Using Argo under sea ice

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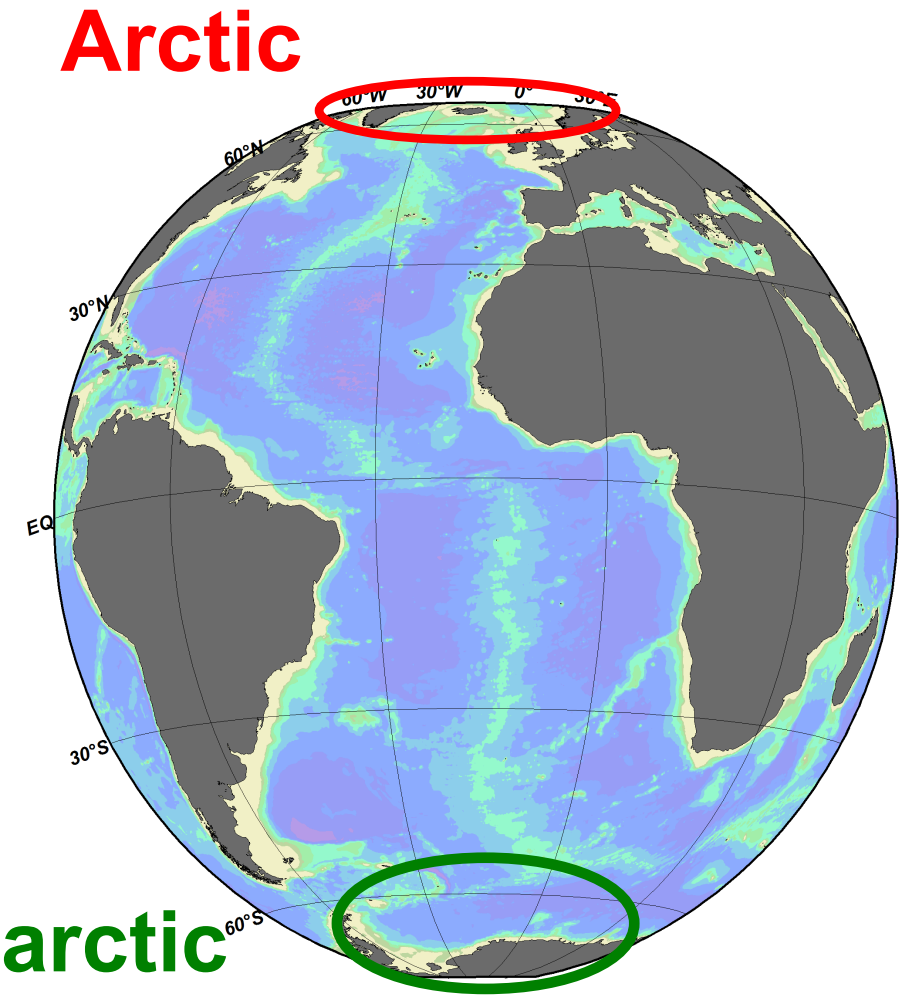

Outline

- Antarctic
  - Towards ice compatible floats
    - Ice Sensing Algorithm
    - Interim Store
    - RAFOS-Receivers
  - Array of Sound sources

- Outlook

Floats in the sea ice

Ice compatibility of Argo floats: a 3 step process

Ice sensing algorithm (ISA) 2003	Interim storage (iStore) 2005	RAFOS 2008
Aborts ascent when sea – ice is expected at the surface	Provides delayed mode profile when surfacing impossible	Provides subsurface profile position when surfacing impossible

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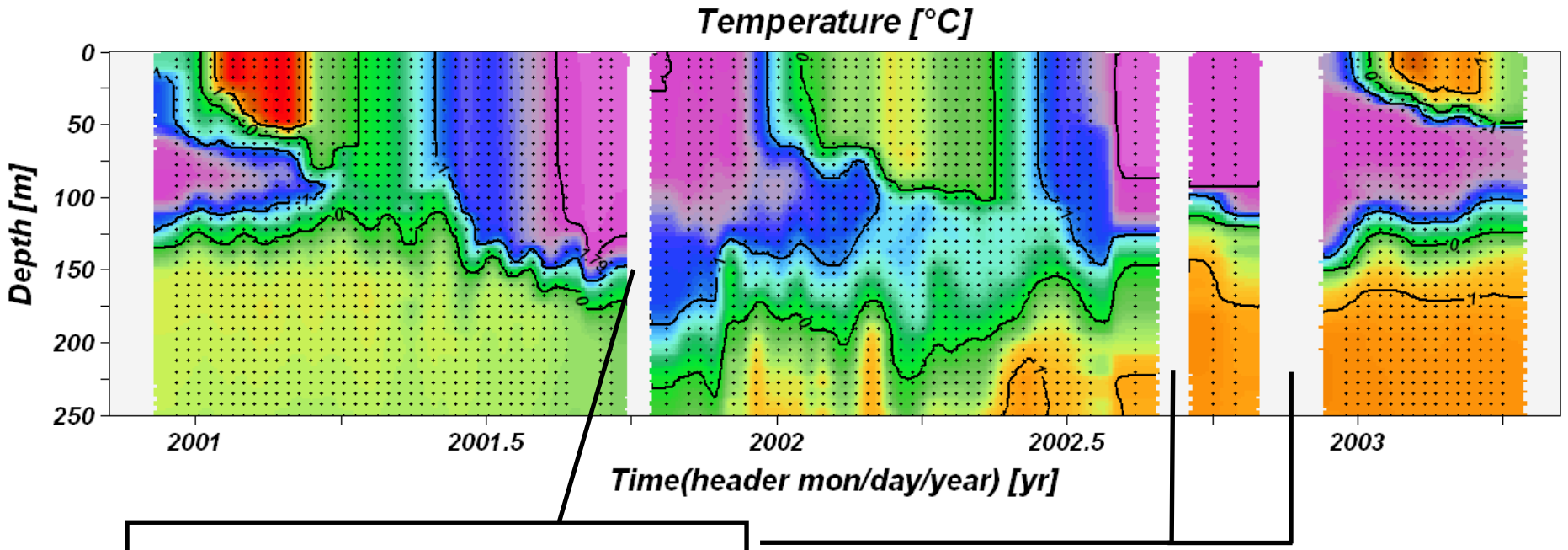
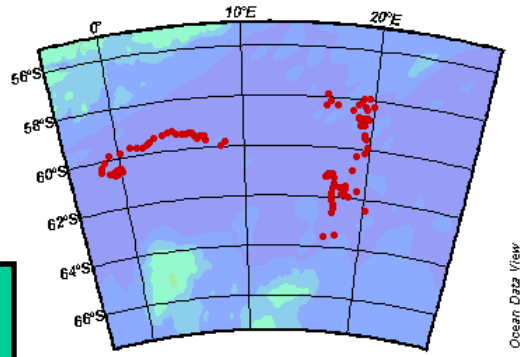
Ice Sensing Algorithm



T = -1.79 °C braces missing profiles



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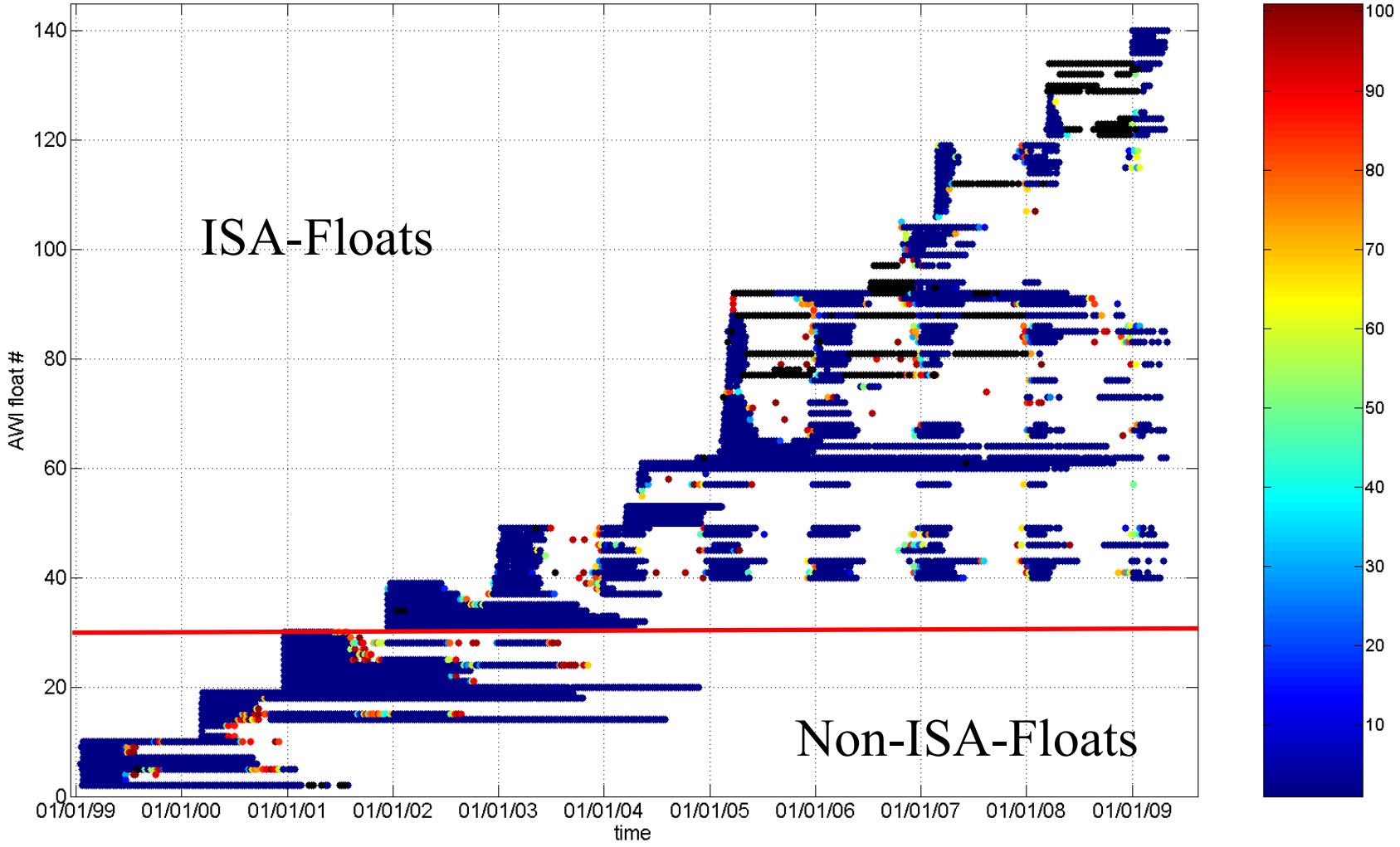
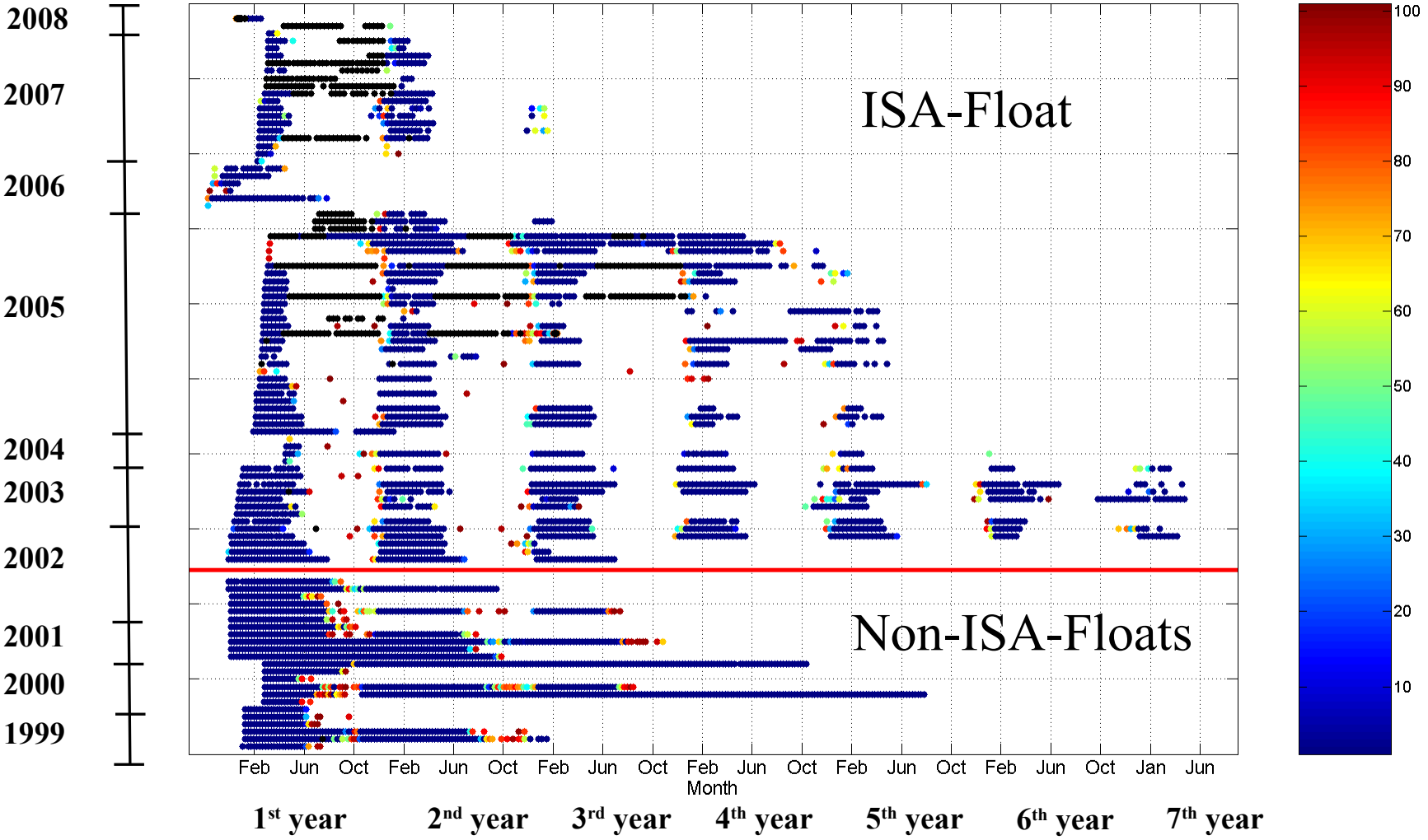
Median ($T_{|p=(50,45,40,35,30,25,20\ dbar)} \leq -1.79$ °C):

-> abort surface attempt

Floats vs. ice coverage



Floats vs. ice coverage



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Aborts ascent when sea – ice is expected at the surface	Provides delayed mode profile when surfacing impossible	Provides subsurface profile position when surfacing impossible
Succesfully 80% survival rate modifications are planed		

AWI

Ice compatibility of Argo floats: a 3 step process

Ice sensing algorithm2 (ISA2) 2007	Interim storage (iStore) 2005	RAFOS 2008
Aborts ascent when sea – ice is expected at the surface **+Retarded response**	Provides delayed mode profile when surfacing impossible	Provides subsurface profile position when surfacing impossible
Successful **Update under test**		

AWI

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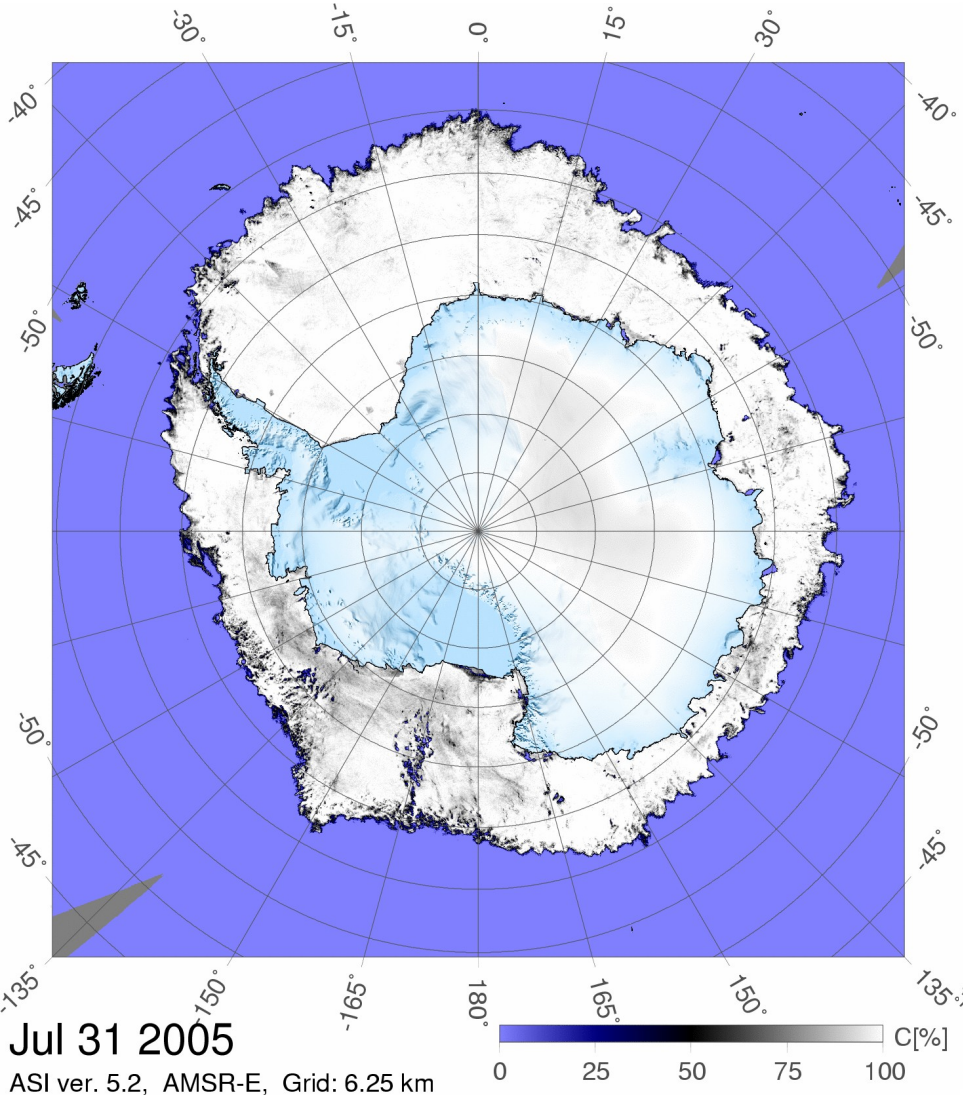
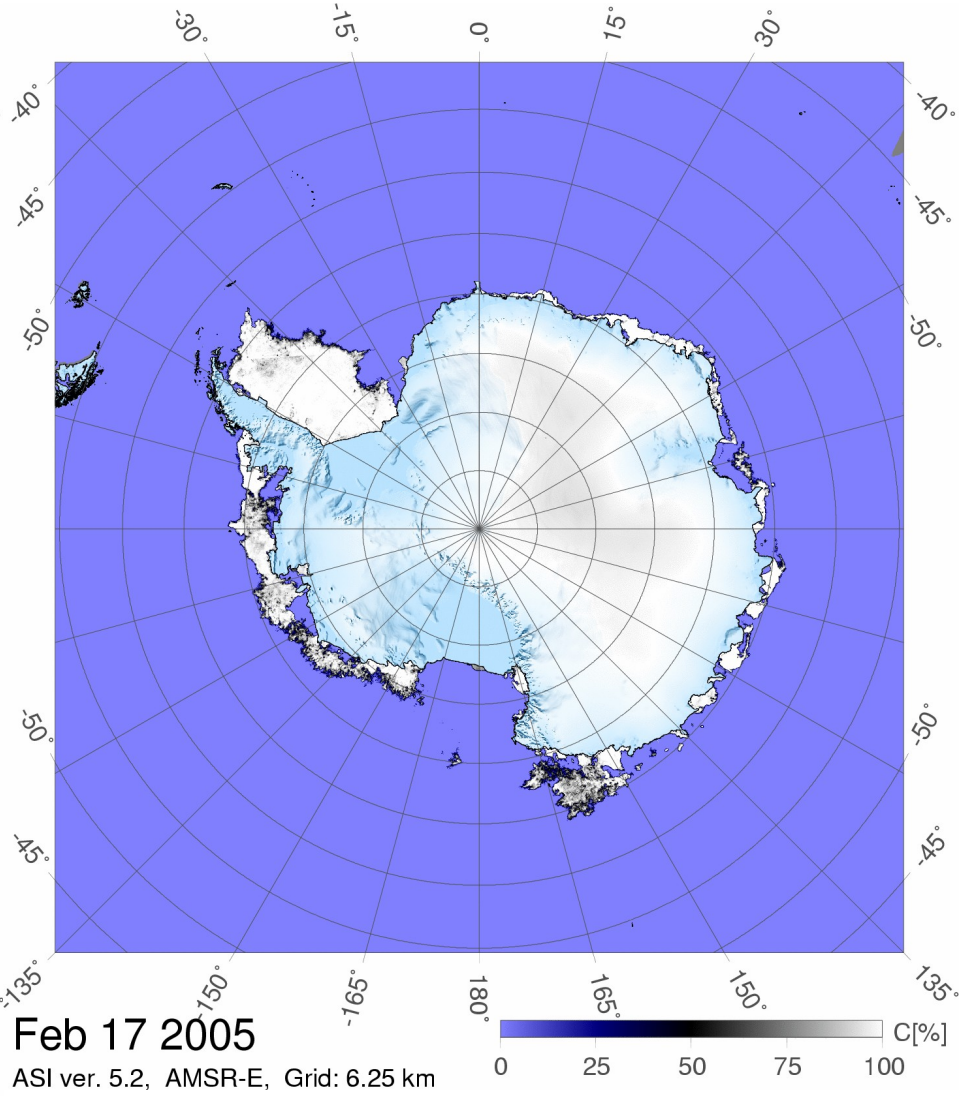
Interim data Storage (iStore)



Jul 31 2005

ASI ver. 5.2, AMSR-E, Grid: 6.25 km



Feb 17 2005

ASI ver. 5.2, AMSR-E, Grid: 6.25 km

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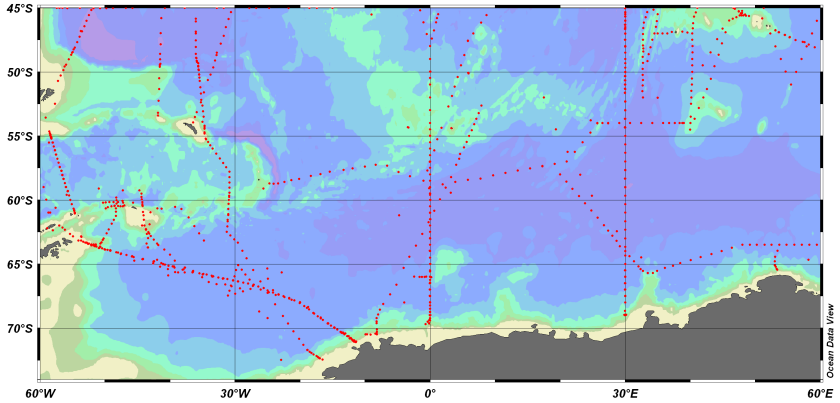
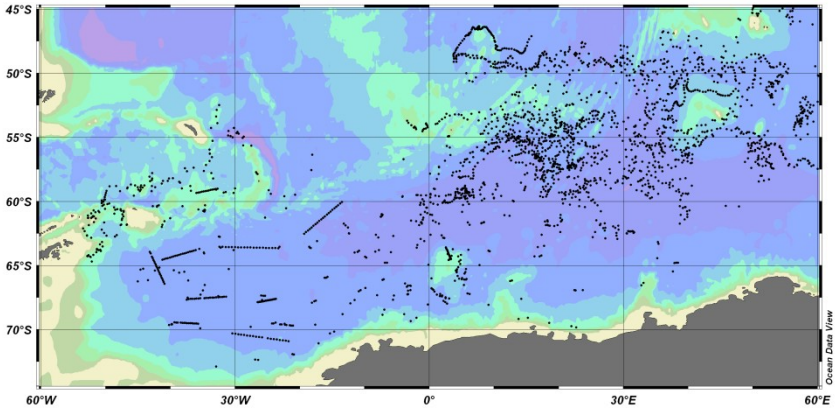
Weddell Sea data

WOCE: CTD-stations winter



< 300 CTD casts

AWI floats winter



>2500 float profiles

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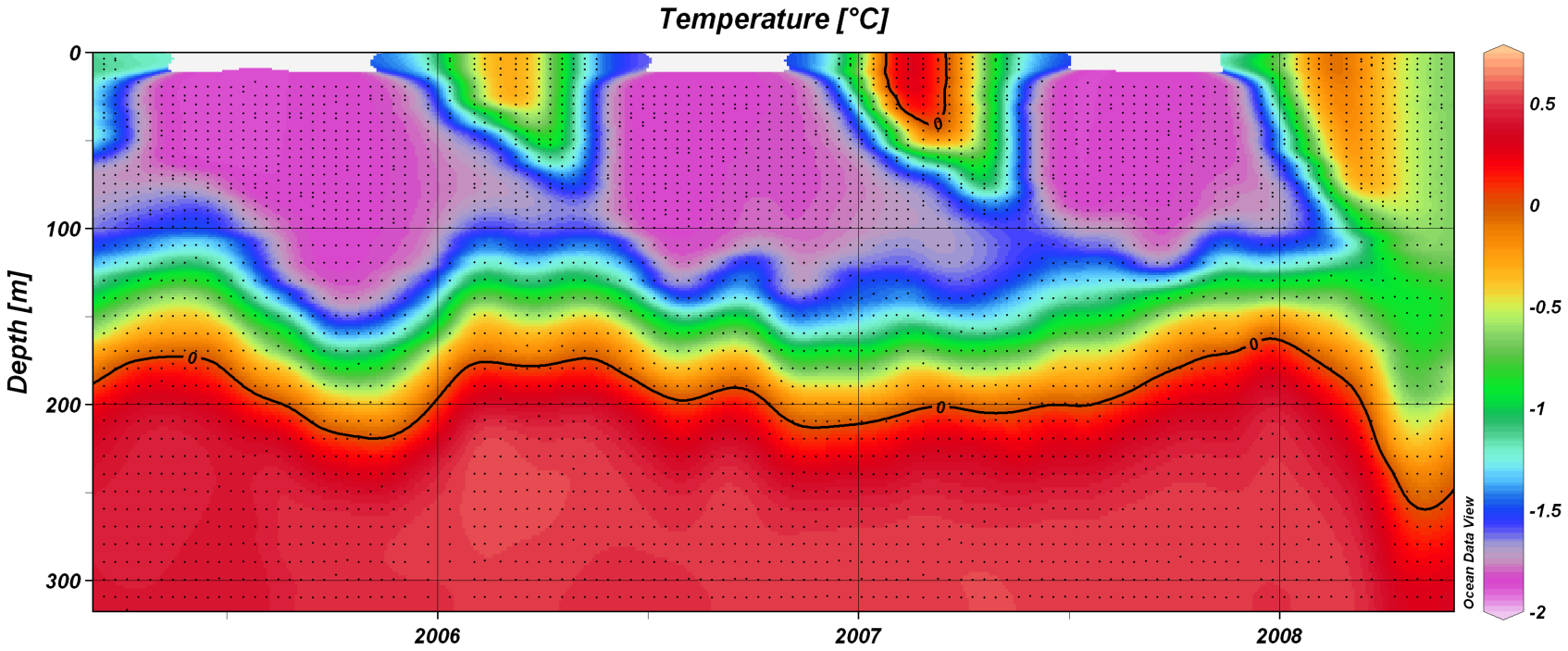
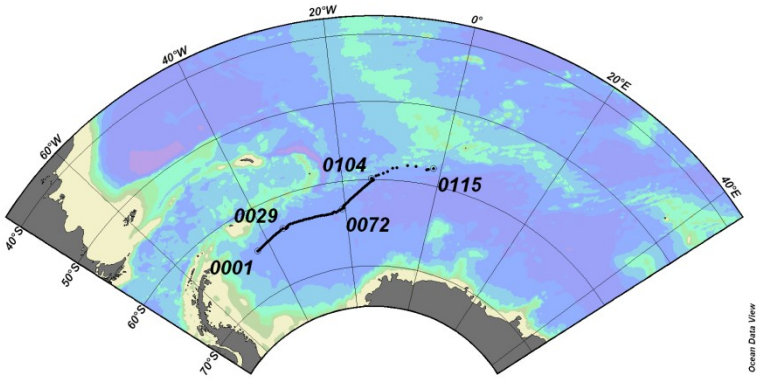
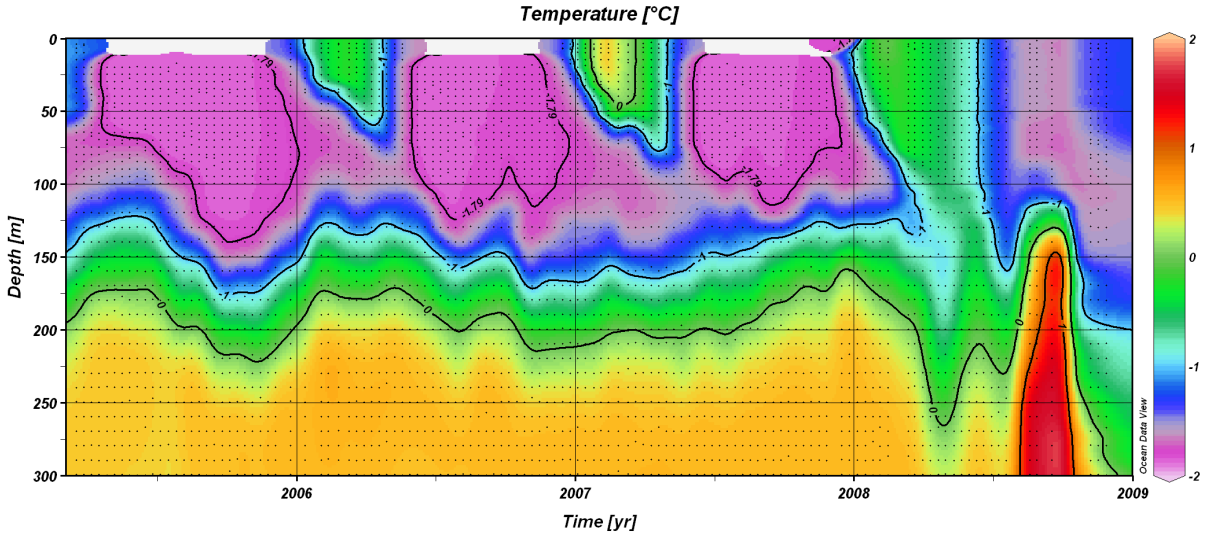
All-season data: Temperature

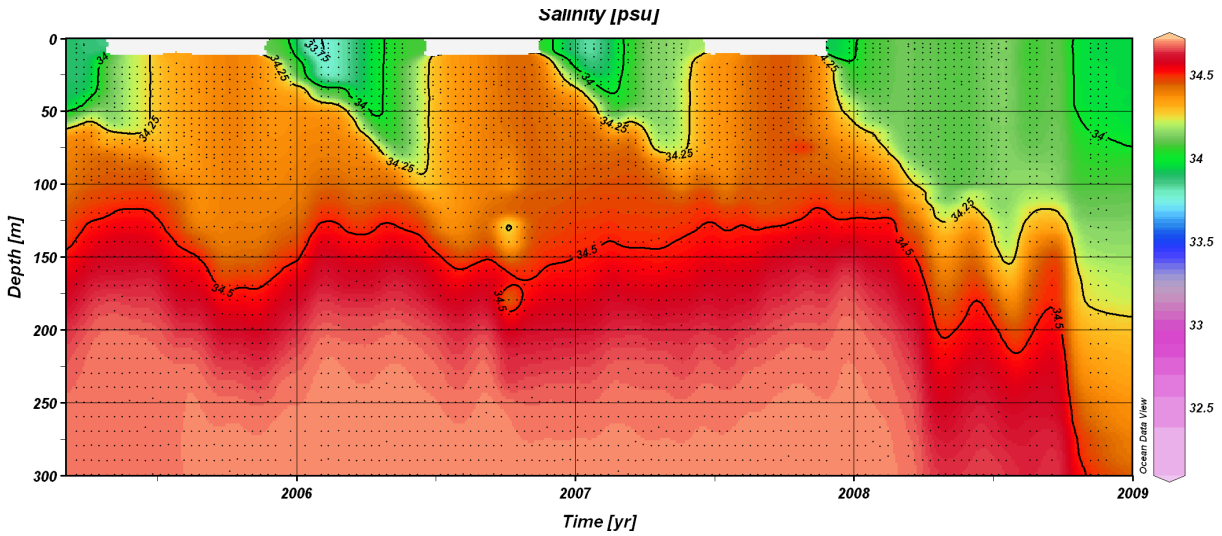


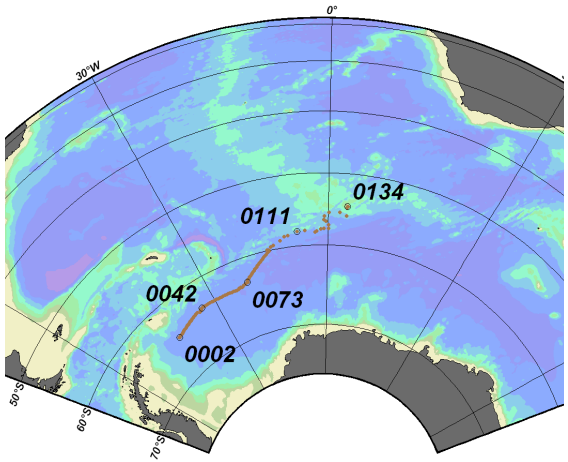


AWI_088
wmo number: 7900086

All-season data:







AWI_088

wmo number: 7900086

Ice compatibility of Argo floats: a 3 step process

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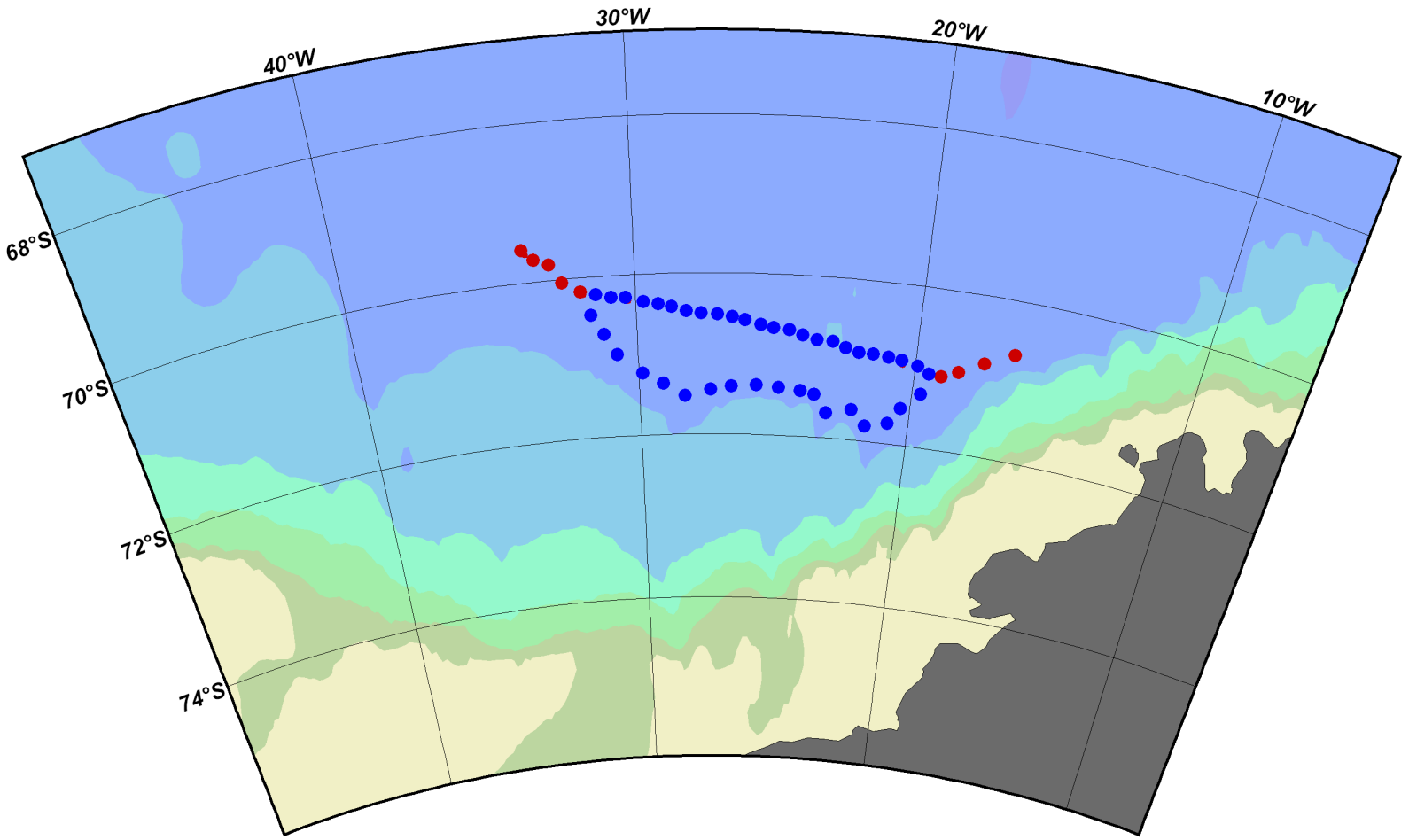
Aborts ascent when sea – ice is expected at the surface +Retarded response	**Provides delayed mode profile when surfacing impossible**	Provides subsurface profile position when surfacing impossible
Successful Update under test	**Successful**	

AWI

Need of RAFOSs



AWI

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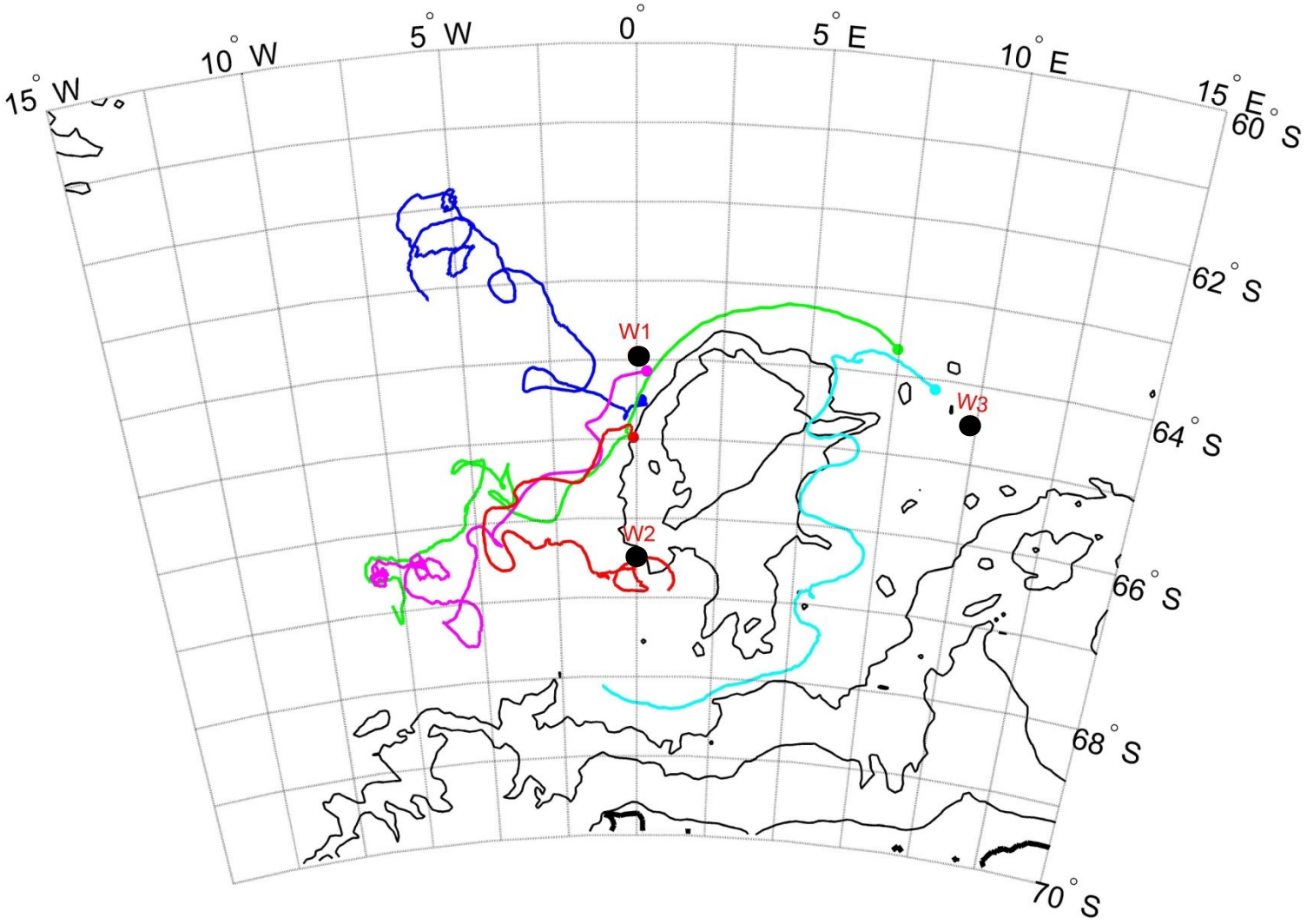
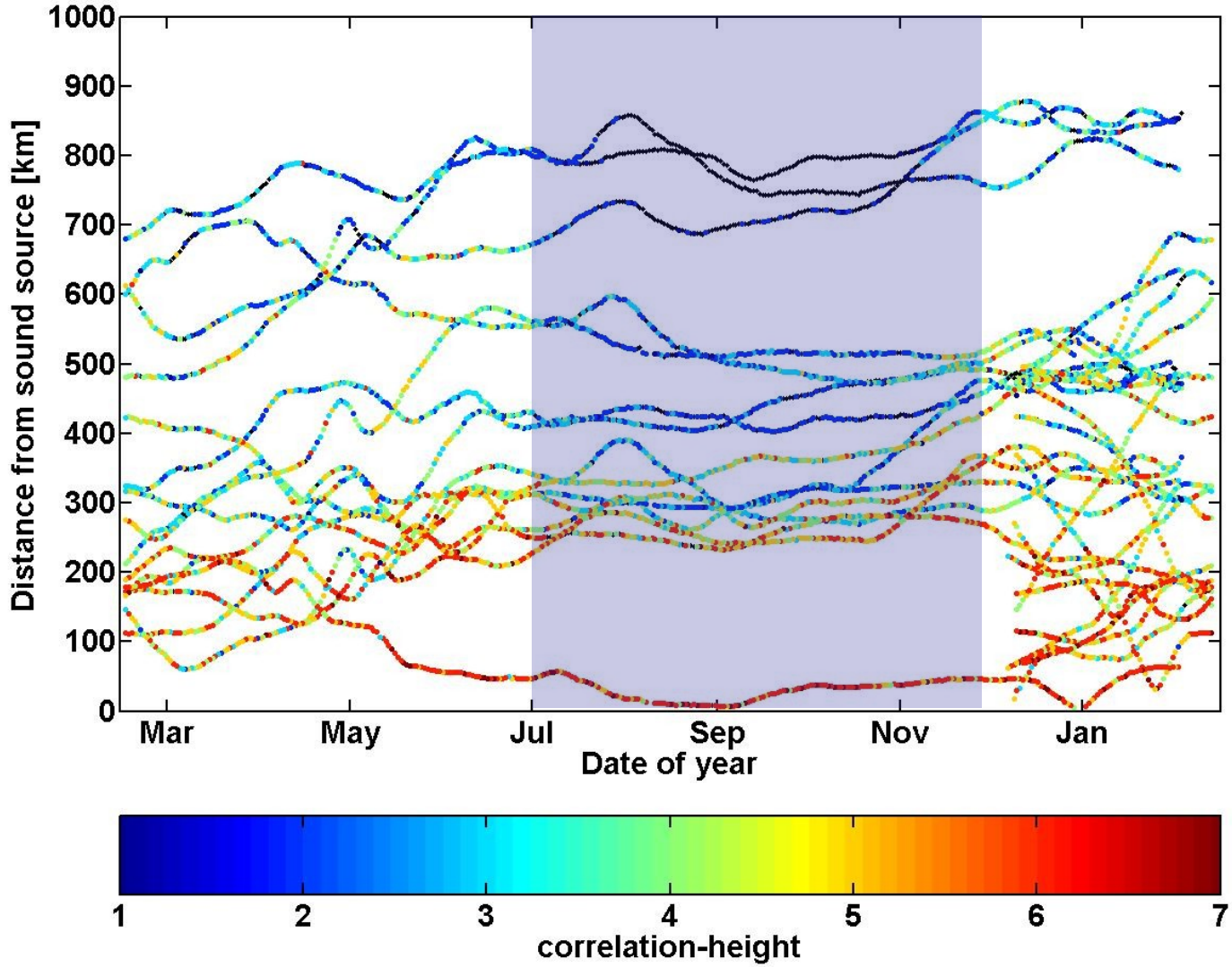
Successful Update under test	Successful	

RAFOS subsurface tracking

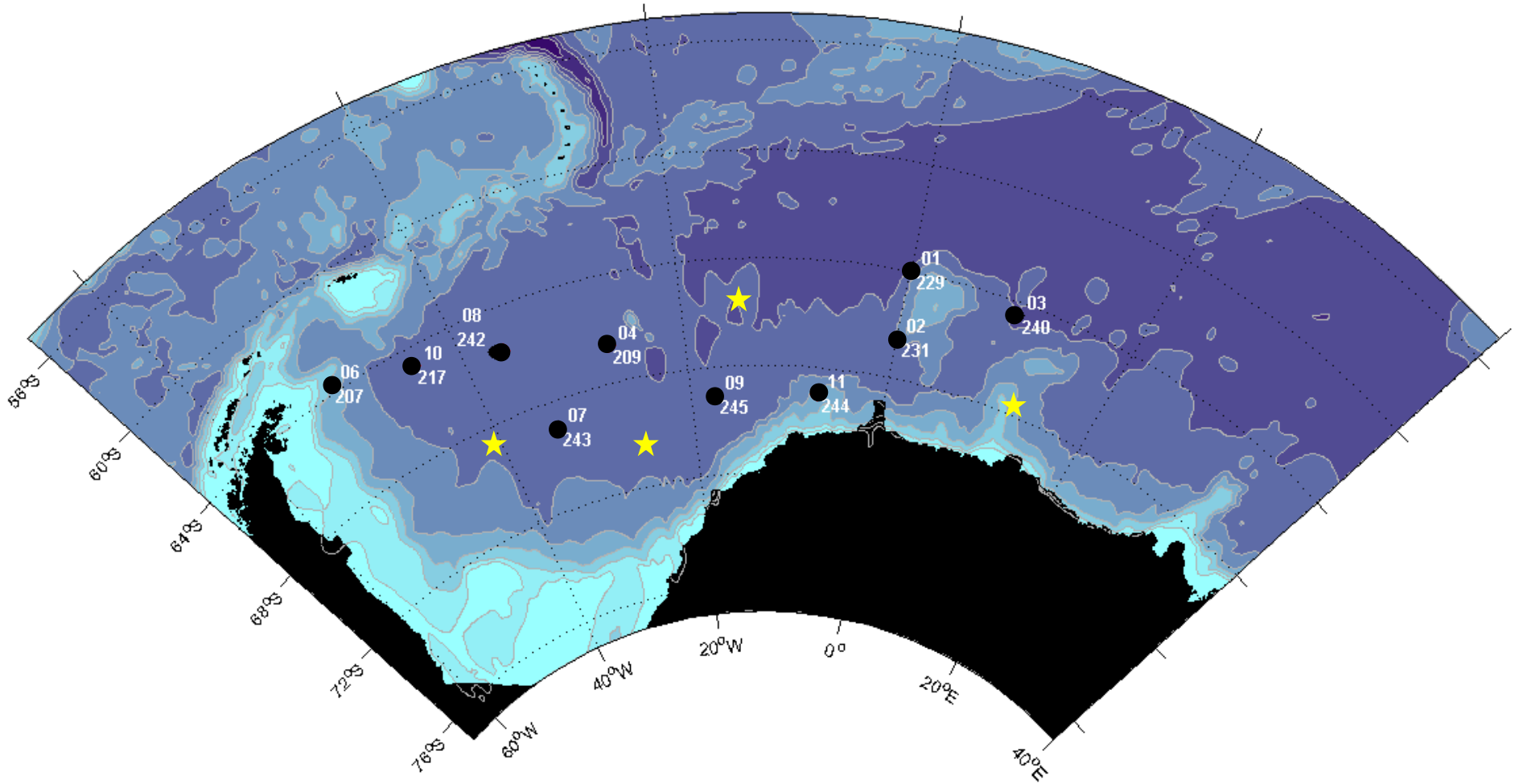


Range of RAFOS-signals in the Weddell Sea



Ice compatibility of Argo floats:

2009: array of 10 Sound Sources installed



AWI

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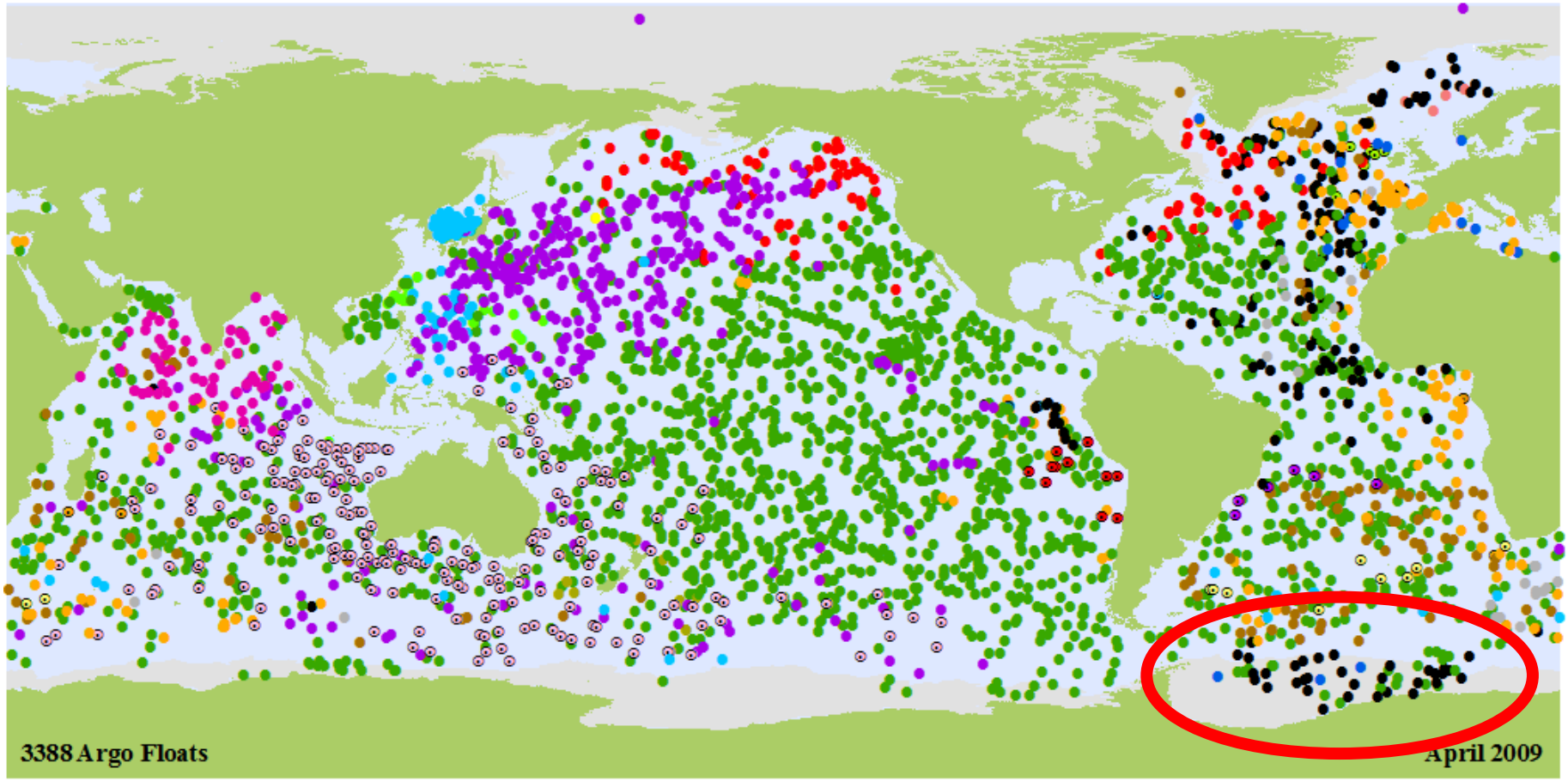
Ice sensing algorithm2 (ISA2) 2007	Interim storage (iStore) 2005	RAFOS 2008
Aborts ascent when sea – ice is expected at the surface +Retarded response	Provides delayed mode profile when surfacing impossible	Provides subsurface profile position when surfacing impossible
Successful Update under test	Successful	**Successful** **An array of sound sources is installed**

Recent ARGO float distribution



jcommops

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Outlook

- Combine the Argo-data with a regional GCM with data assimilation (MITgcm)

- Test of the Arctic ISA
  - Deployment of two Nemo-floats in the Arctic Ocean (July)
- Test of Iridium communication
- Determine the range of RAFOS in the Arctic (2010)

  → design of the sound source array (Fram Strait)

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