The performance of a regional coupled ocean/sea ice model
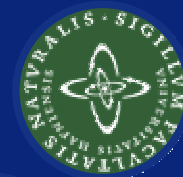
Till A. S. Rasmussen, Nicolai Kliem

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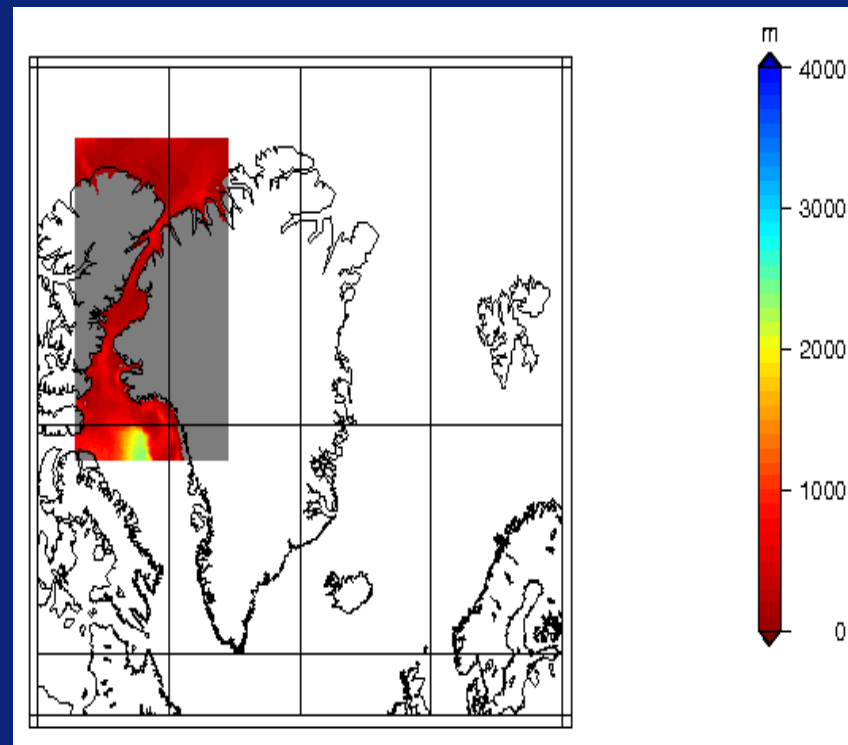UNIVERSITY OF COPENHAGEN

Goal

- *Project goal:*

  Regional changes of sea ice and hydrography when the climate changes in the Nares strait, Baffin bay and Lincoln sea

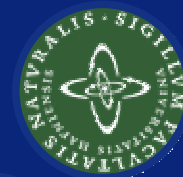- *This talk:*

  Focus on validation of ice flux

Domain

- Nares Strait, Baffin Bay and Lincoln Sea
- 73N – 84 N
- 82W – 46W
- Resolution 4km to 10 km
- 110 x 180 grid points
- Model year 1997 - 1999

Tools

- Coupled model: HYCOM (OCEAN), CICE (sea ice)

- Atmospheric forcing HIRHAM . Regional setup around Greenland (~20 km grid).

- Ocean/sea ice boundaries hope/mpi_om (grid ~30 km)
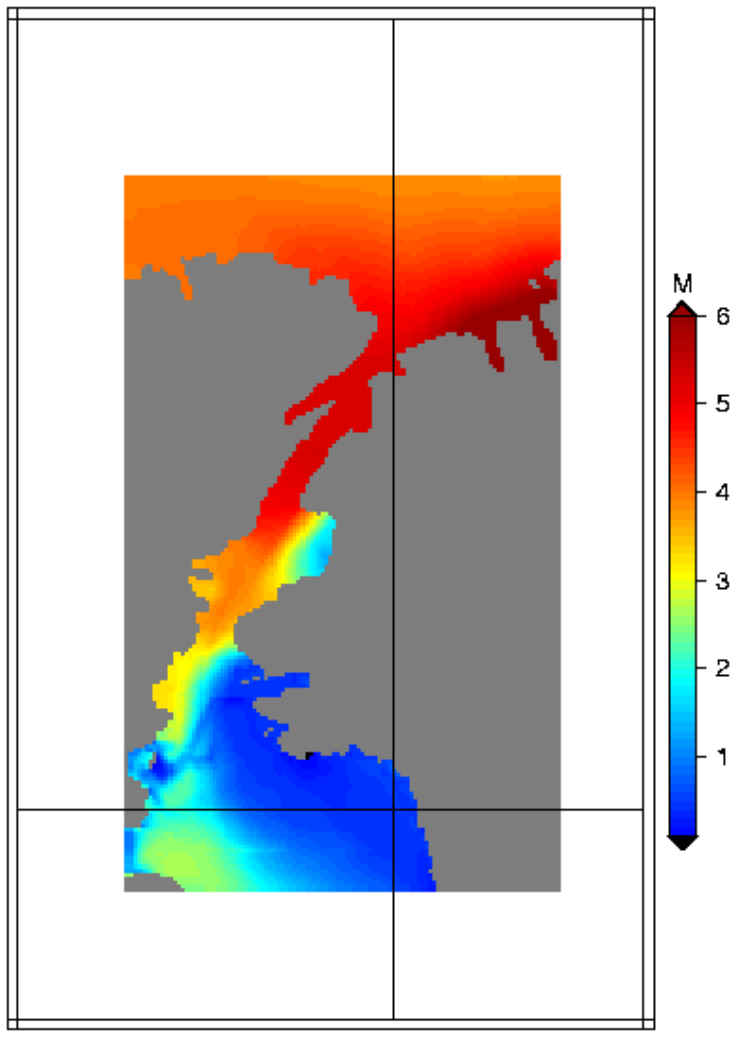
Lateral boundary conditions

- Global Ocean model provides total inflow

- CICE

  – Relaxation of ice thickness and ice concentration.

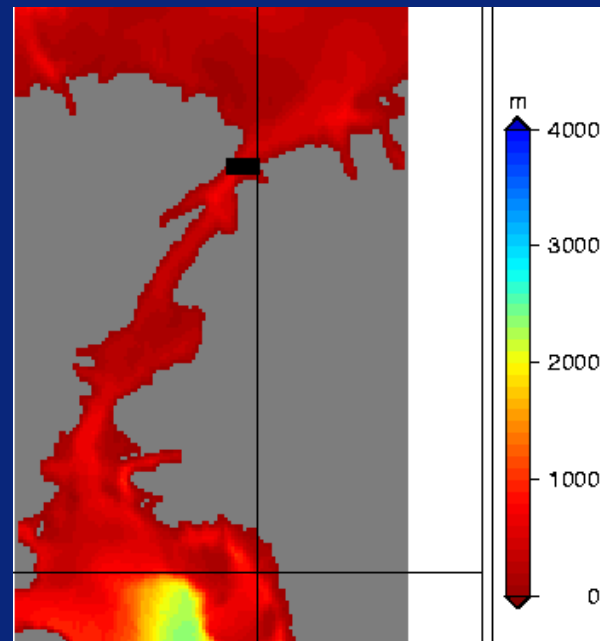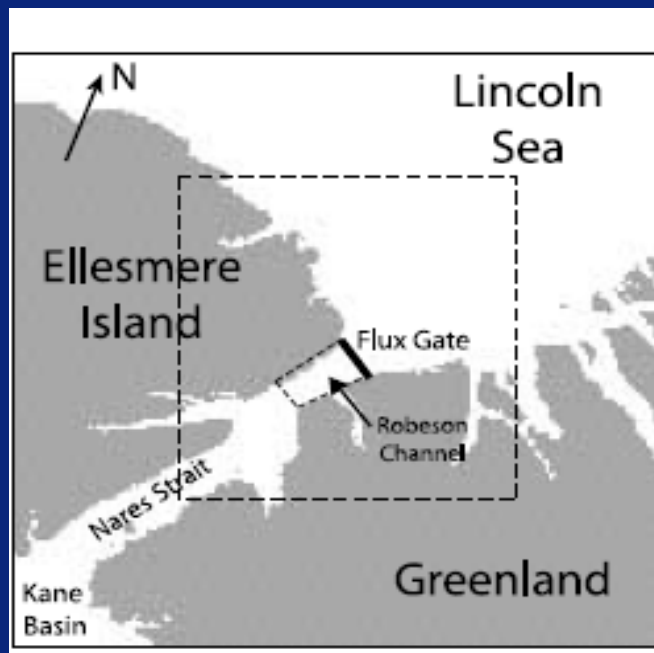 – Energy adjusted to "new" ice cover

  – Closed boundaries

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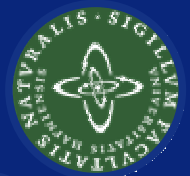
Ice thickness

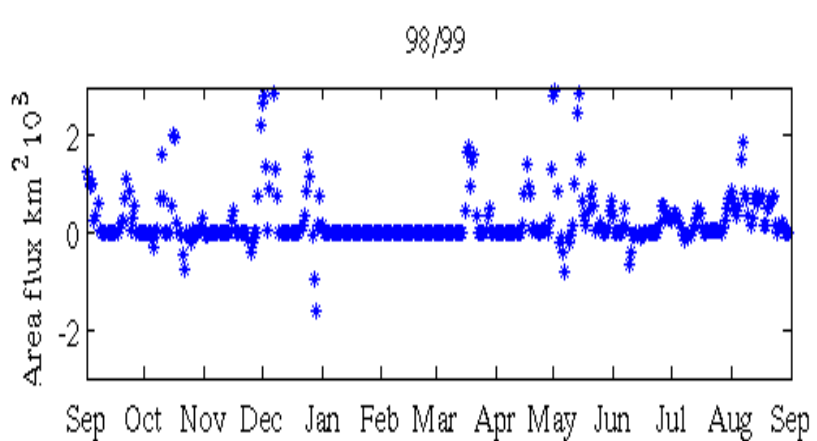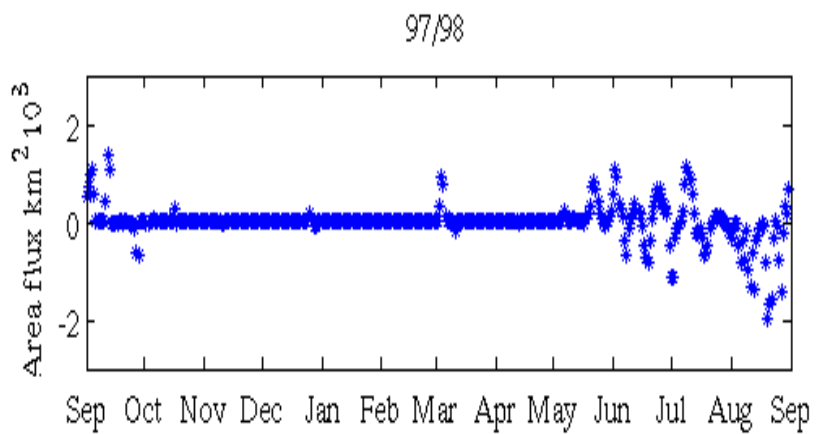1997 005

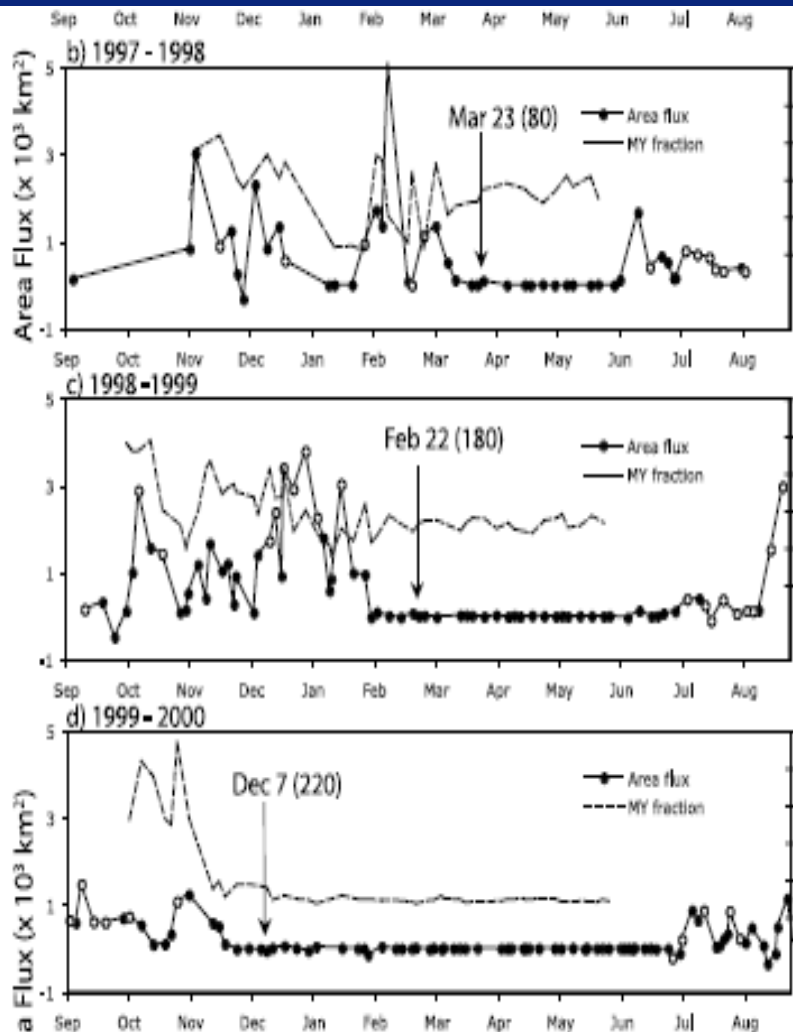# Flux calcutlation Cross section

Reference: Kwok R. (2005)

Finds ice area flux based on satelite images

Assumes ice thickness of 4 meters

Area Flux

Total flux

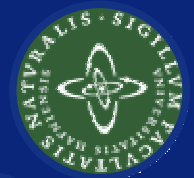| R kwok	Model flux	
Yearly average 97/98 - 01/02	97/98	98/99
Area Flux km^2*10^3		
16– 48	0.3	31
VOL Flux km^3		
64 - 193	1.8	103

Conclusions

- 2 model years has been compared with satellite data

- The first year has a very low flux

  – This is probably caused by a large northward ice flux in the summer

  – This period is dominated by winds towards north

Conclusions

- Fluxes in one year fits well

- The ice flux is generally towards south

- Longer model run is needed