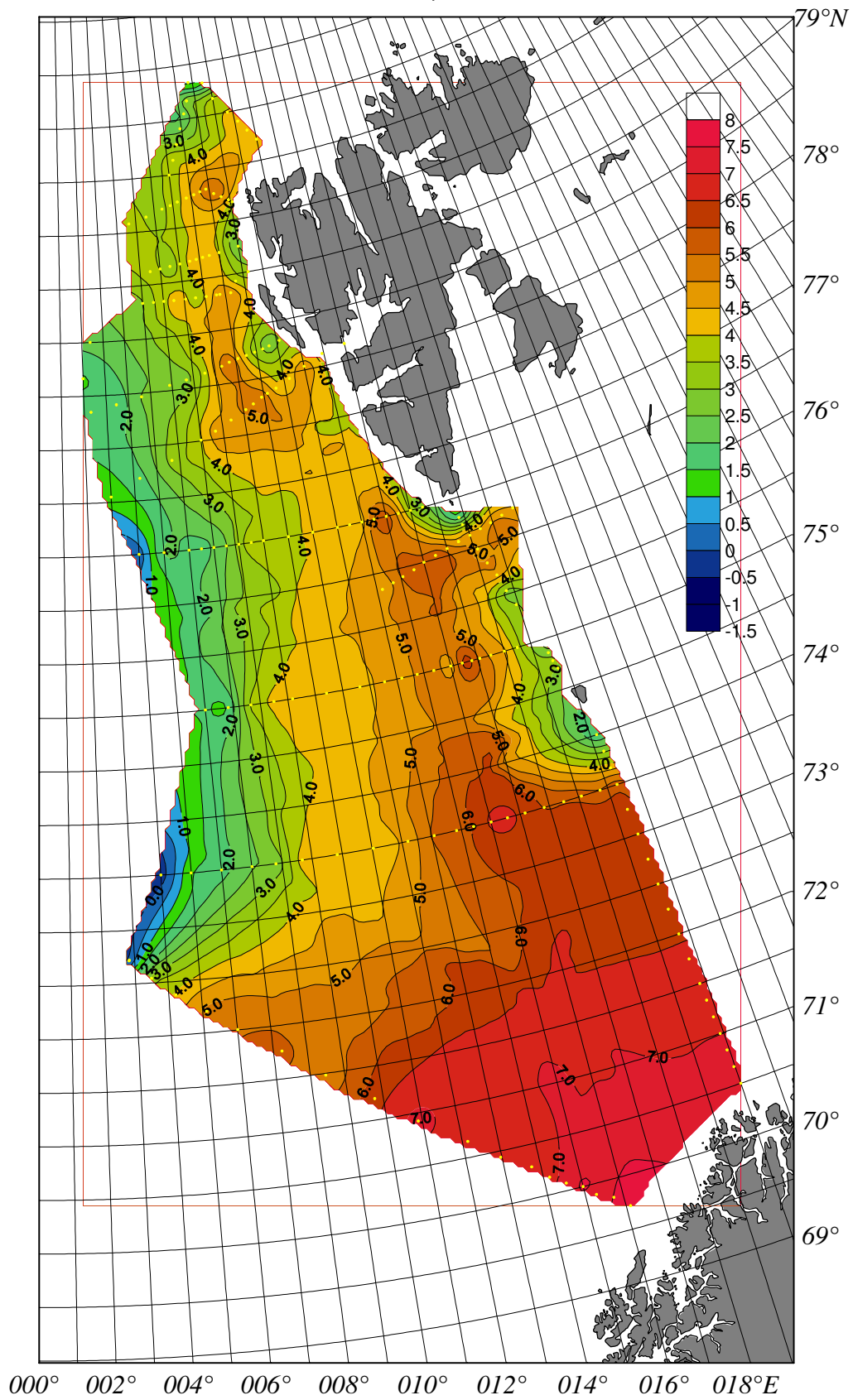


Fig.3 Salinity [psu] distribution at the depth of 100 m

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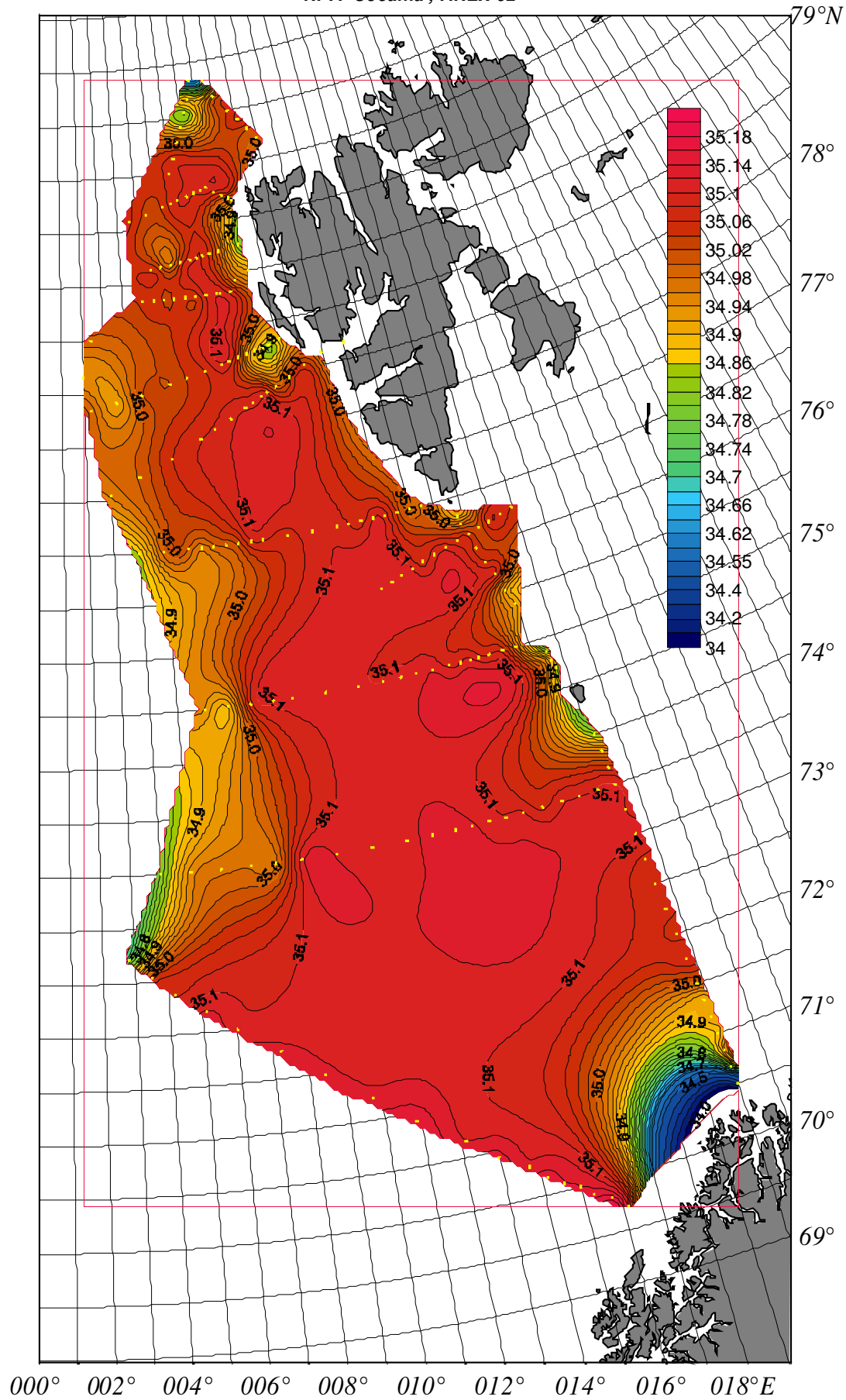
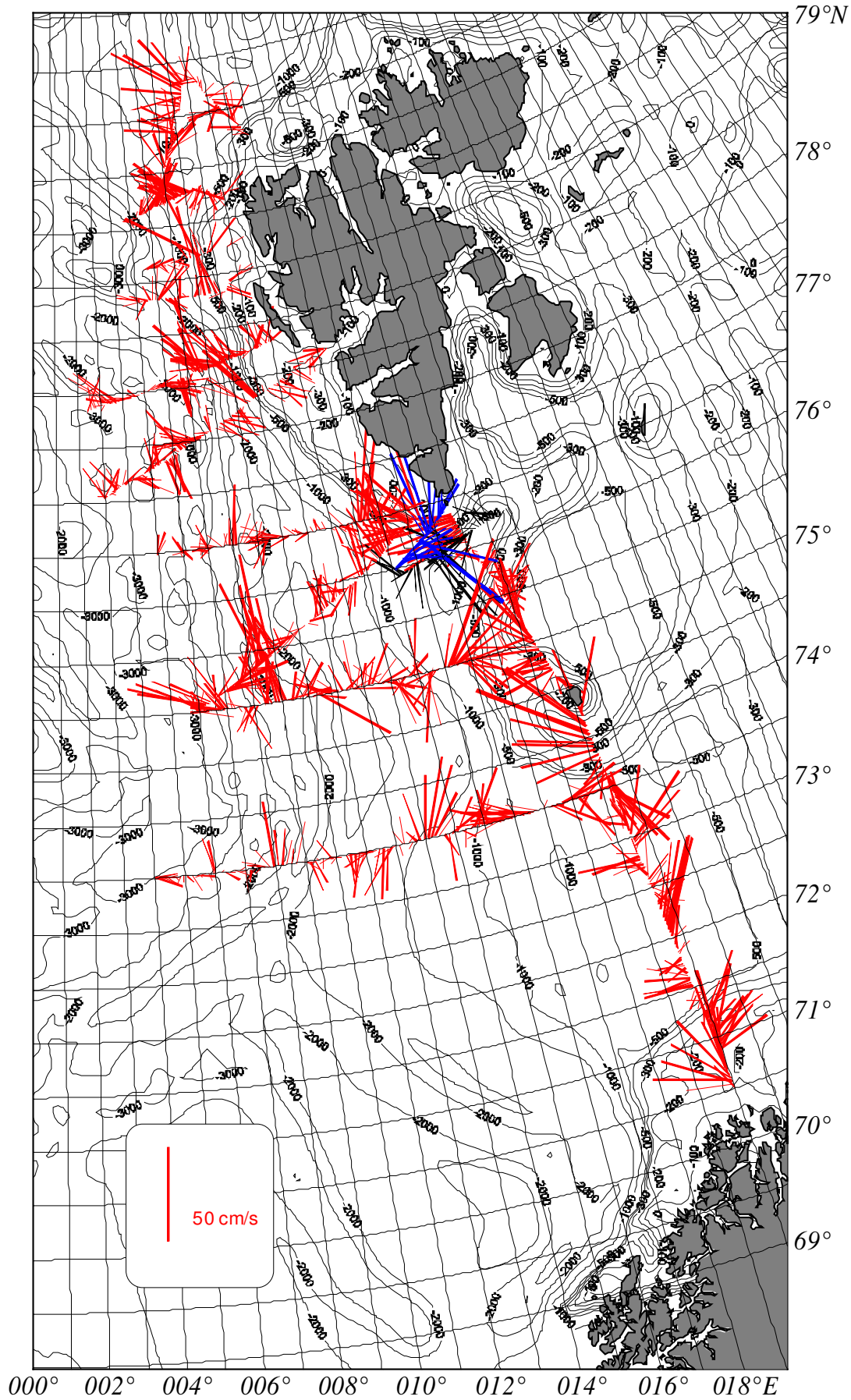


Fig.4 ADCP measured current sticks at the depth of 100 m

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Fig.5. Transect 'N' along 76°30'

