



AWAKE2

*Arctic Climate System Study of Ocean, Sea Ice and
Atmosphere interactions*



WP3. Fjord Oceanography

Task 3.1. Fjord hydrography from historical and new data

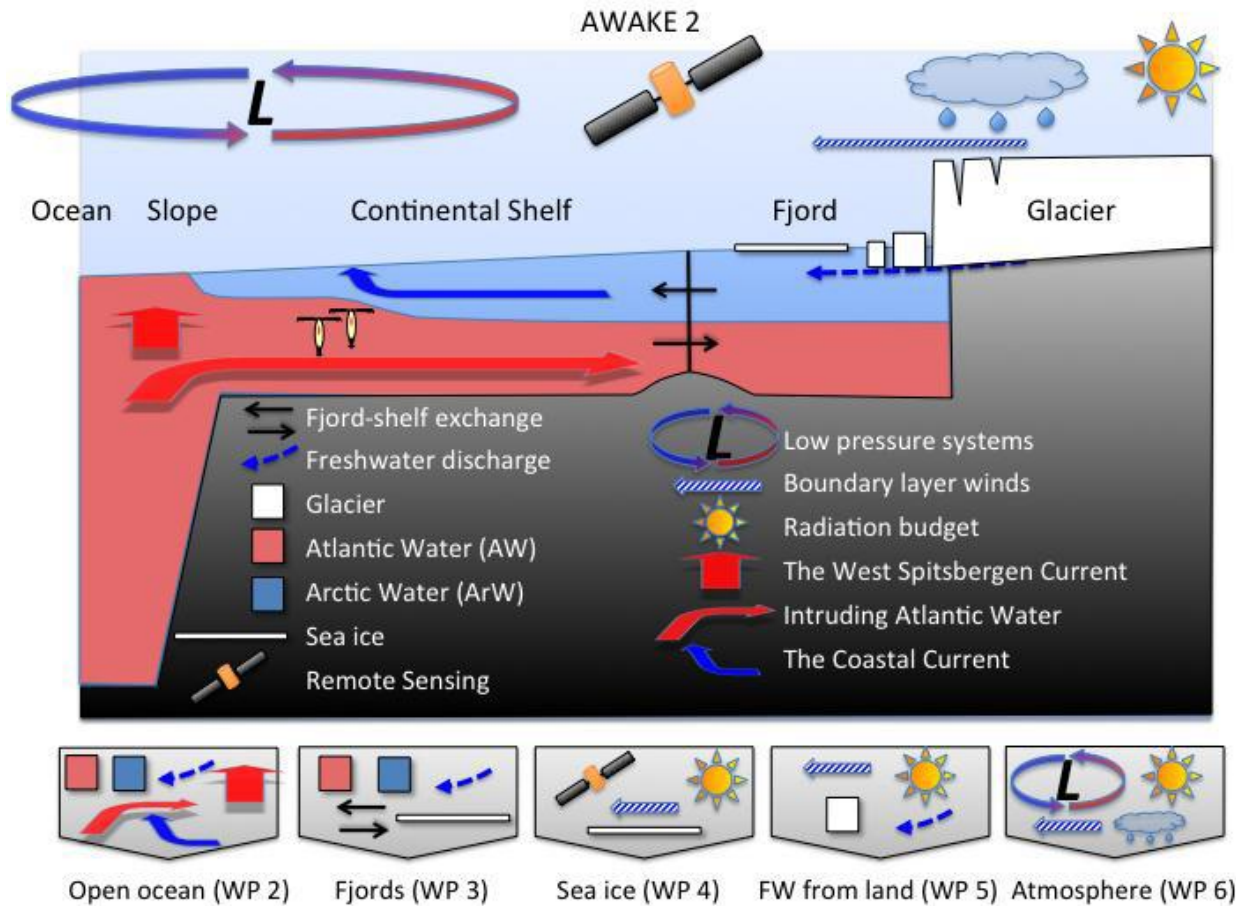
Agnieszka Promińska

Institute of Oceanology Polish Academy of Sciences - Centre for Polar
Studies KNOW (Leading National Research Centre), Sopot, Poland



Work Package 3: Fjord oceanography

Task 3.1. Fjord hydrography from historical and new data

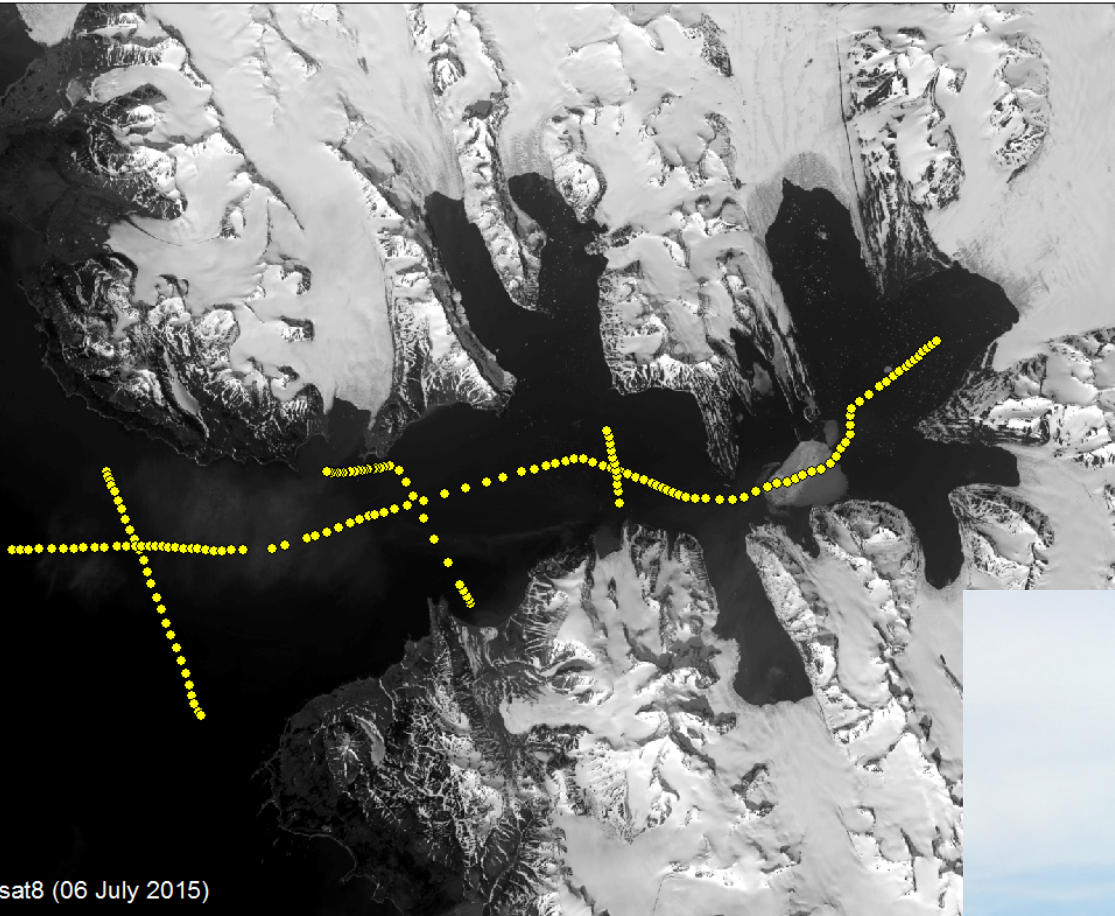


D3.1.2: Hydrographic time series for 2000-2015 (36)

Data collection

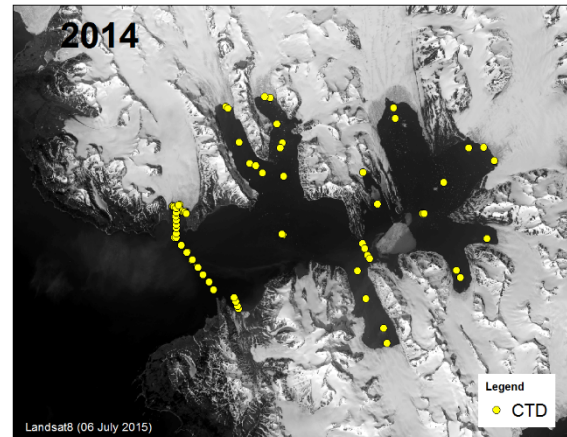
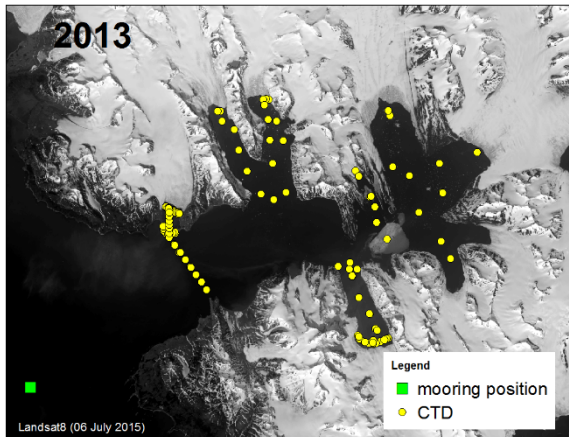
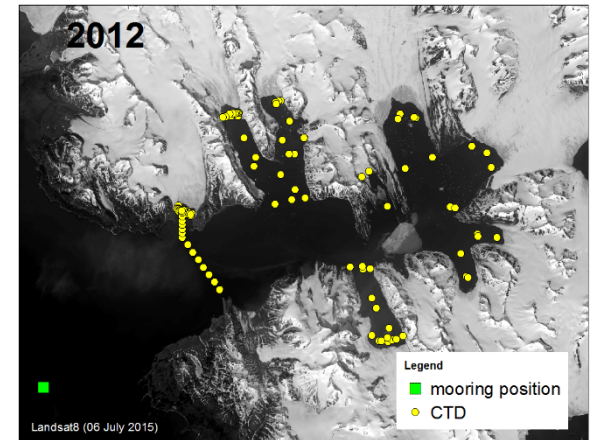
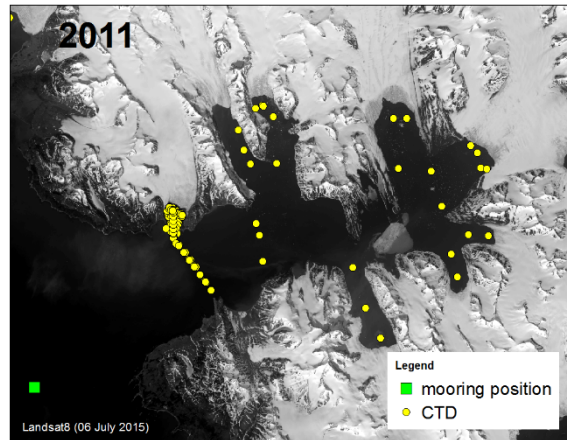
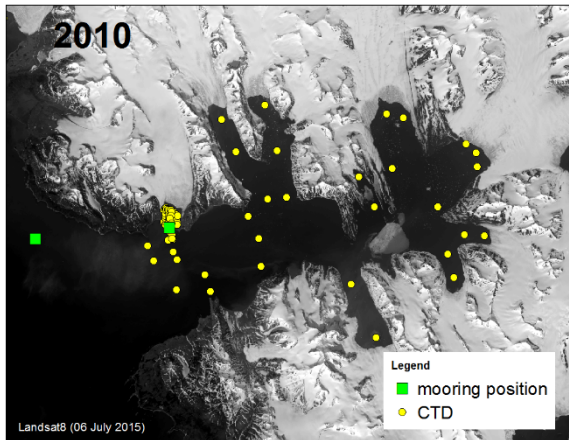
Monitoring sections

- CTD (**C**onductivity, **T**emperature, **D**epth) data collection - towed CTD profiling system
- 2001 – 2015 - summer cruises onboard the RV Oceania



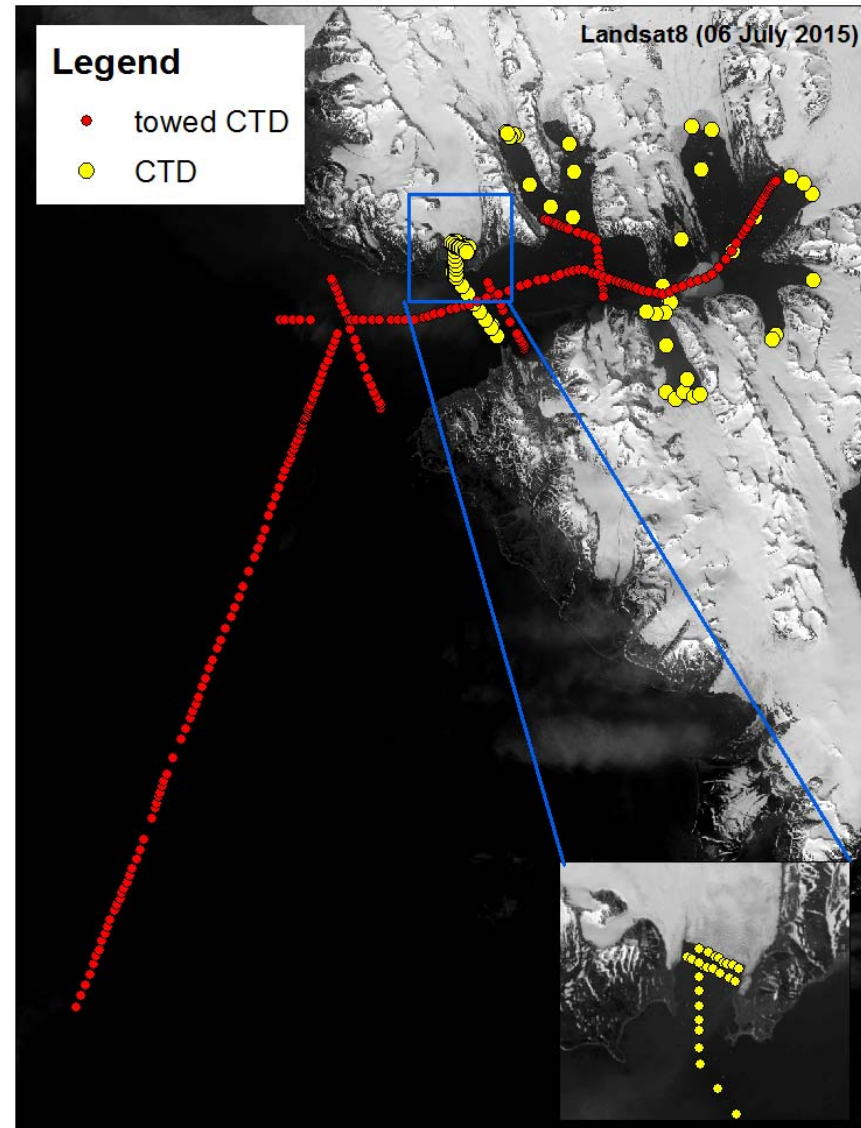
Data collection

AWAKE and AWAKE-2 projects

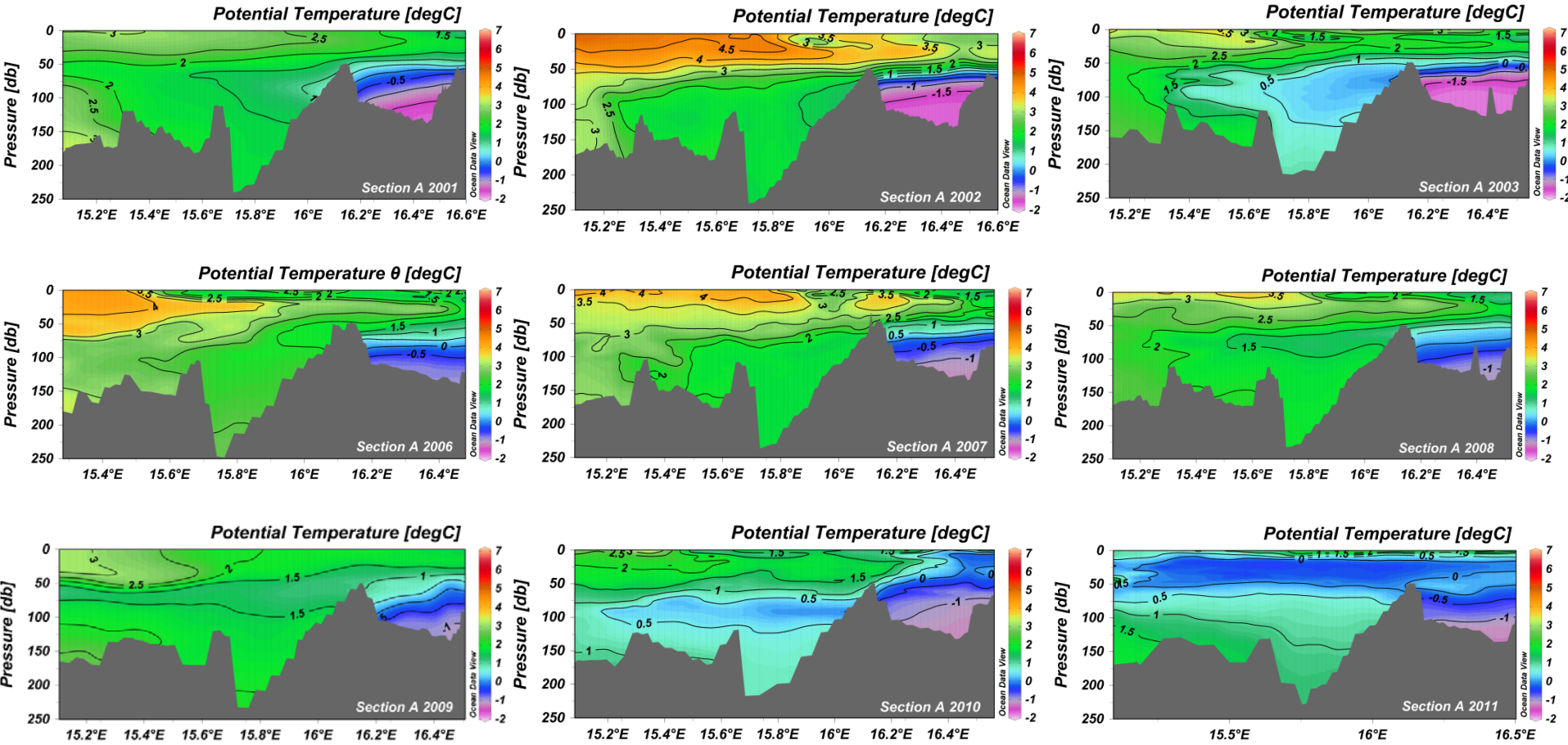
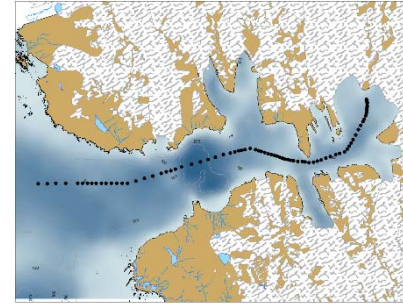


Fieldwork 2015

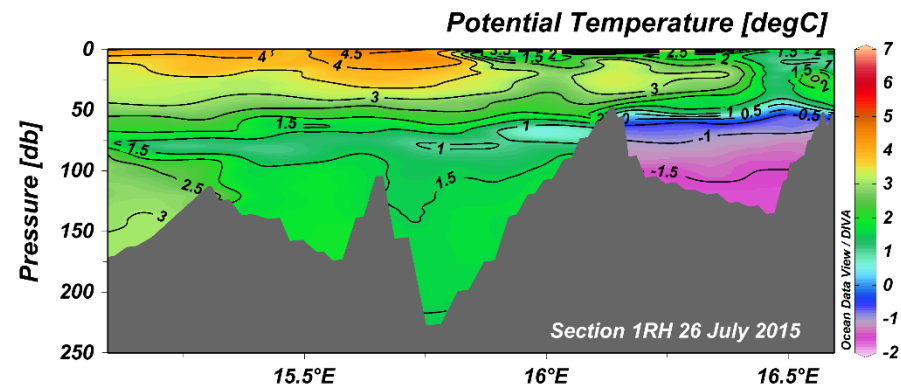
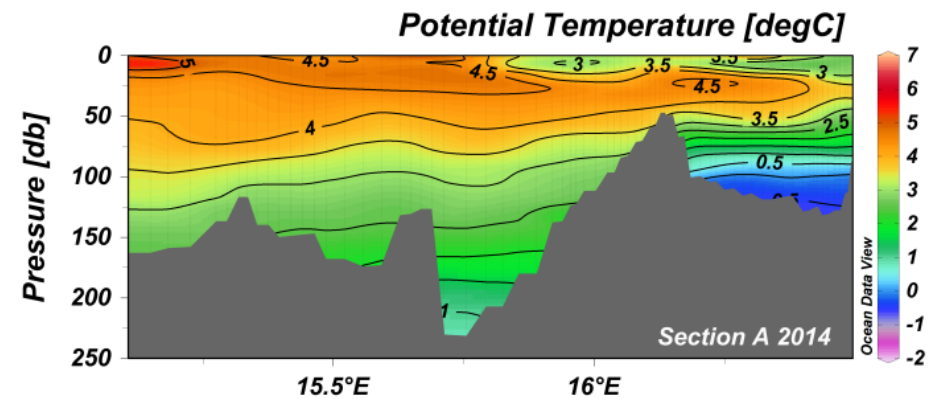
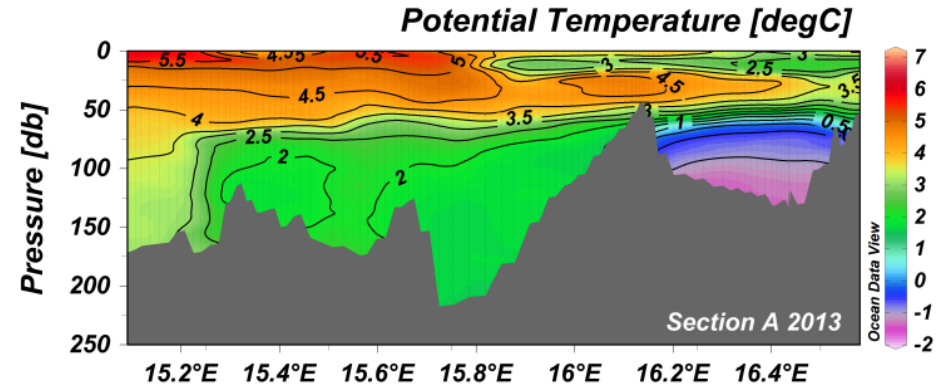
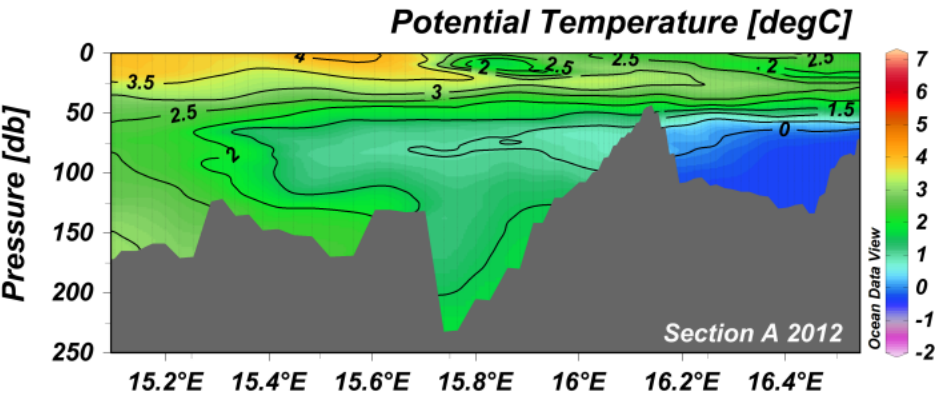
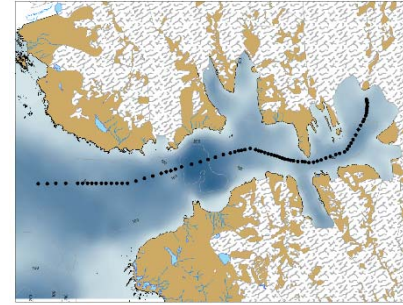
- 4 monitoring sections in the fjord
- One section at the fjord foreground
- CTD's collected from April to August (yellow dots)



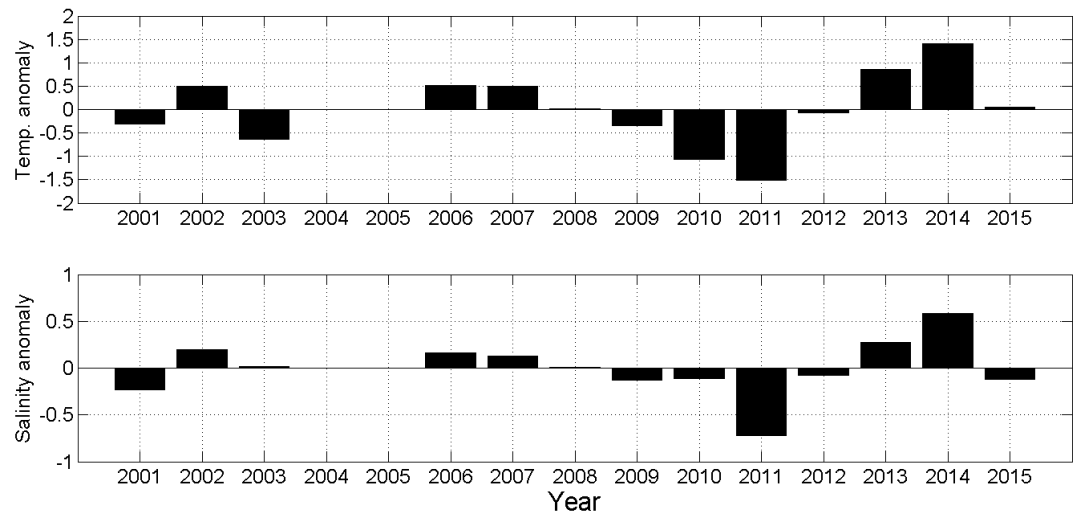
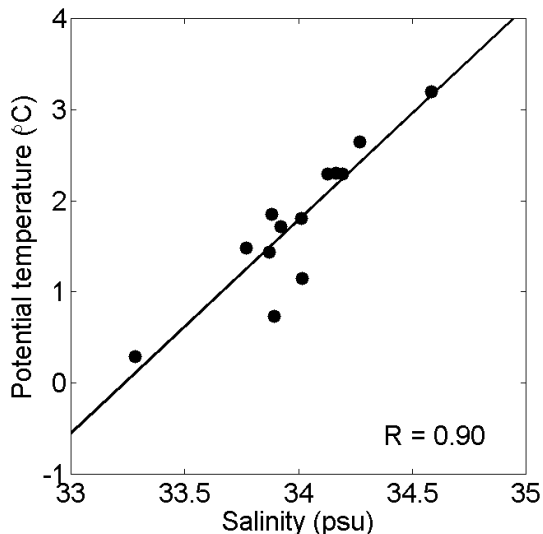
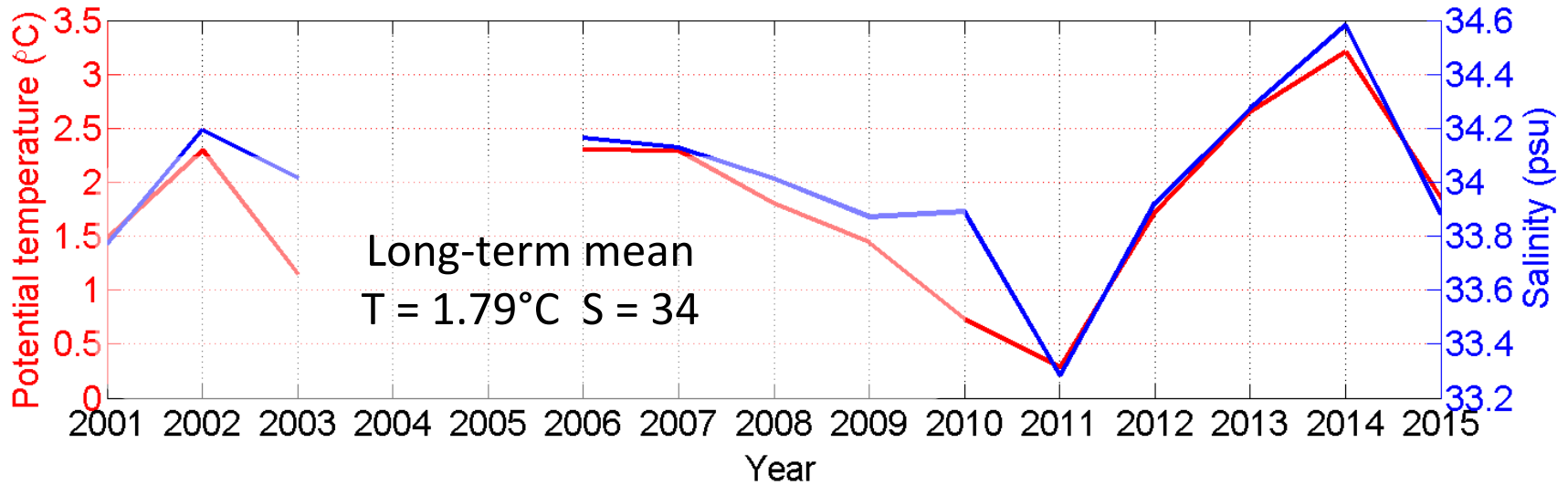
Distribution of potential temperature along section A in July 2001-2011



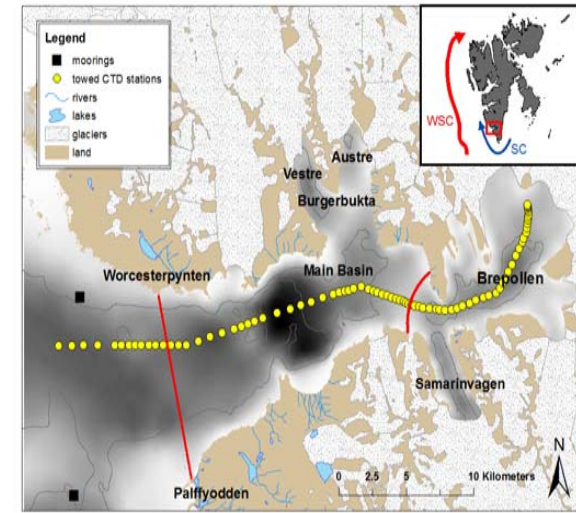
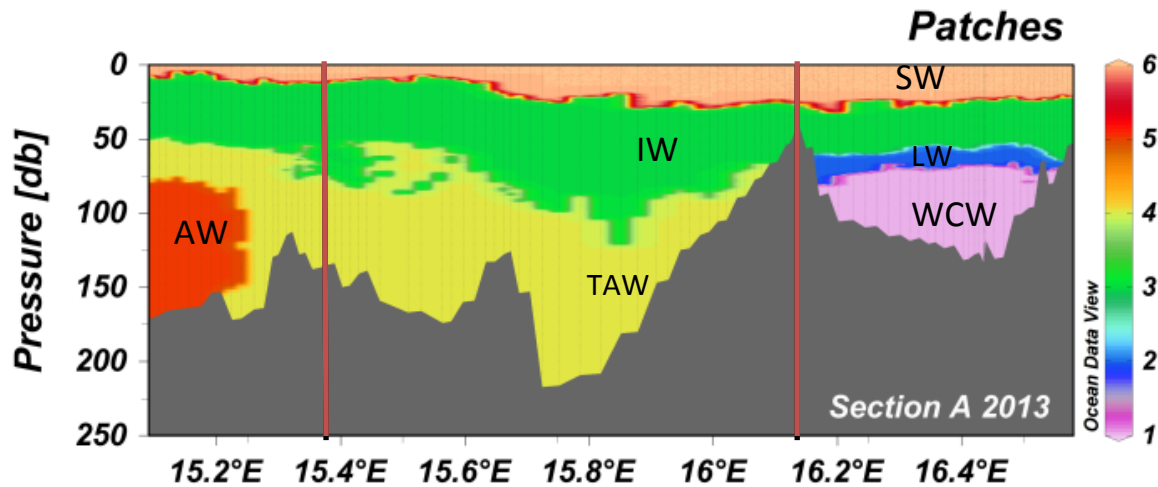
Distribution of potential temperature along section A in July 2012-2015



Changes in water temperature and salinity in summers 2001-2015



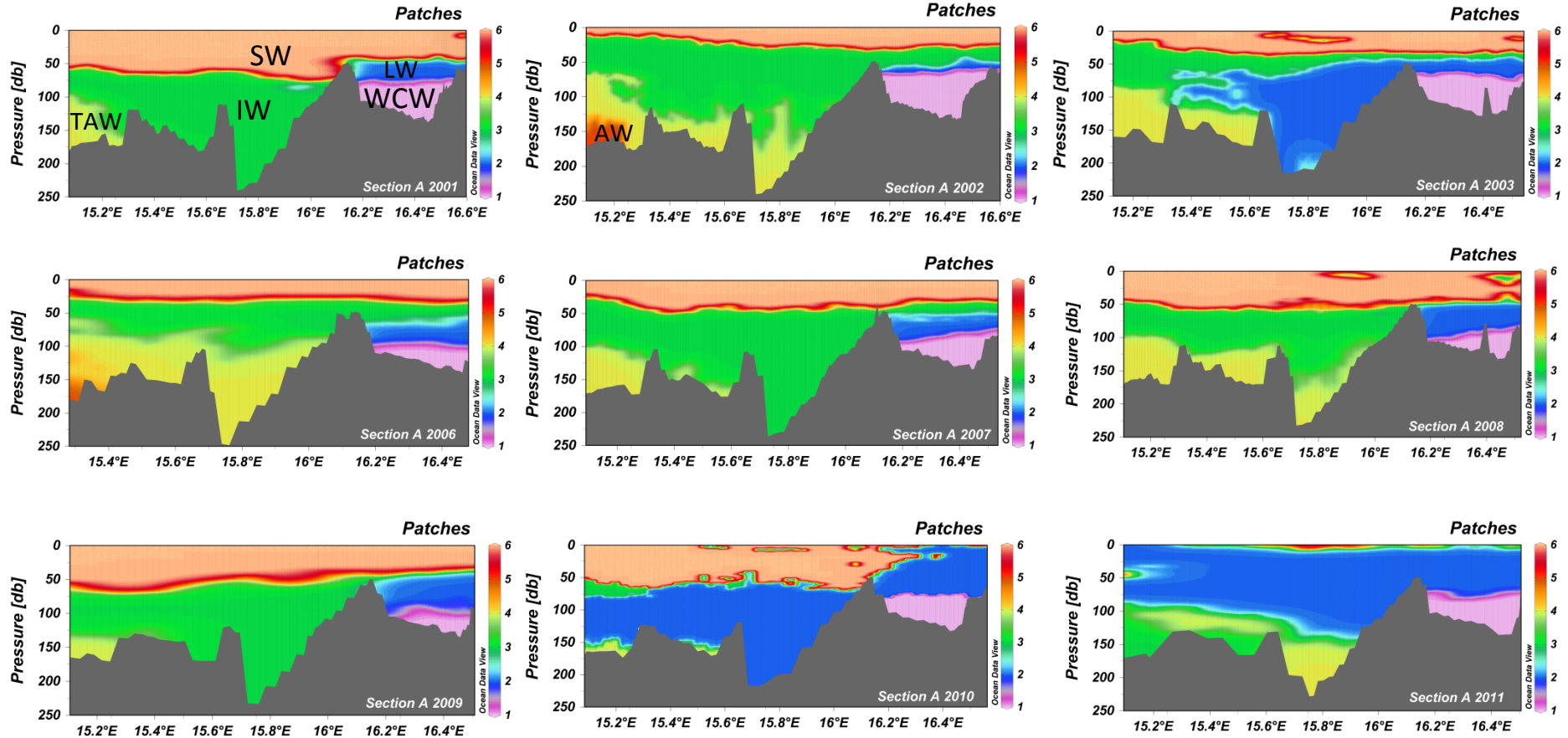
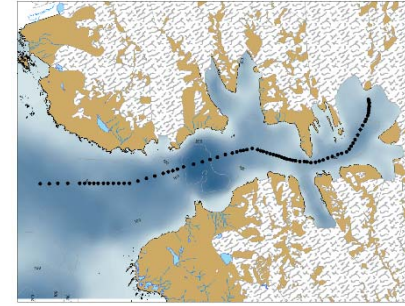
General pattern and variability of summer water properties in the fjord



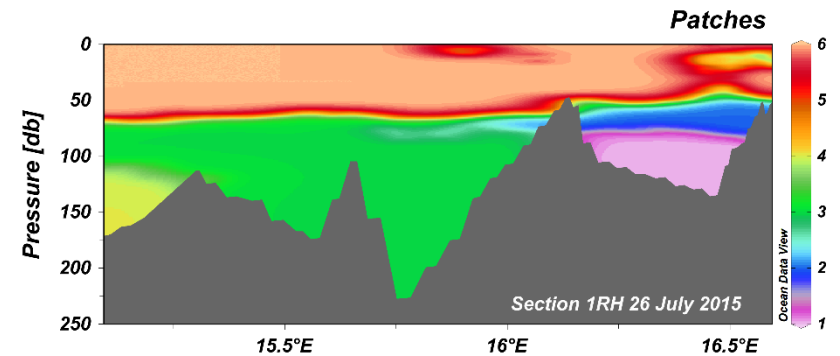
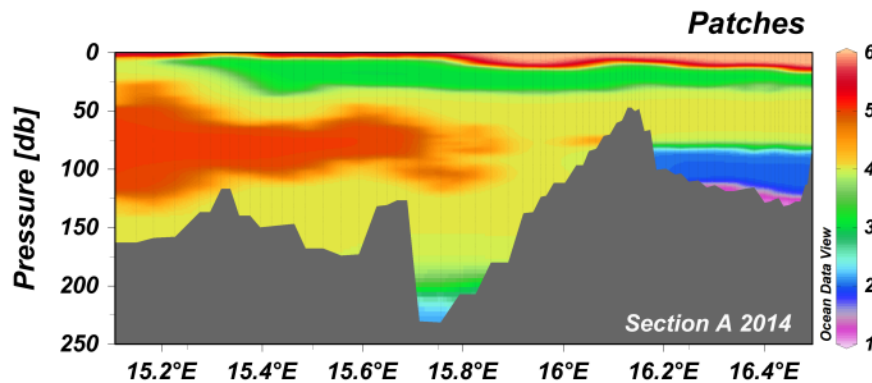
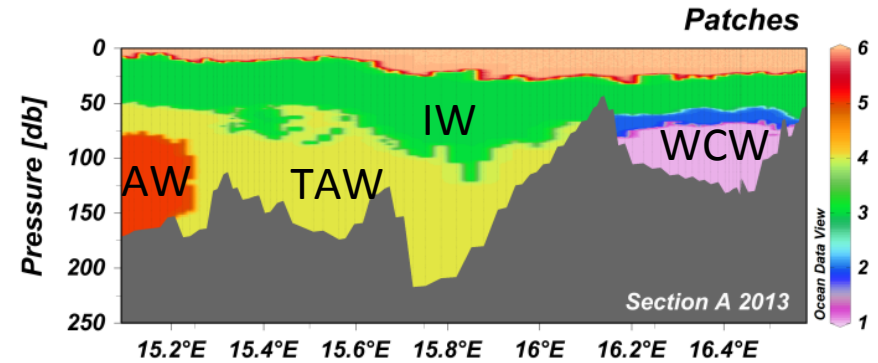
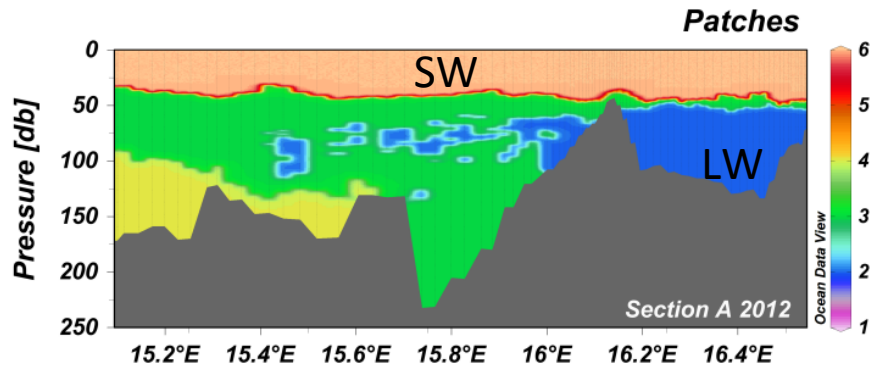
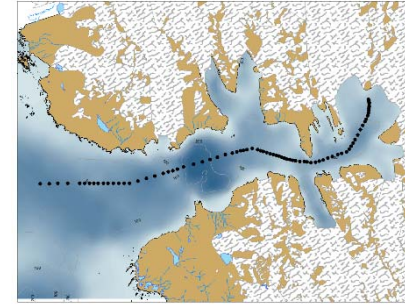
Water mass	Acronym	Temperature	Salinity
Atlantic Water	AW	> 3	> 34.9
Transformed Atlantic Water	TAW	> 1	> 34.7
Surface Water	SW	> 1	< 34
Intermediate Water	IW	> 1	34 ÷ 34.7
Local Water	LW	< 1	
Winter – cooled Water	WCW	< -0.5	> 34.4

According to Nilsen et al. 2008

Distribution of water masses along section A in July 2001-2011

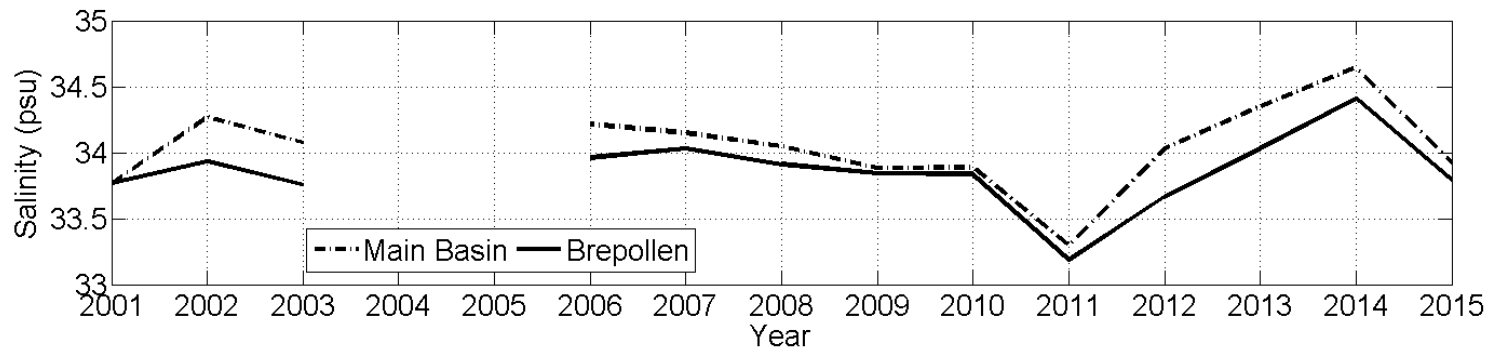
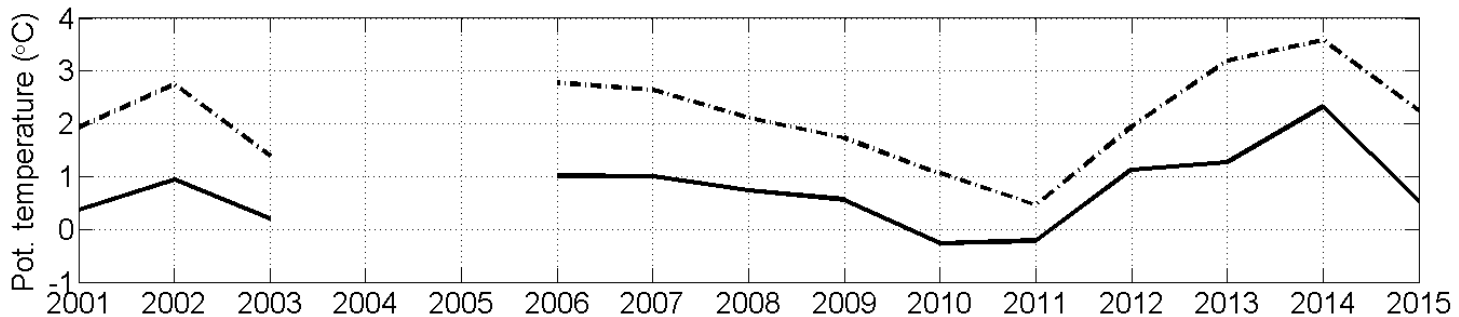
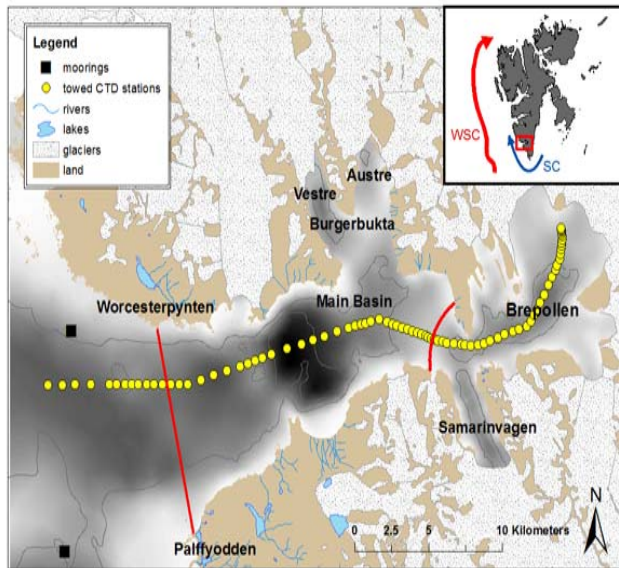


Distribution of water masses along section A in July 2012-2015

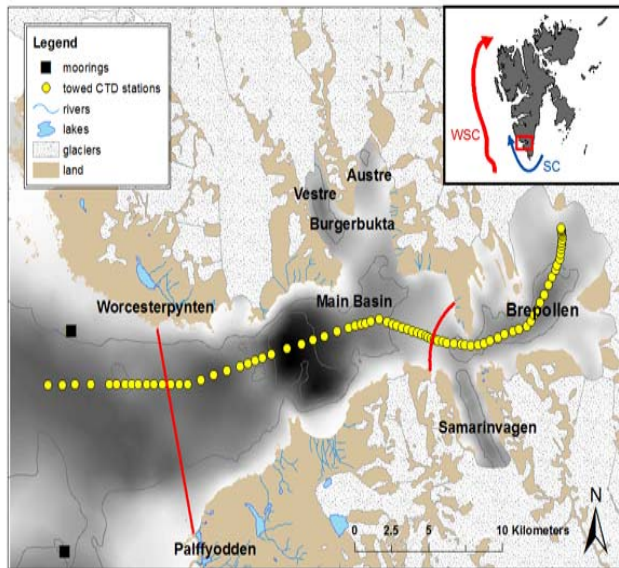


Differences in temperature and salinity between Main Basin and Brepollen

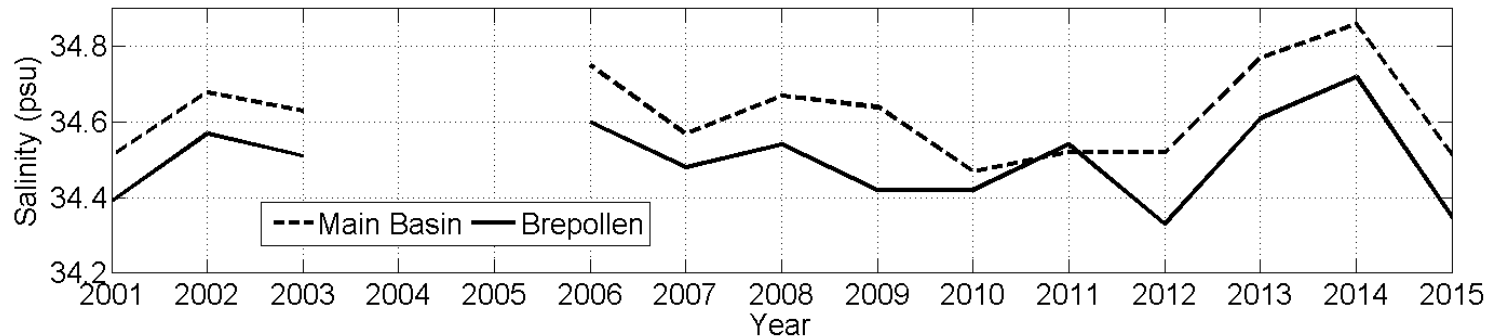
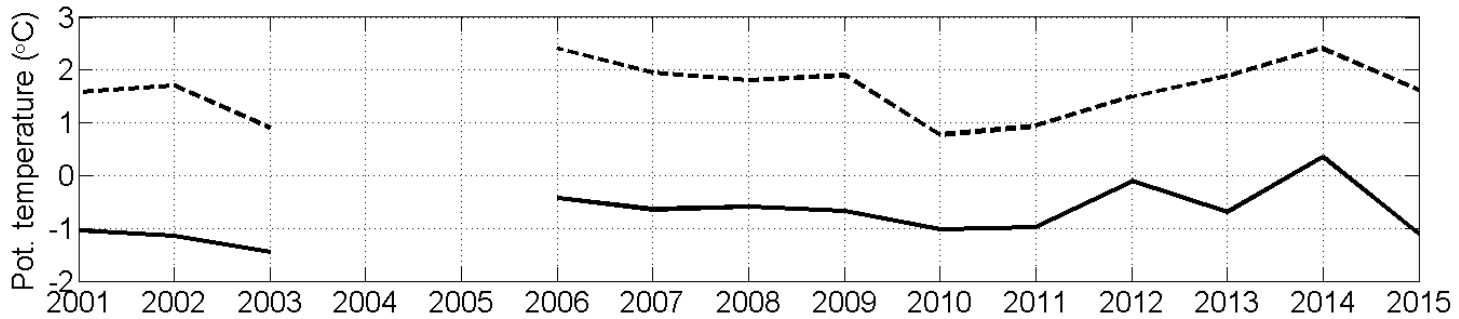
mean T difference: 1.40°C
mean S difference: 0.19 psu



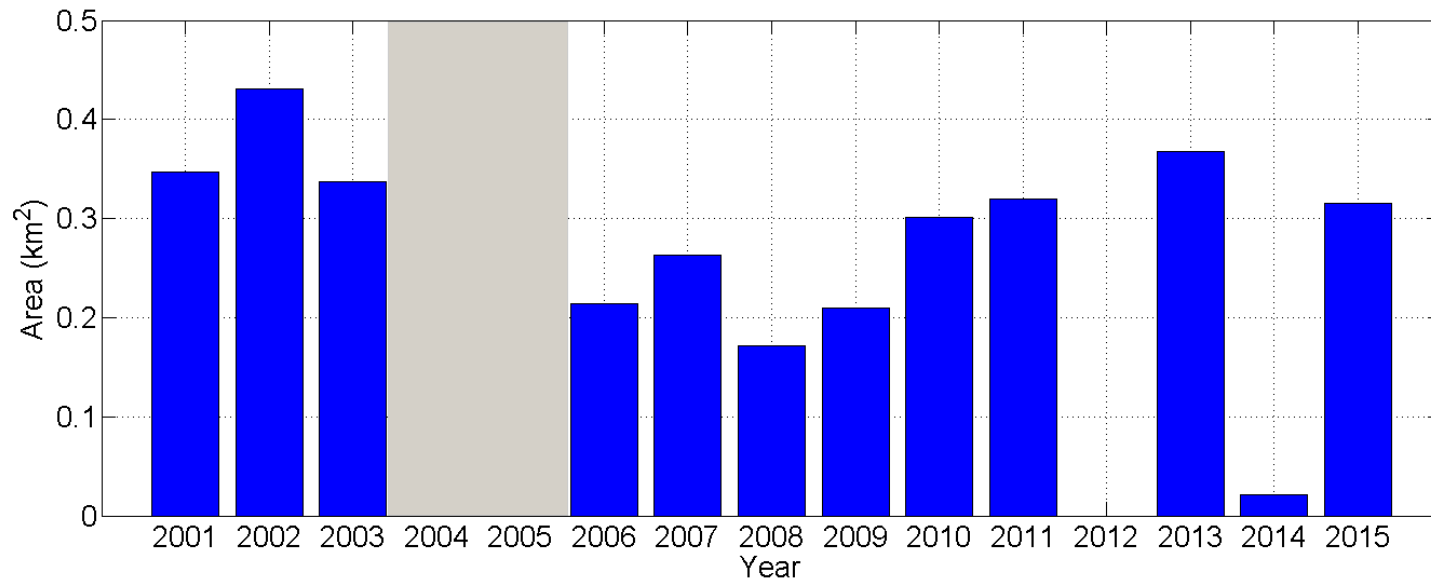
Differences in bottom temperature and salinity between Main Basin and Brepollen



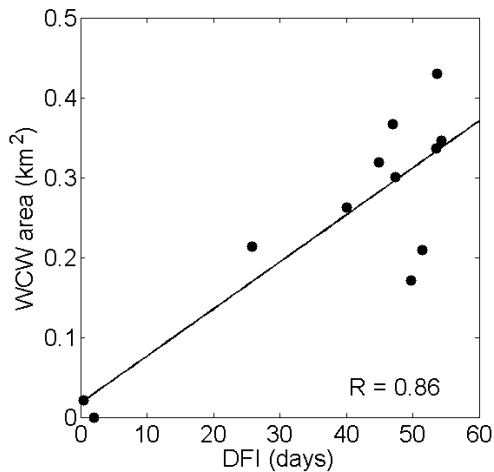
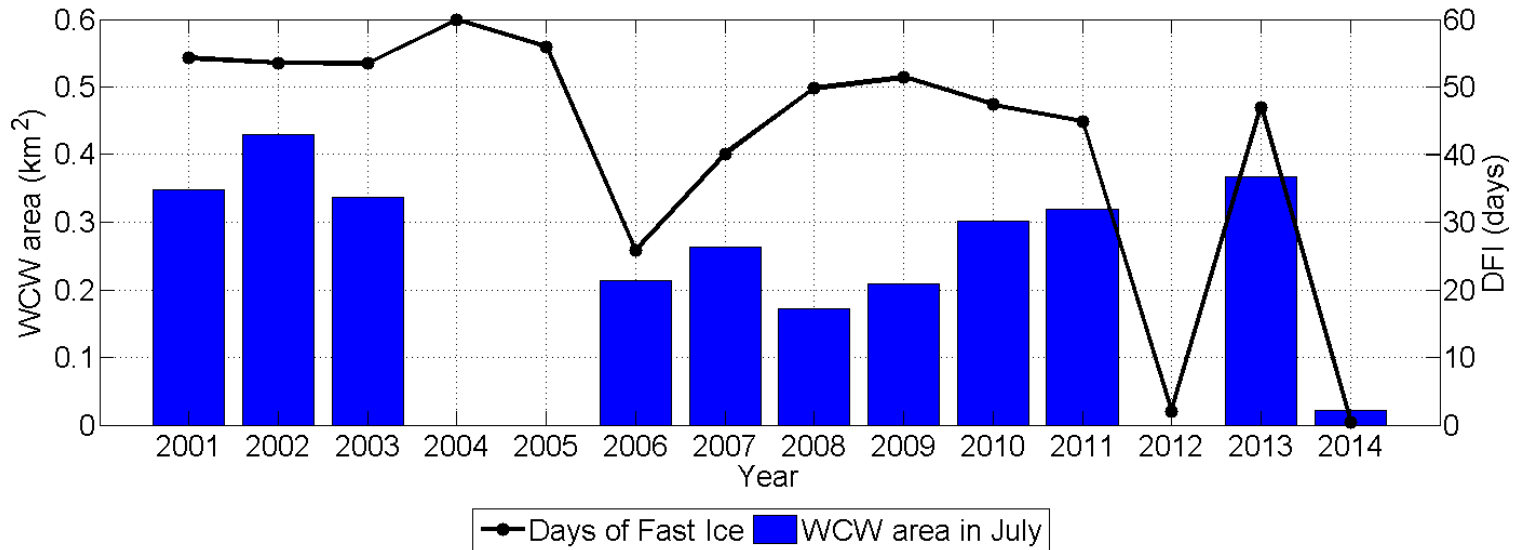
mean bottom T difference: 2.38°C
mean bottom S difference: 0.13 psu



Area of section A occupied by Winter Cooled Water every July 2001-2015

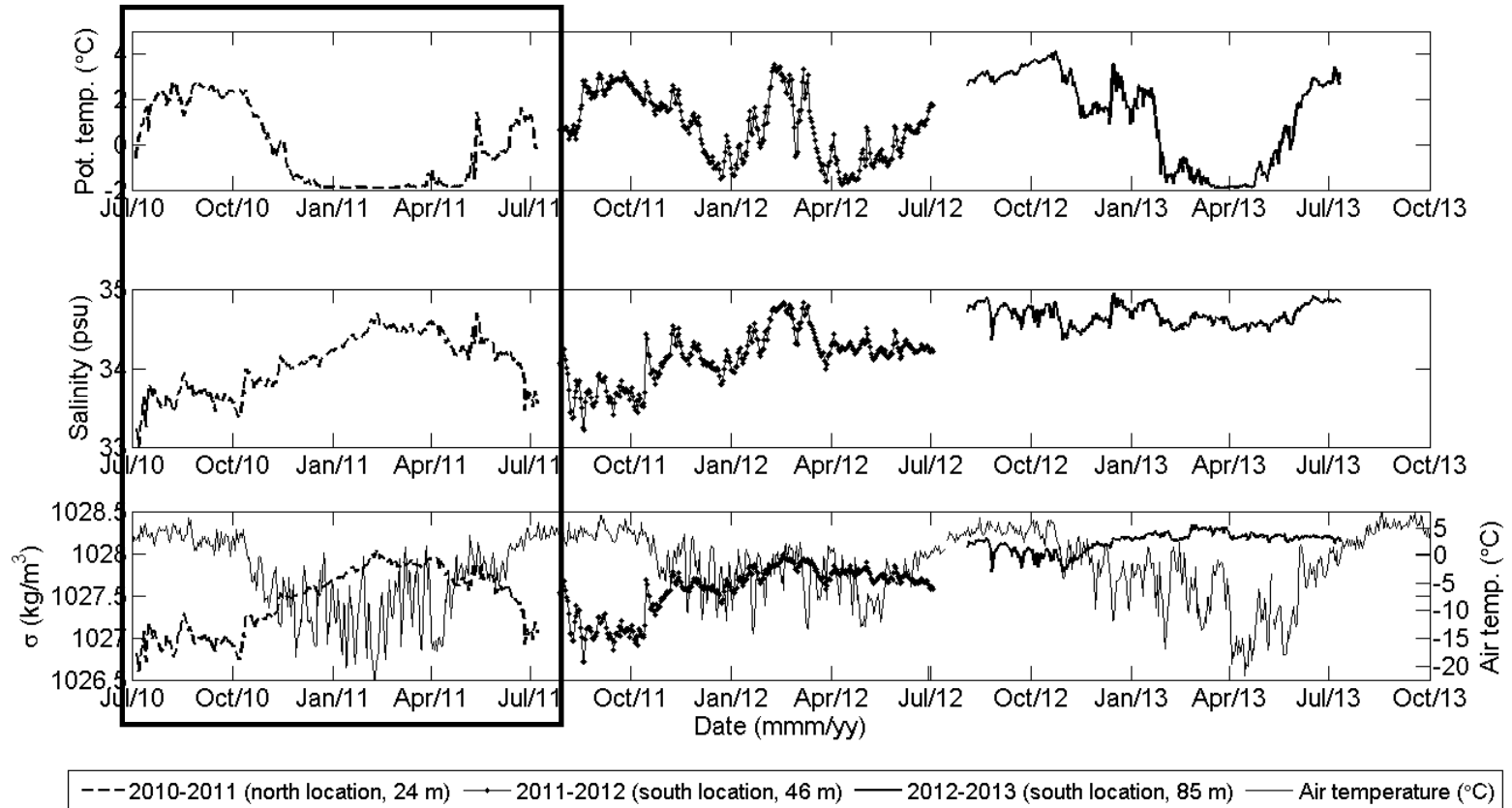
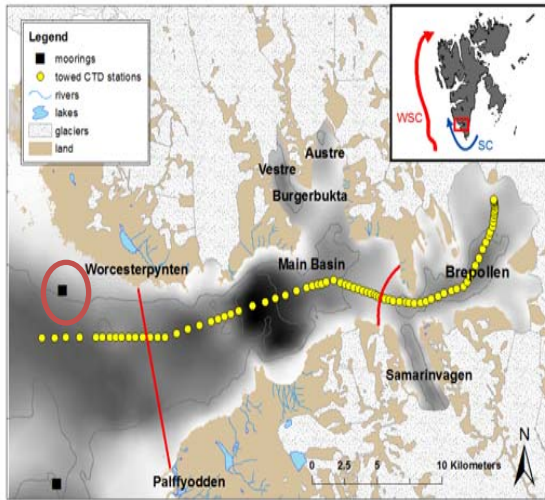


Winter Cooled Water vs Days of Fast Ice (DFI)

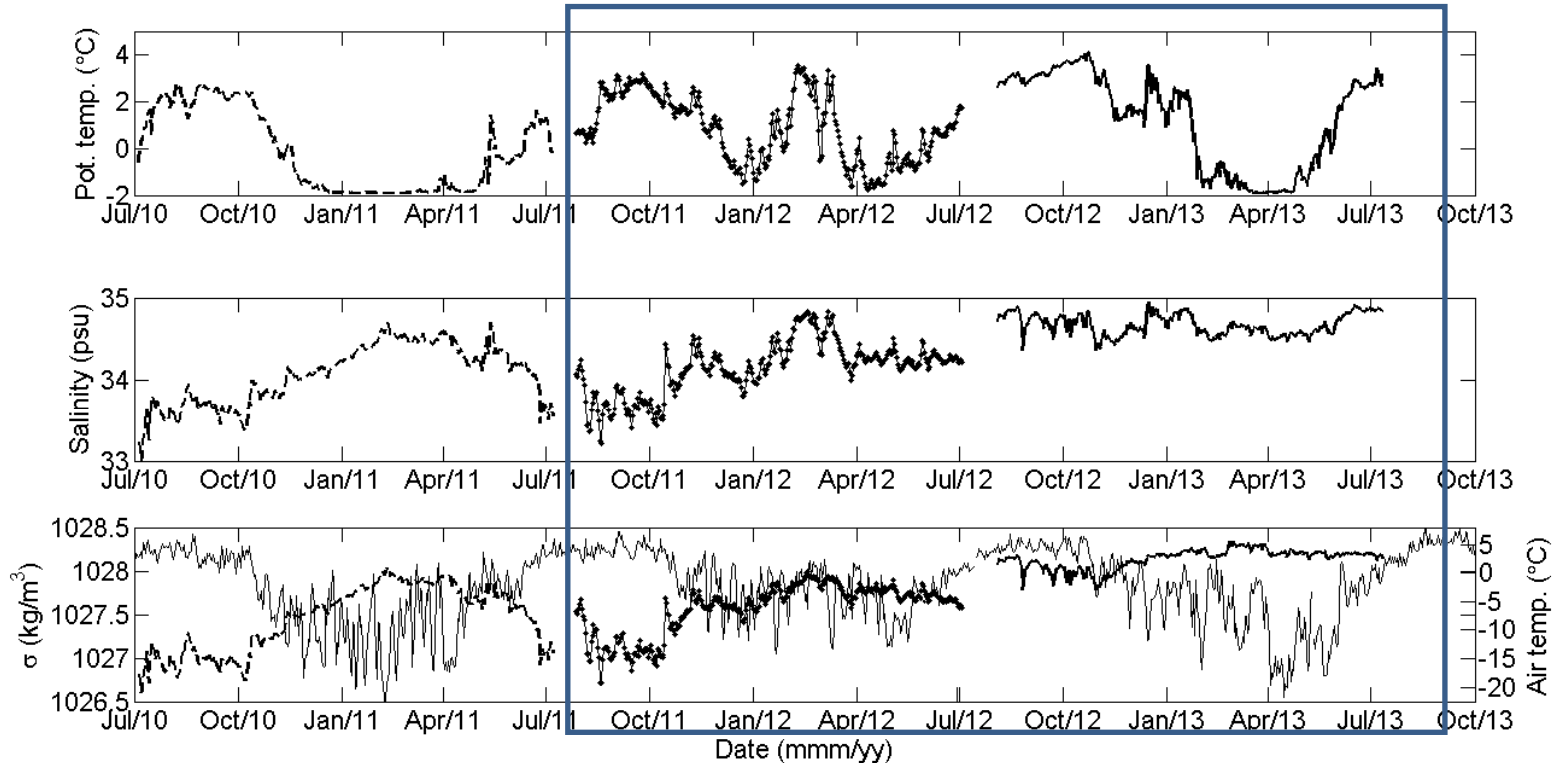
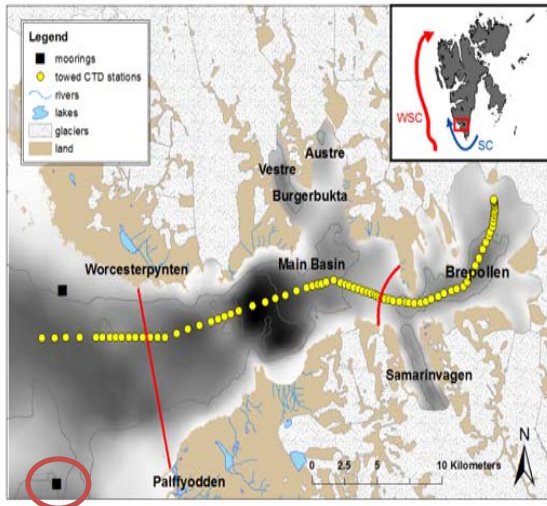


Data of DFI are taken from Muckenhuber et al. 2015

Mooring observations

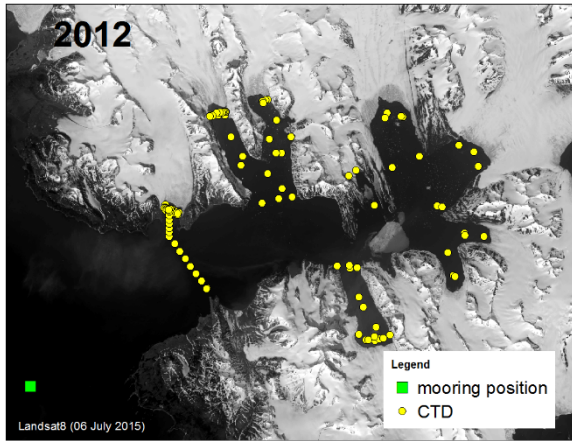


Mooring observations

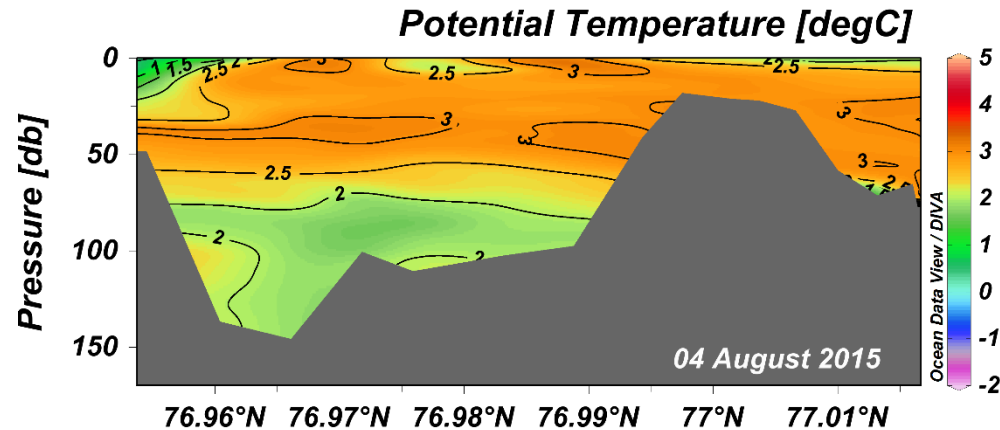
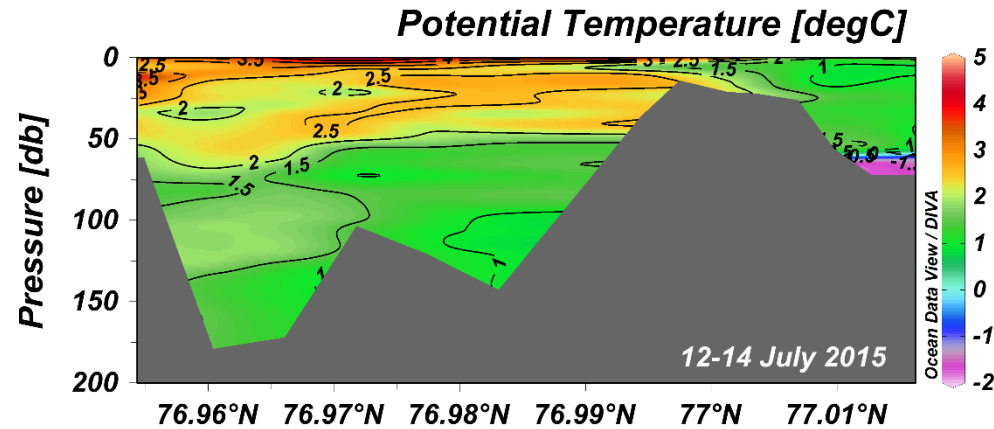
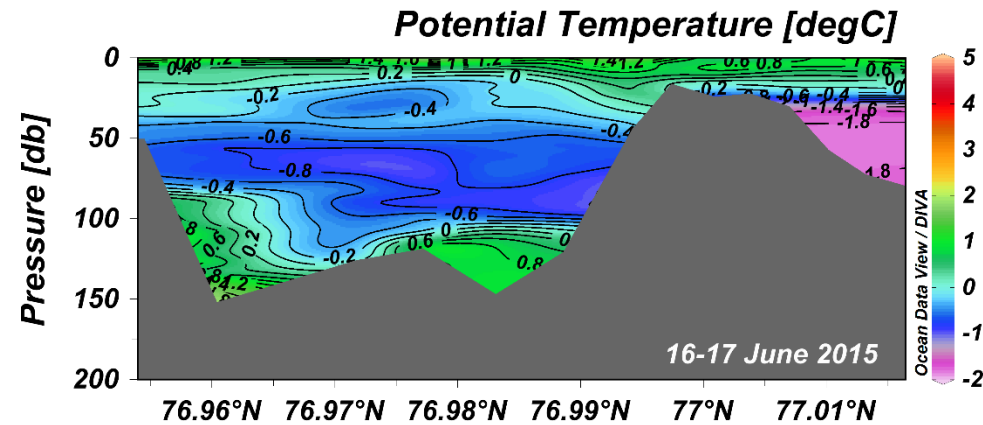


--- 2010-2011 (north location, 24 m) -+ 2011-2012 (south location, 46 m) — 2012-2013 (south location, 85 m) — Air temperature ($^{\circ}\text{C}$)

Water mass evolution

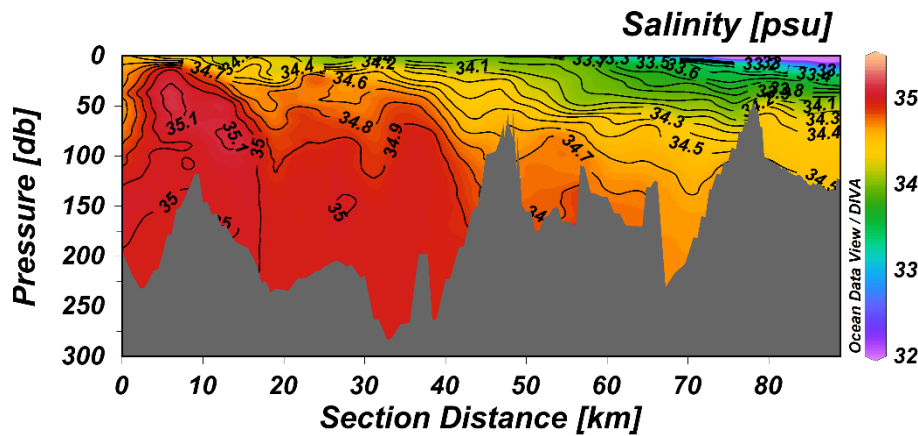
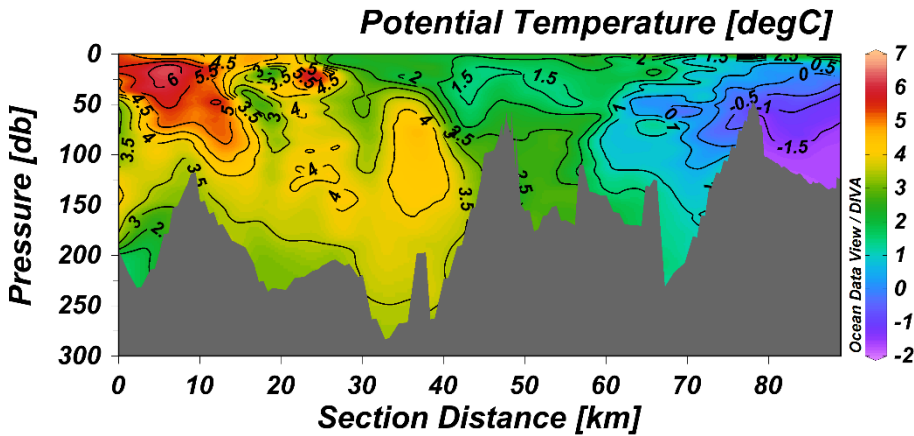


- The transition between winter and summer conditions is observed in June
- The shift from summer (Atlantic type) to winter conditions (Arctic type) is observed between November and December

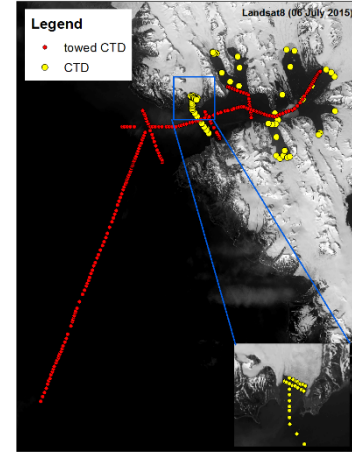
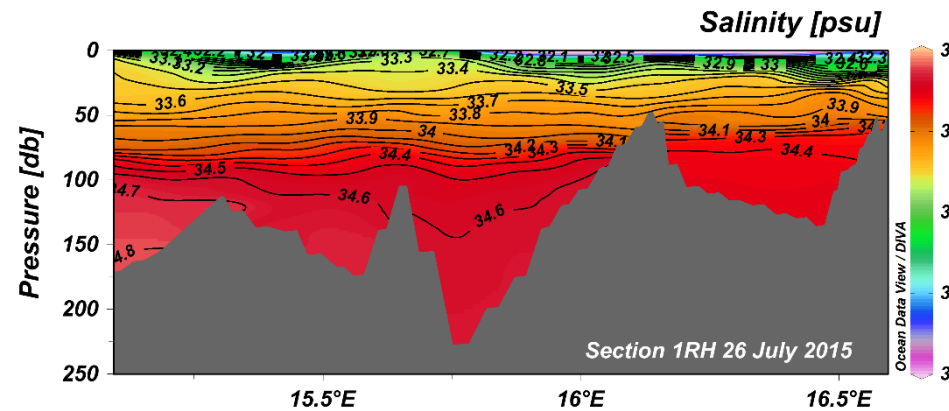
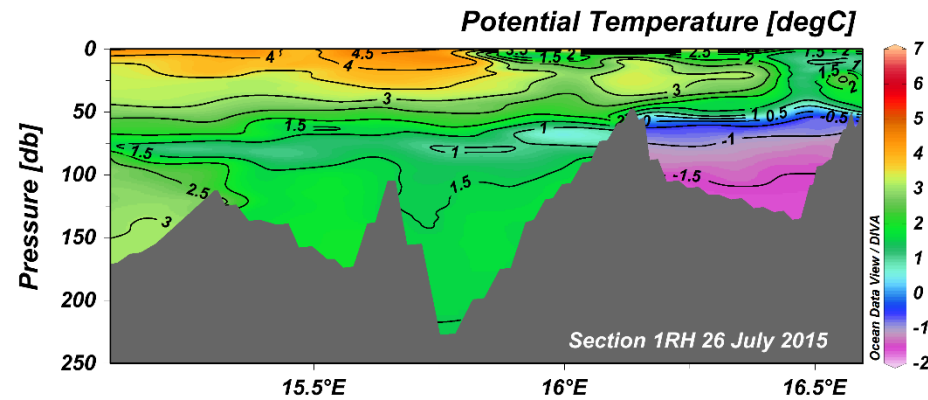


Summer 2015

4-5 July



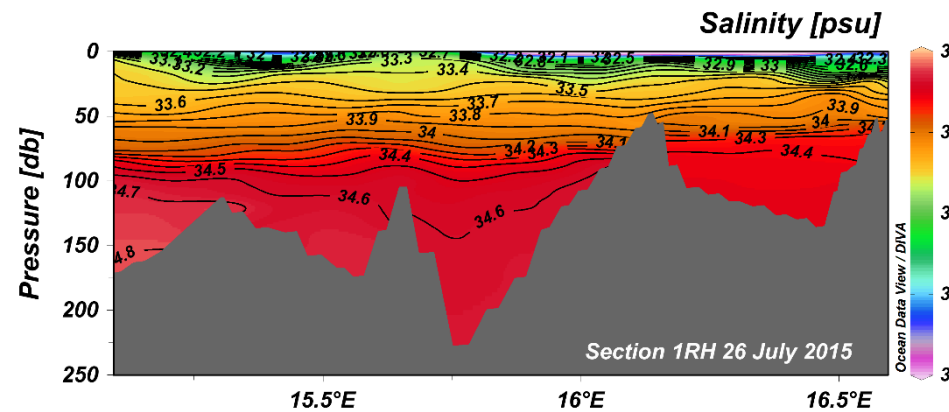
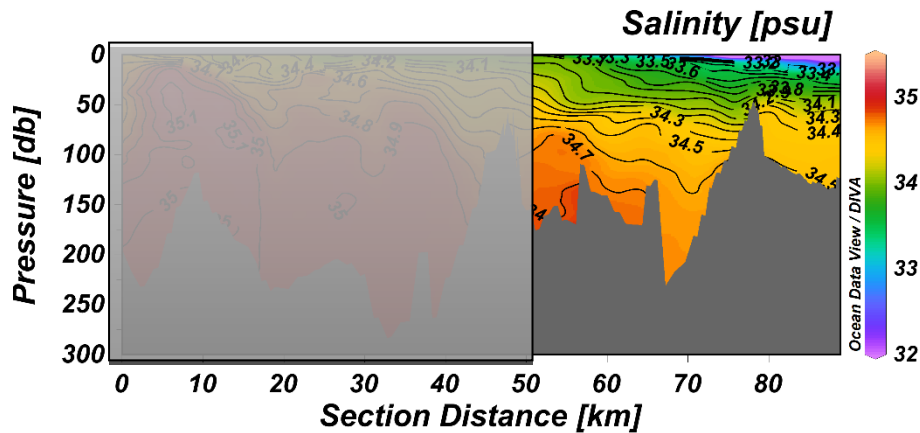
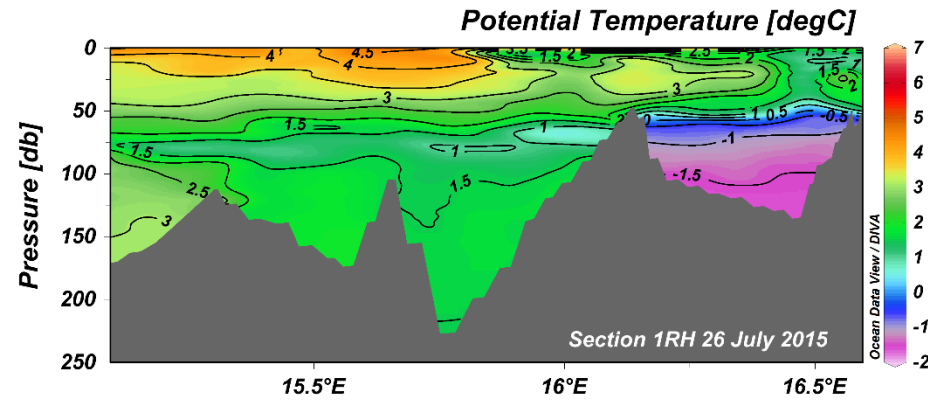
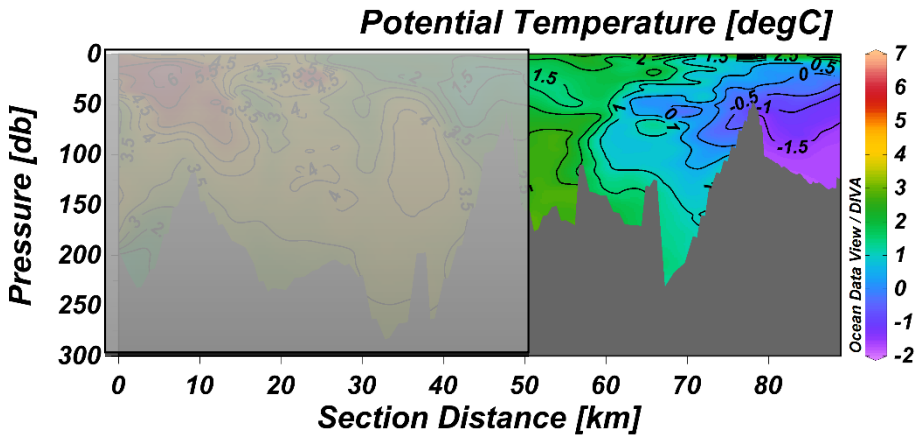
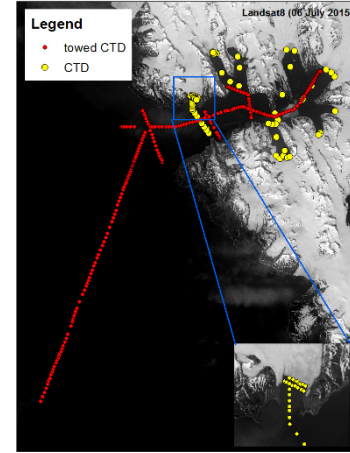
26 July



Summer 2015

4-5 July

26 July





AWAKE2

*Arctic Climate System Study of Ocean, Sea Ice and
Atmosphere interactions*



WP3. Fjord Oceanography

Task 3.1. Fjord hydrography from historical and new data

Thank you for the attention

