

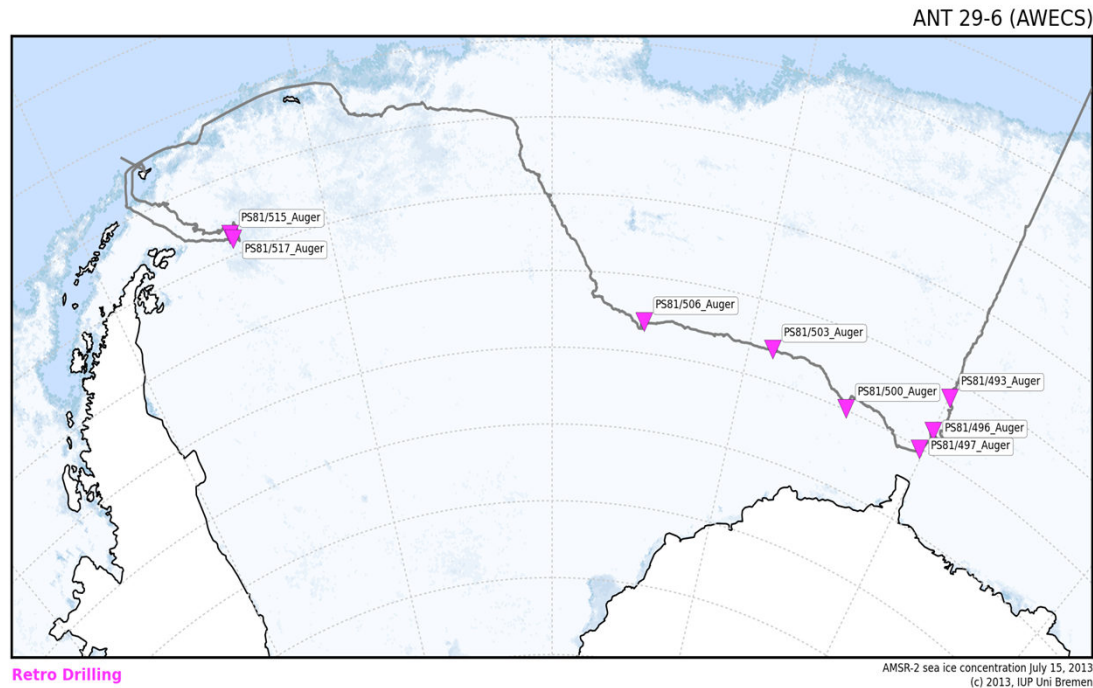
# Winter sea-ice thicknesses in the Weddell Sea and their variability over the past 24 years

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# ANT-XXIX/6: the recent winter experiment



ANT-XXIX/6  
08.06.-12.08.13

Cape Town – Punta Arenas  
Winter experiment

- 9 drilling stations
- Sea ice thickness
  - Freeboard
  - Snow depth

# Objectives



## Regional Sea Ice Thickness Distribution

Thermodynamic & Dynamic Ice Growth

## Remote Sensing Validation Data

CryoSat-2

SMOS

## Method Development

Improved Resolution (1D ► 2D)



# Objectives



## Regional Sea Ice Thickness Distribution

Thermodynamic & Dynamic Ice Growth

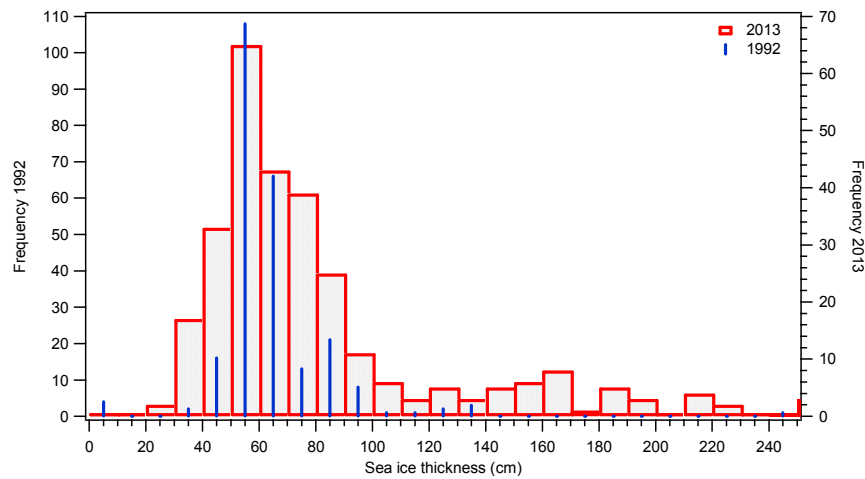
Comparison to other winter data



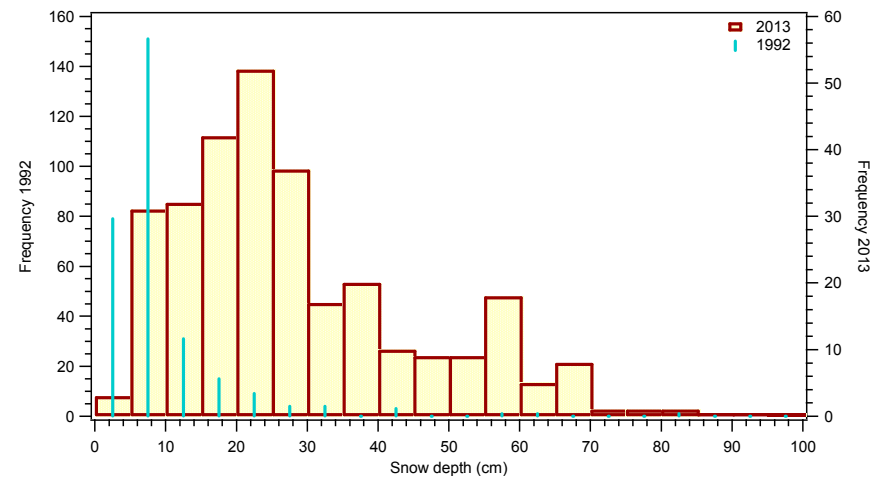
# Distribution 1992 vs. 2013



### Sea ice thickness

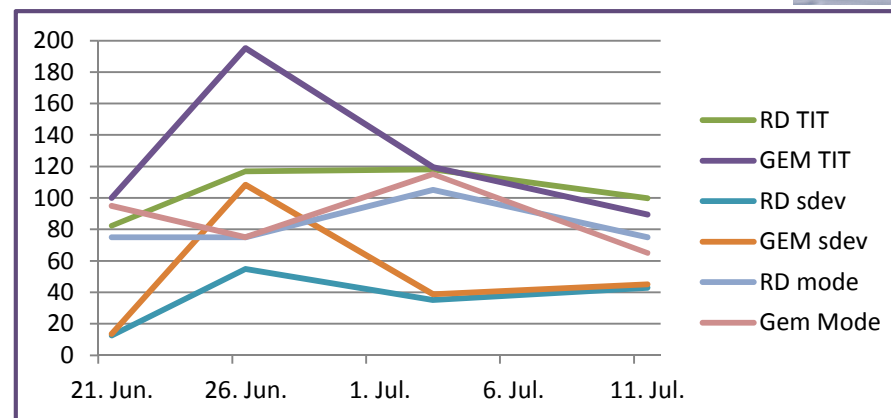
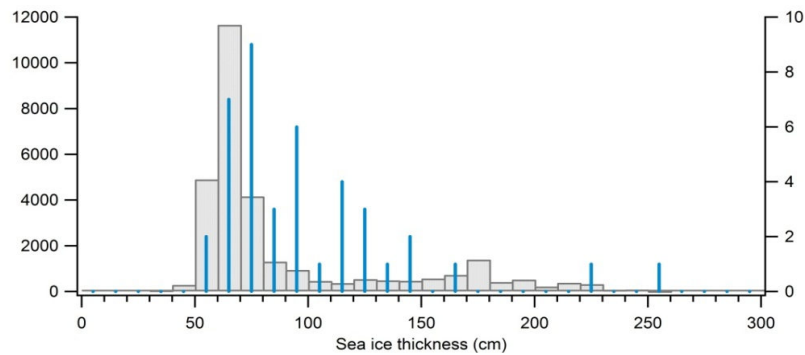
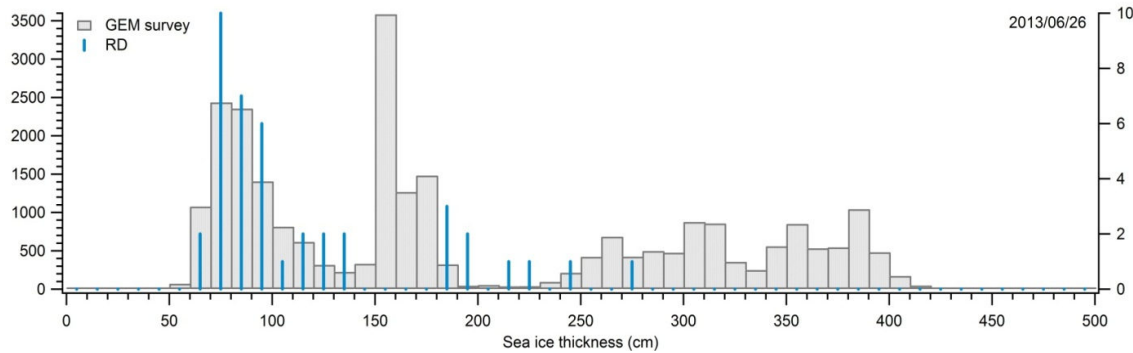


### Snow depth

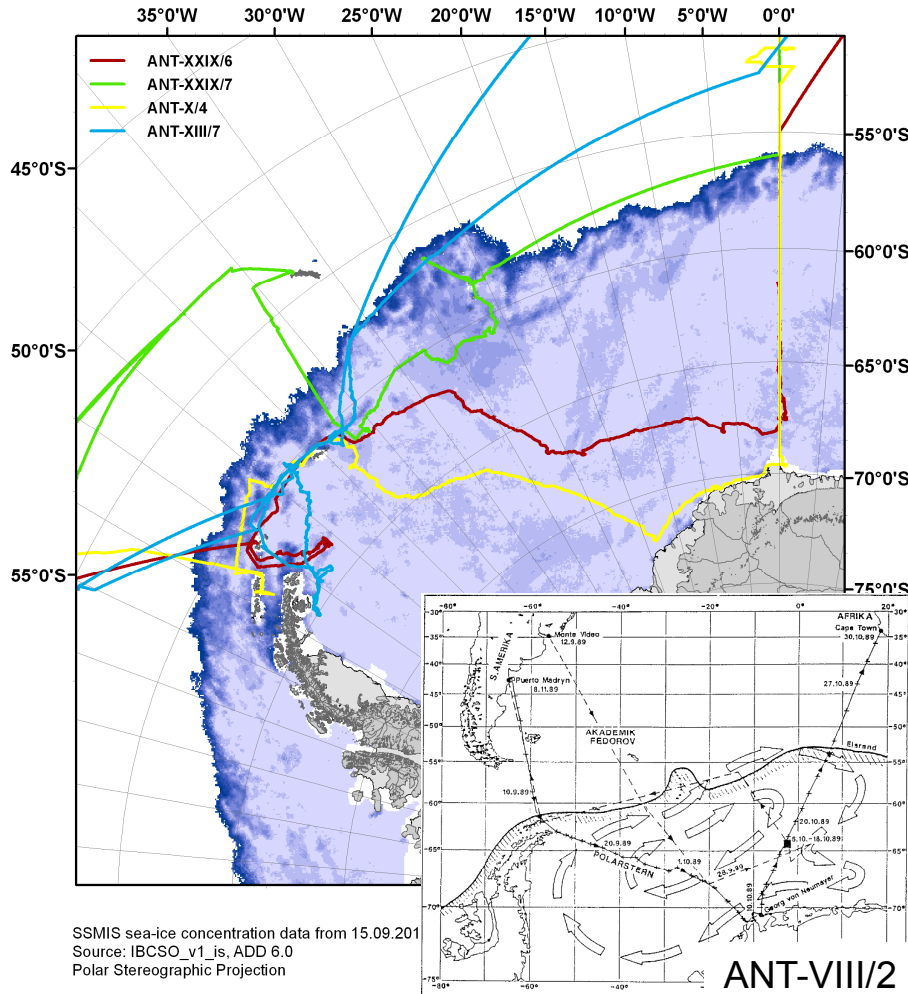


- Sea-ice thickness distribution comparable
- Snow depth much higher in 2013

# Retro Drilling-GEM comparison



# Winter - early spring expeditions



## ANT-VIII/2

06.09. – 31.10.1989  
Weddell Sea, Spring

## ANT-X/4

21.05. – 06.08.1992  
Weddell Sea, Winter

## ANT-XXIII/7

24.08. – 29.10.2006  
Western Weddell Sea, Winter-Spring

## ANT-XXIX/6

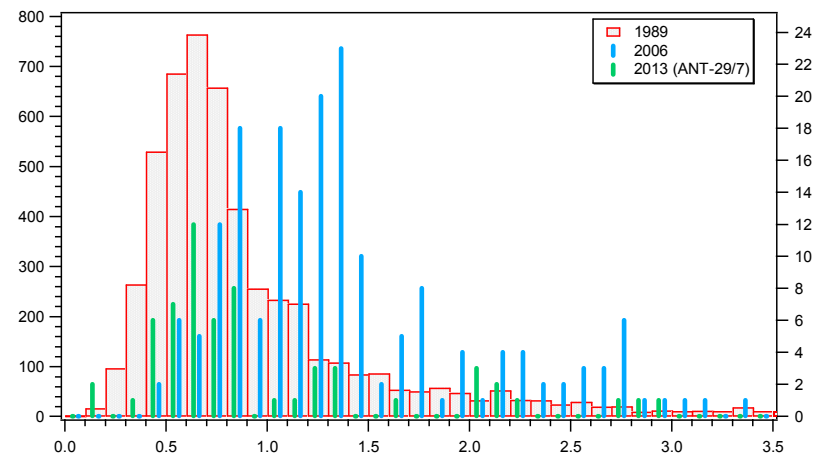
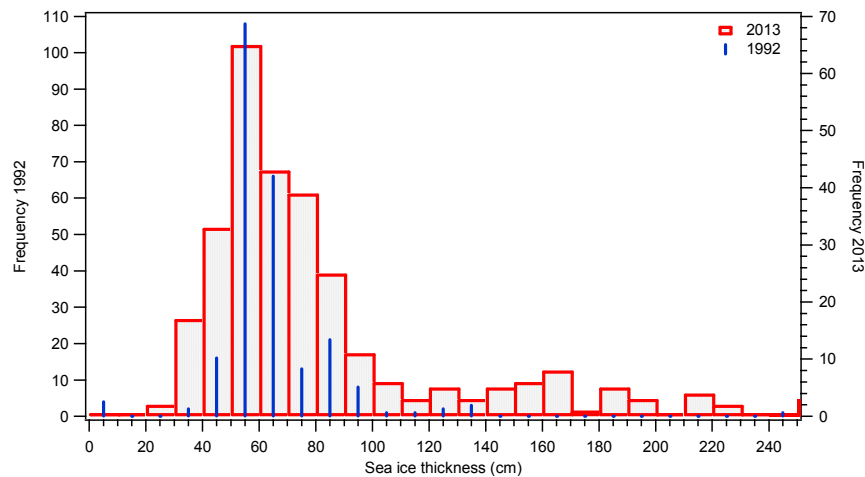
08.06. – 12.08.2013  
Weddell Sea, Winter

## ANT-XXIX/7

14.08. – 16.10.2013  
Western Weddell Sea, Winter-Spring



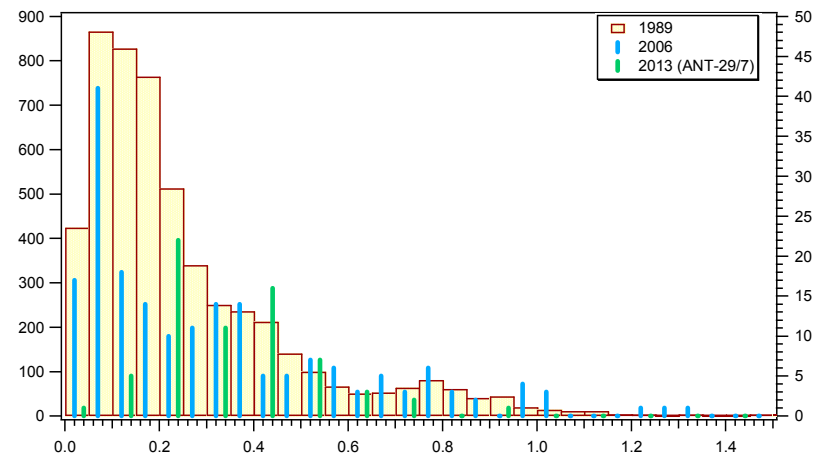
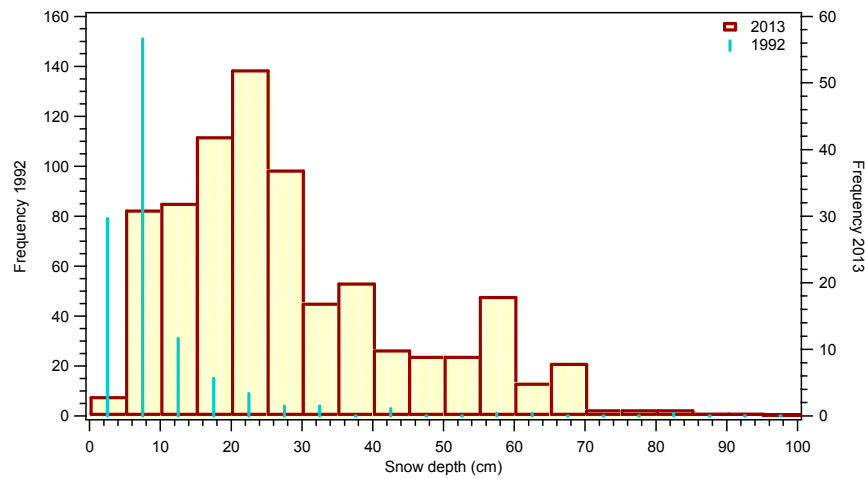
# Sea-ice thickness comparison



- Sea-ice thickness distribution comparable between 1989 and 2013
- 2006 shows higher sea-ice thickness

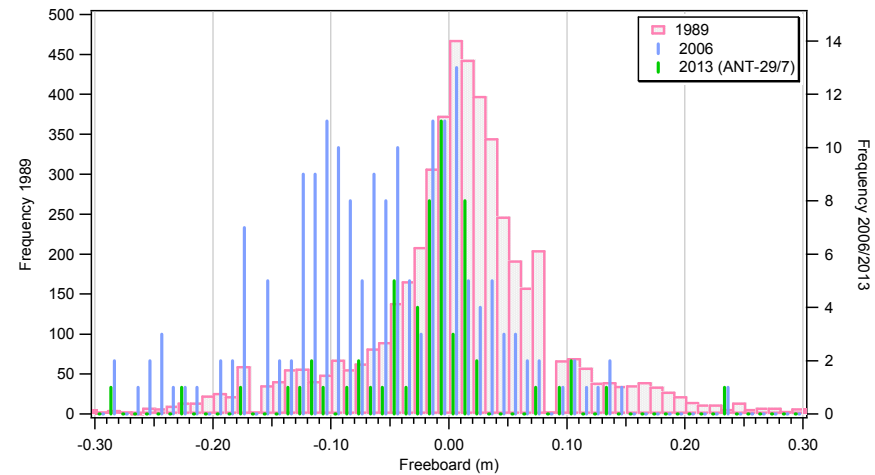
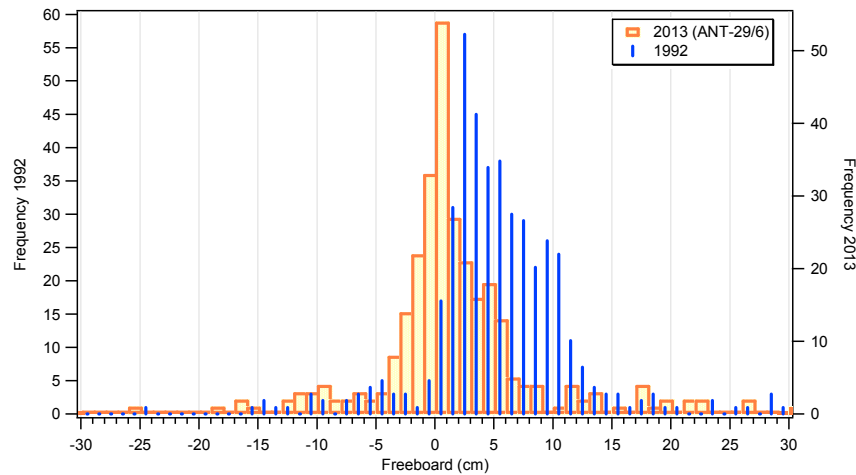


# Snow depth comparison



- Snow depth much higher than in every other year

# Freeboard comparison



- Freeboard shifted to lower or more negative values in 2013
- Interesting feature: 2006 shows very low, strongly negative shifted freeboard despite of less snow and thicker ice compared to other years!

# Sea ice extent variability

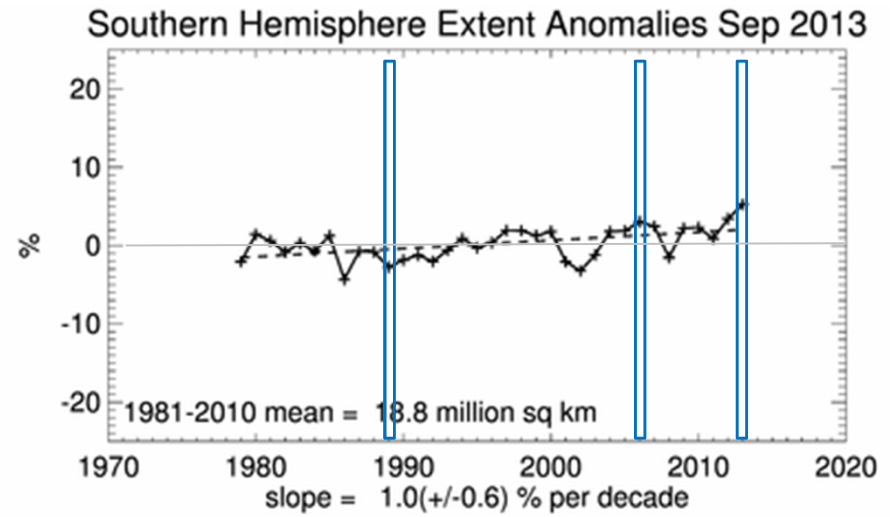
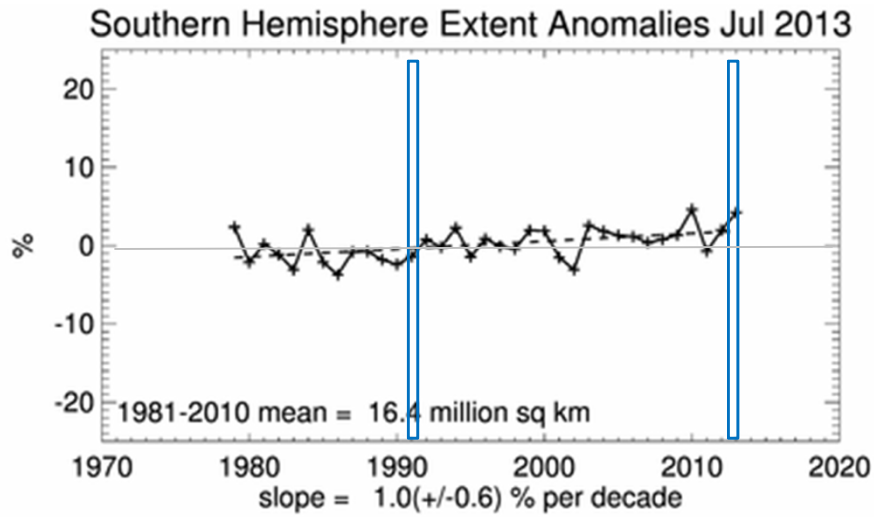


Image source: [http://nsidc.org/data/seaice\\_index/](http://nsidc.org/data/seaice_index/)

# Summary



- Sea ice thicknesses comparable to former winter/spring experiments
- Snow depth particularly high in 2013
- Freeboard generally more negative with higher snow coverage
  - Exception: 2006



# Outlook

- Comparison with model data
- Analysis: Does the snow save the sea ice