Vortex at Tromsøflaket

Workshop on the Norwegain Atlantic Current

Tromsø 31/8 - 2/9 2009

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Vortex at Tromsøflaket

Observations:

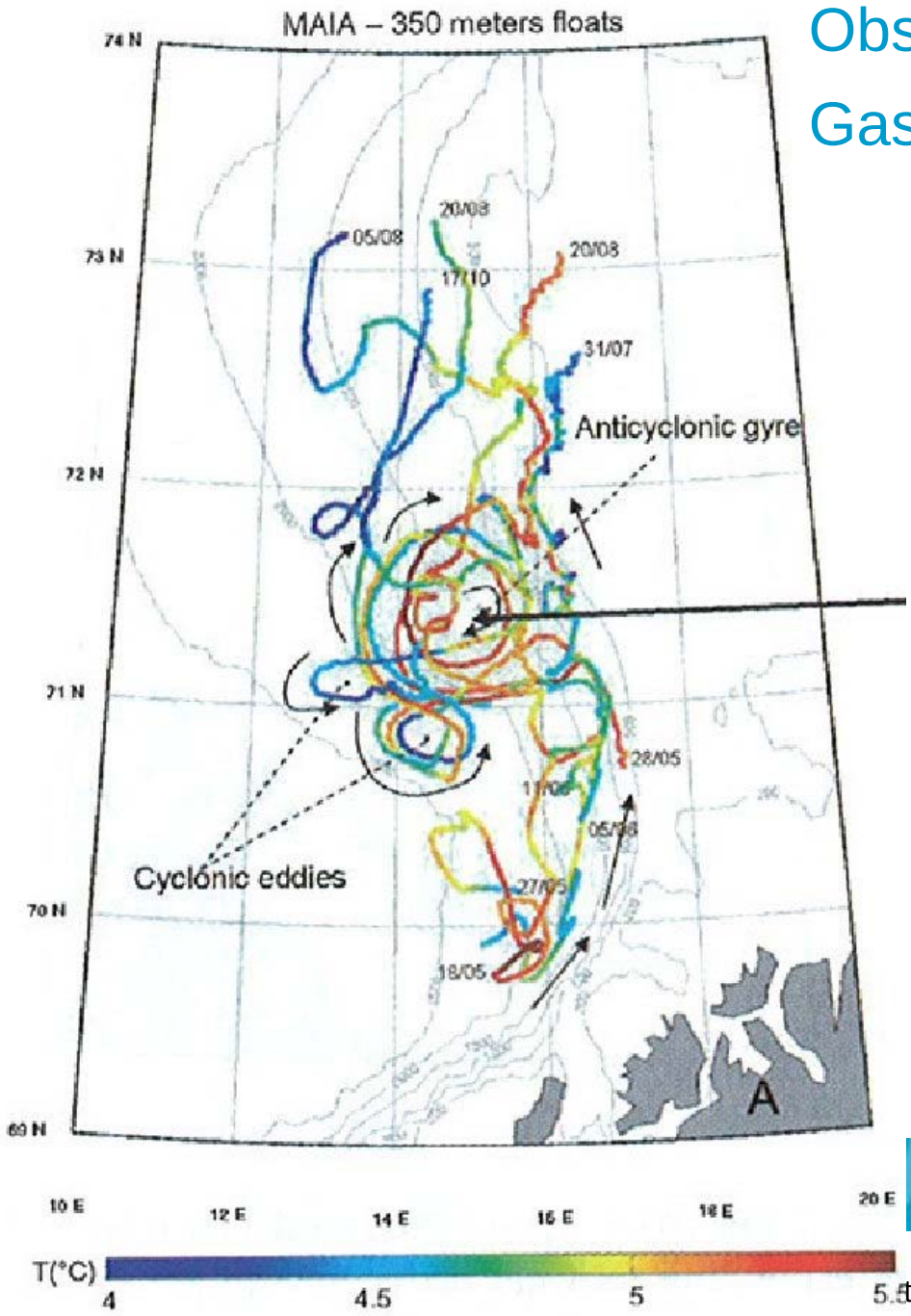
floats data 2001-2004, Gascard & Mork 2008

Numerical simulations:

Skarðhamar & Svendsen 2005

Observed vortex:

Gascard & Mork (2008)



Floats trajectories

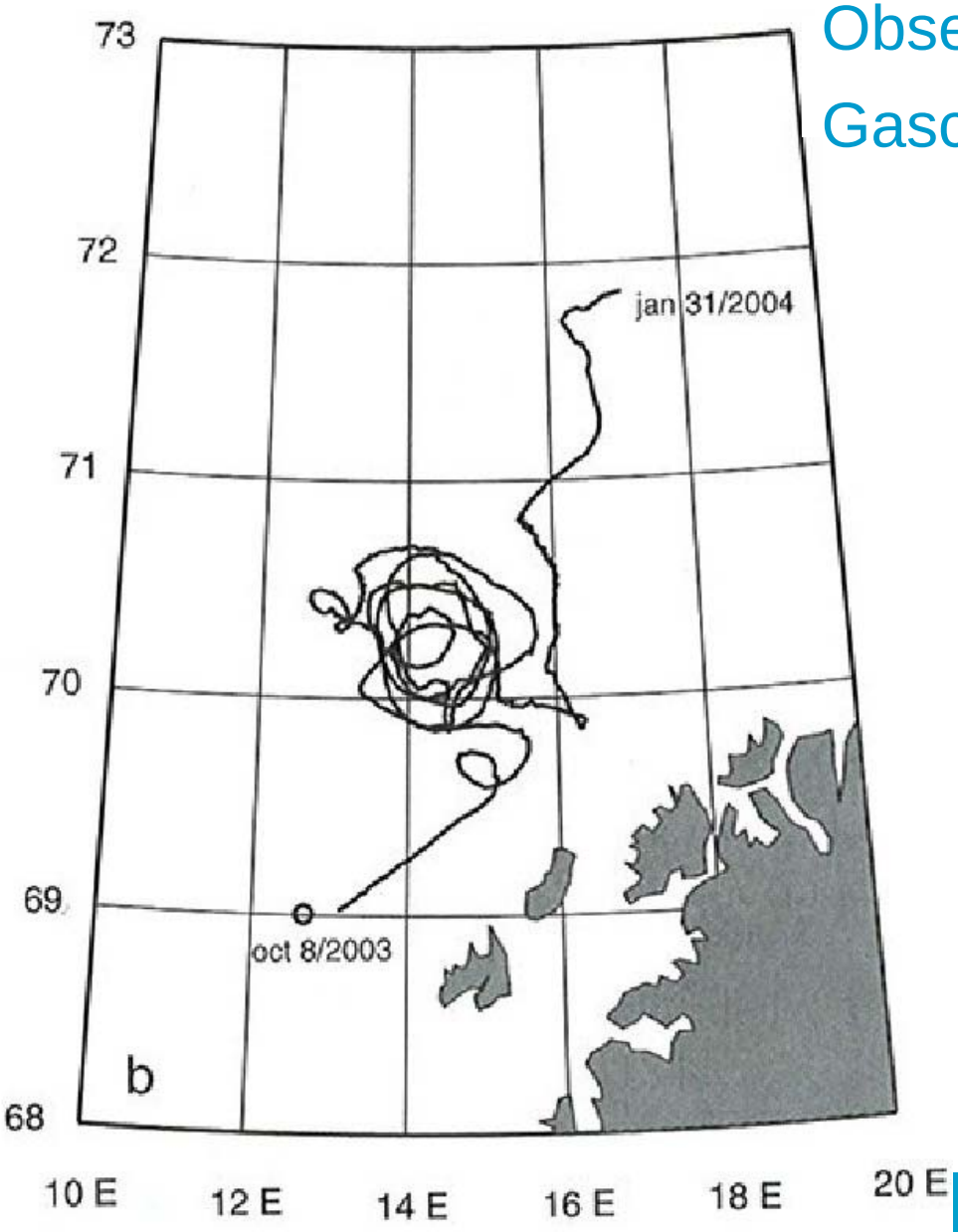
May – Oct. 2001

Depth 350 m

Anticyclonic eddy
~100 km
2 weeks period

Observed vortex:

Gascard & Mork (2008)



Floats trajectories

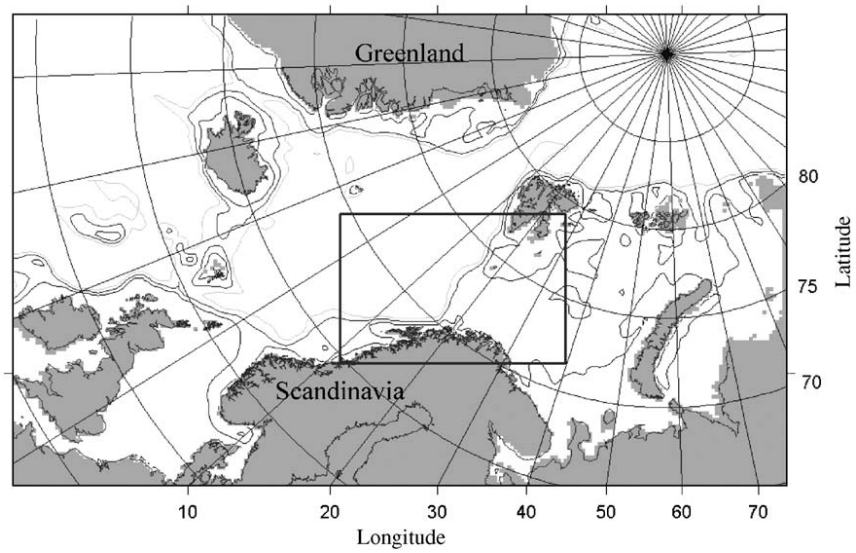
Oct.03 - Jan.04

Depth 300 m

Latitude 70 - 71°N

Anticyclonic eddy ~50 km
1 week period

Numerical model



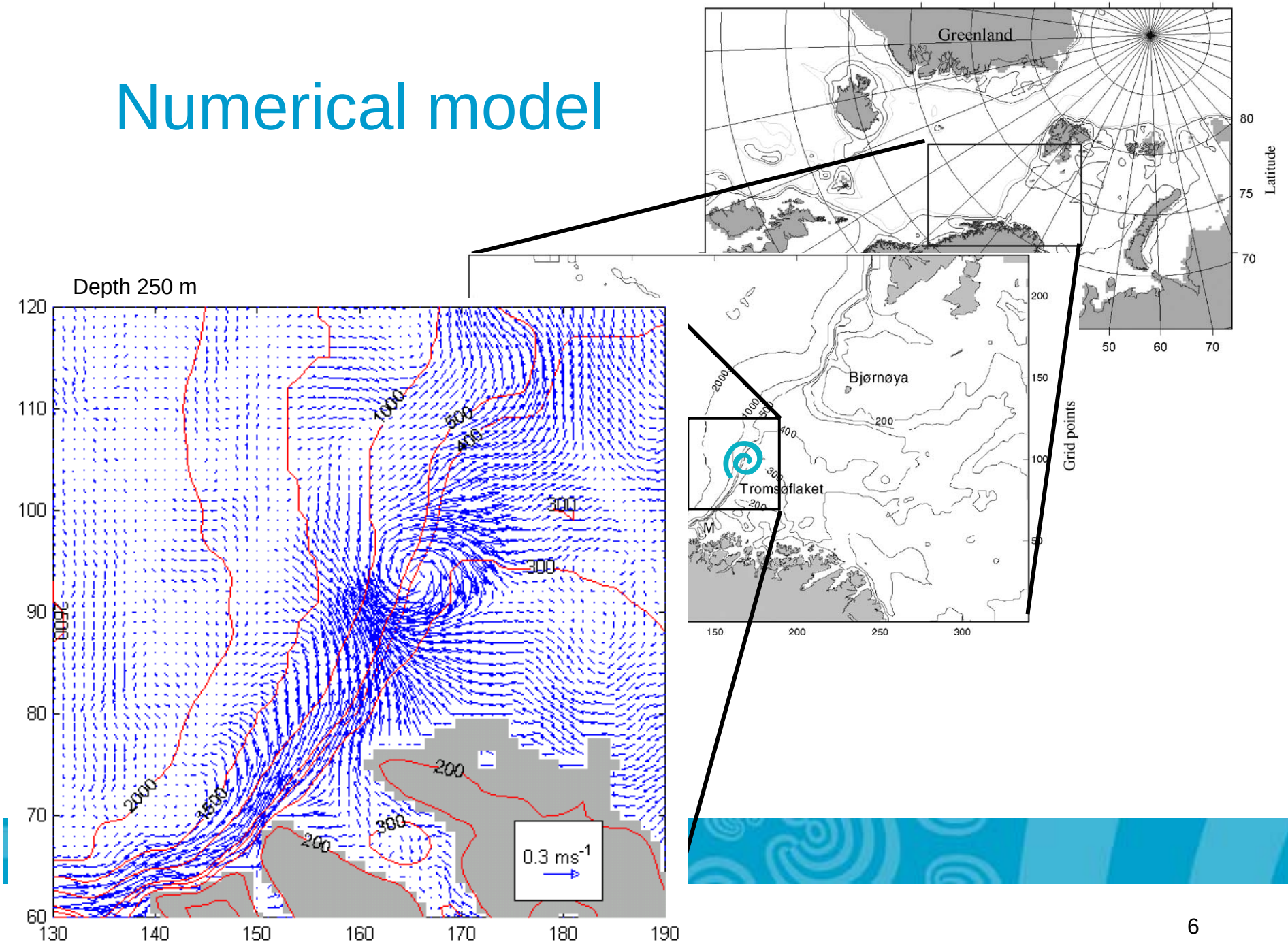
SINMOD

Grid cells: 4 km

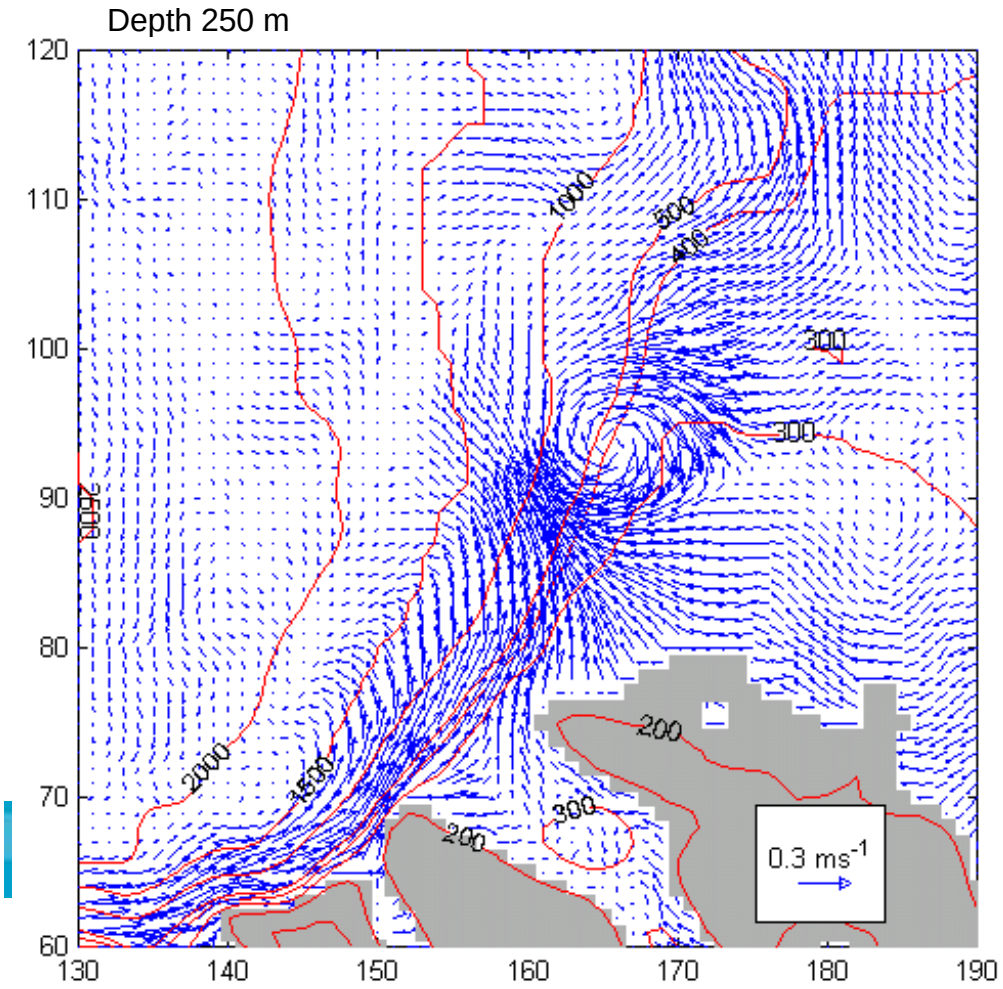
Atmospheric forcing from MET

Tides: M2, S2, N2, K1

Numerical model



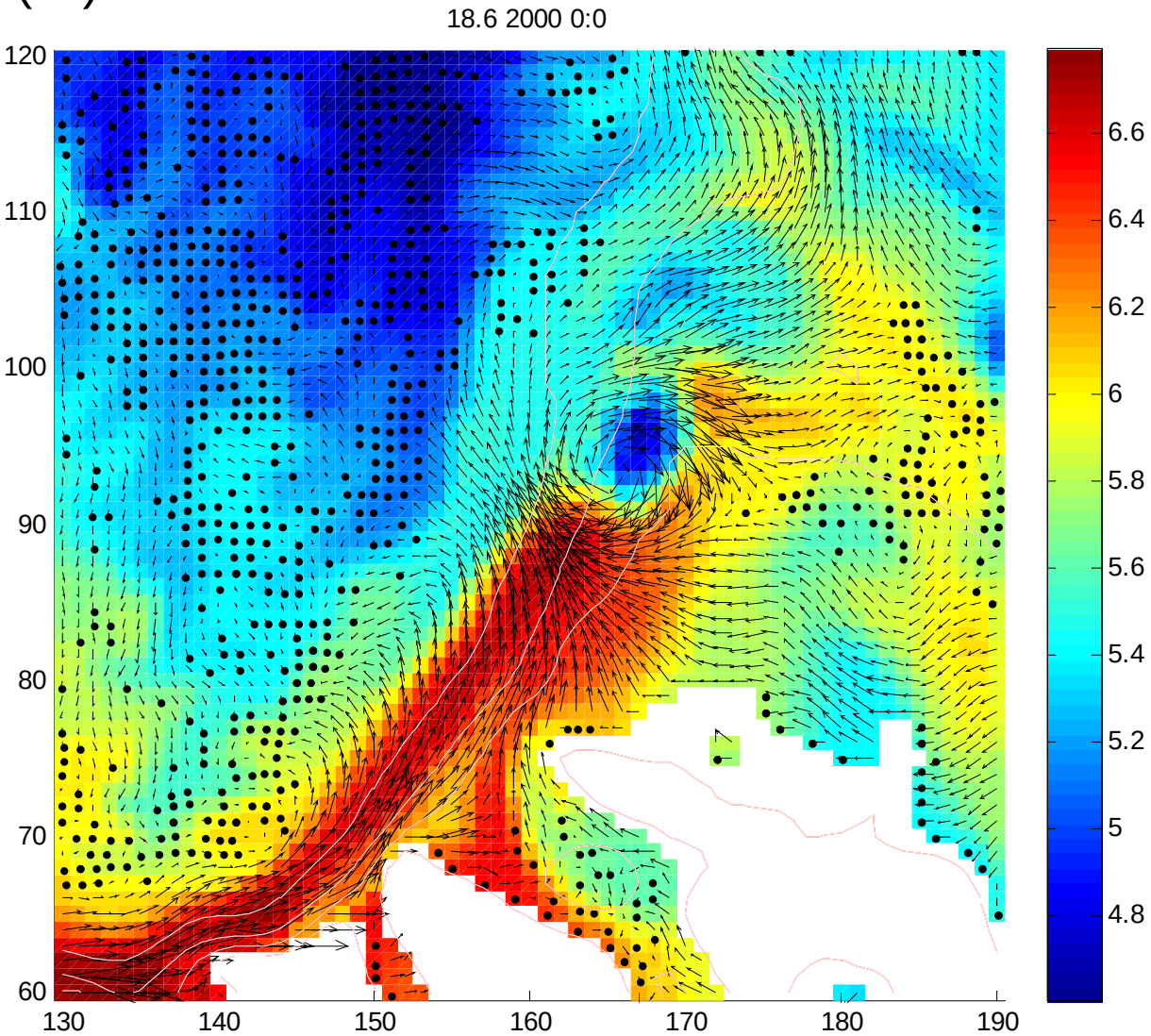
Numerical model



Anti-cyclonic
Horizontal scale: 60-80 km
Depth: 100-350 m
Latitude: 71-72°N

Skarðhamar & Svendsen (2005)

Temperature (°C)
Depth 250 m



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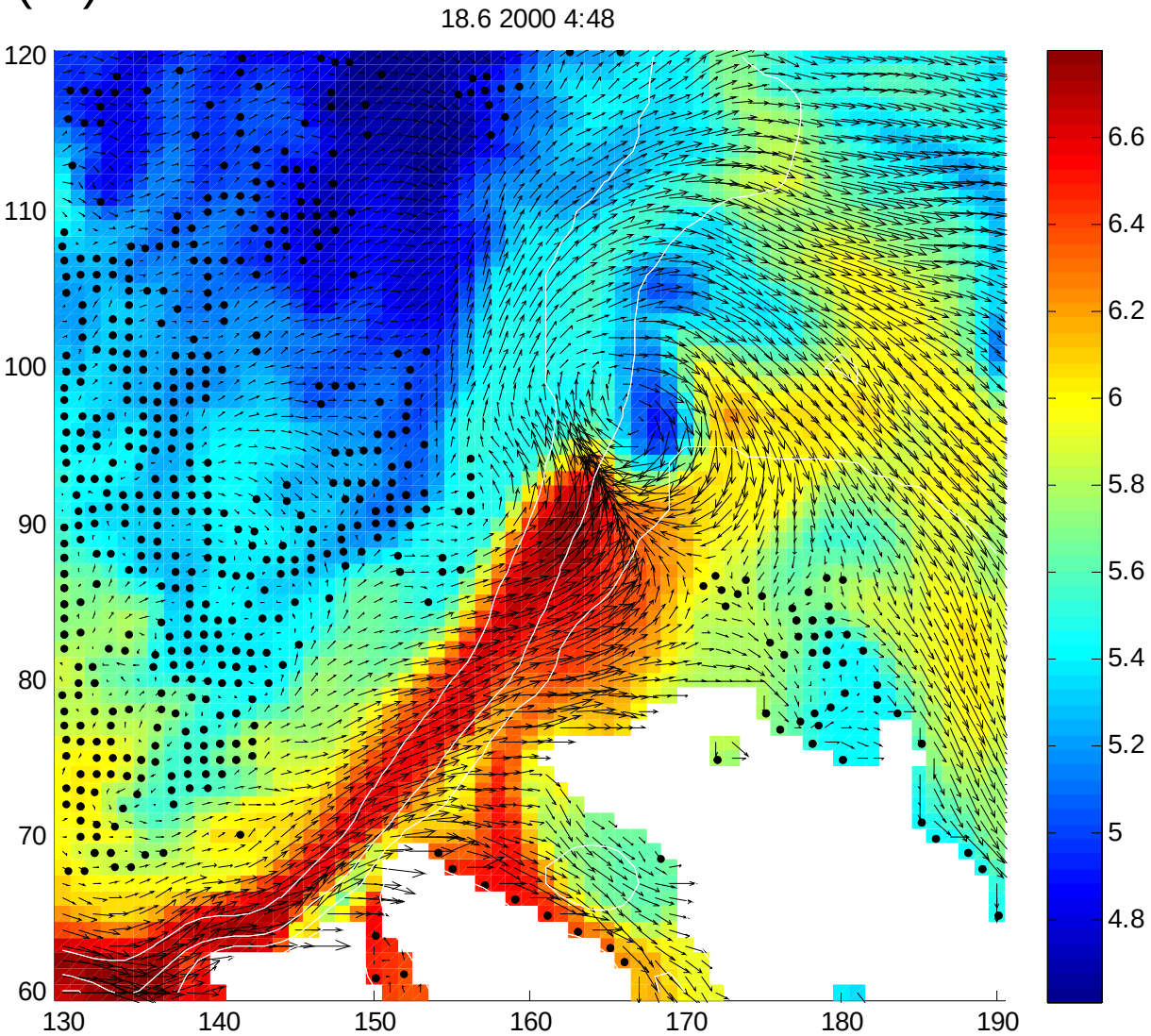
Depth 250 m



Temperature (°C)
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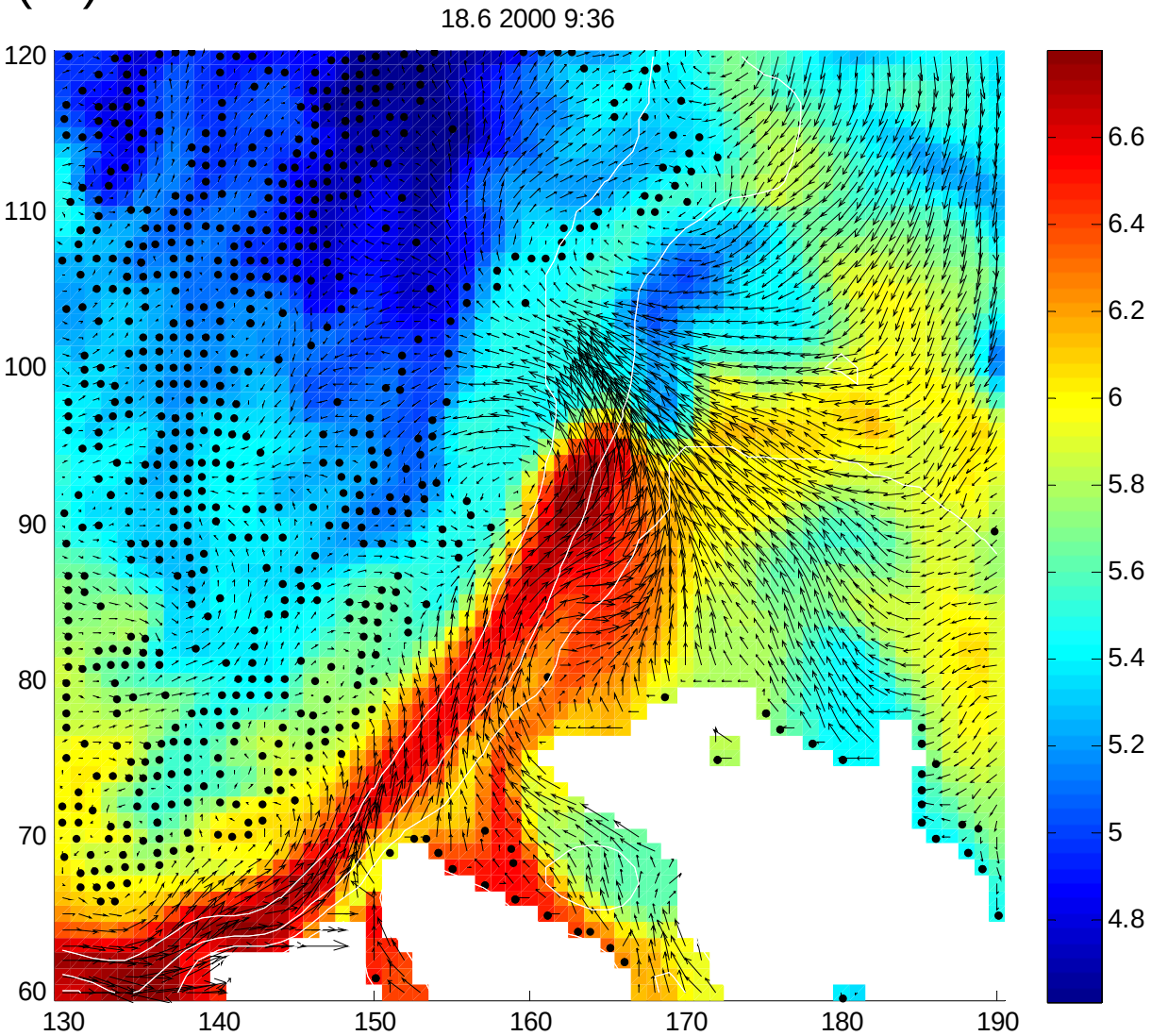
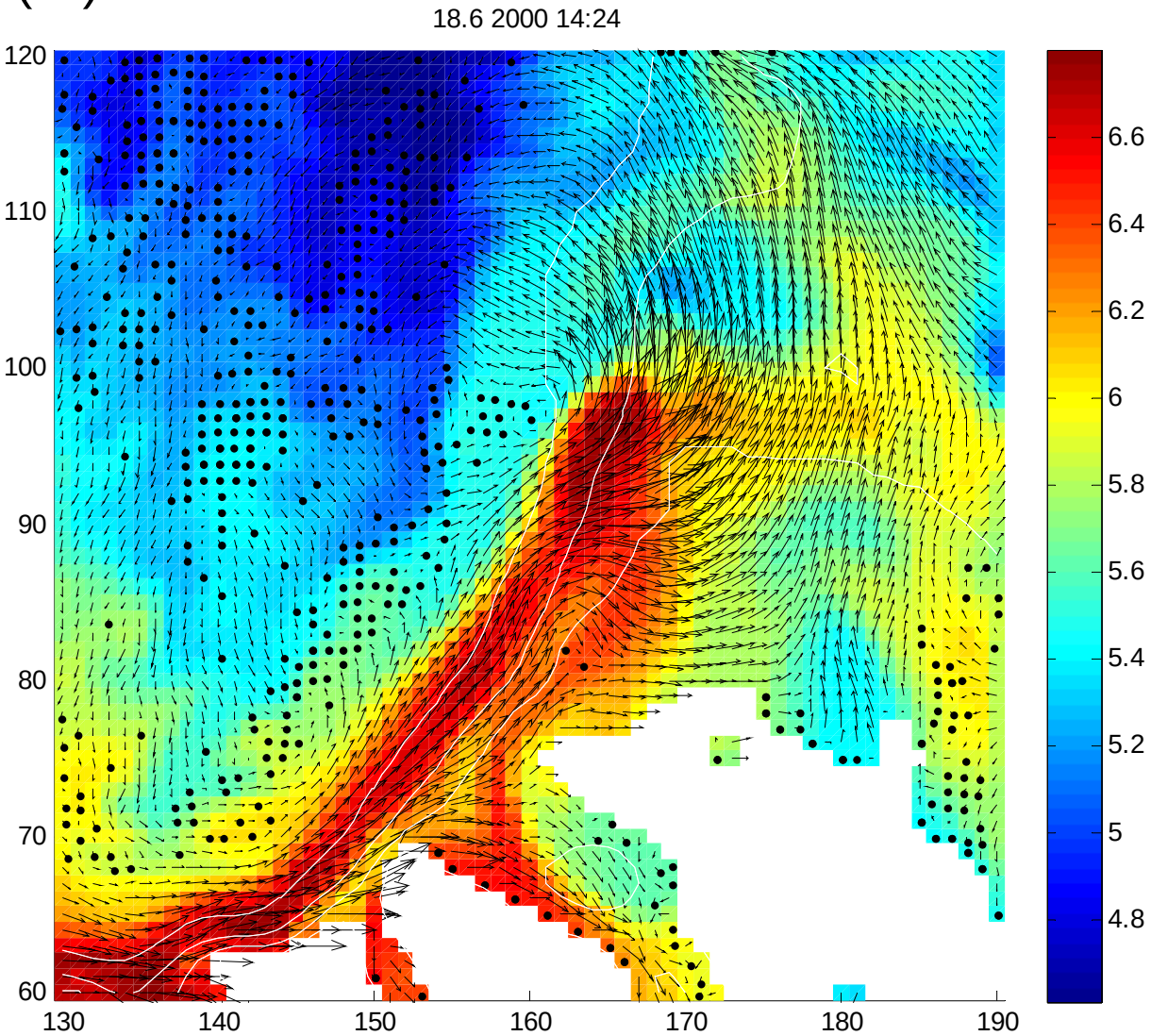


Temperature (°C)
Depth 250 m



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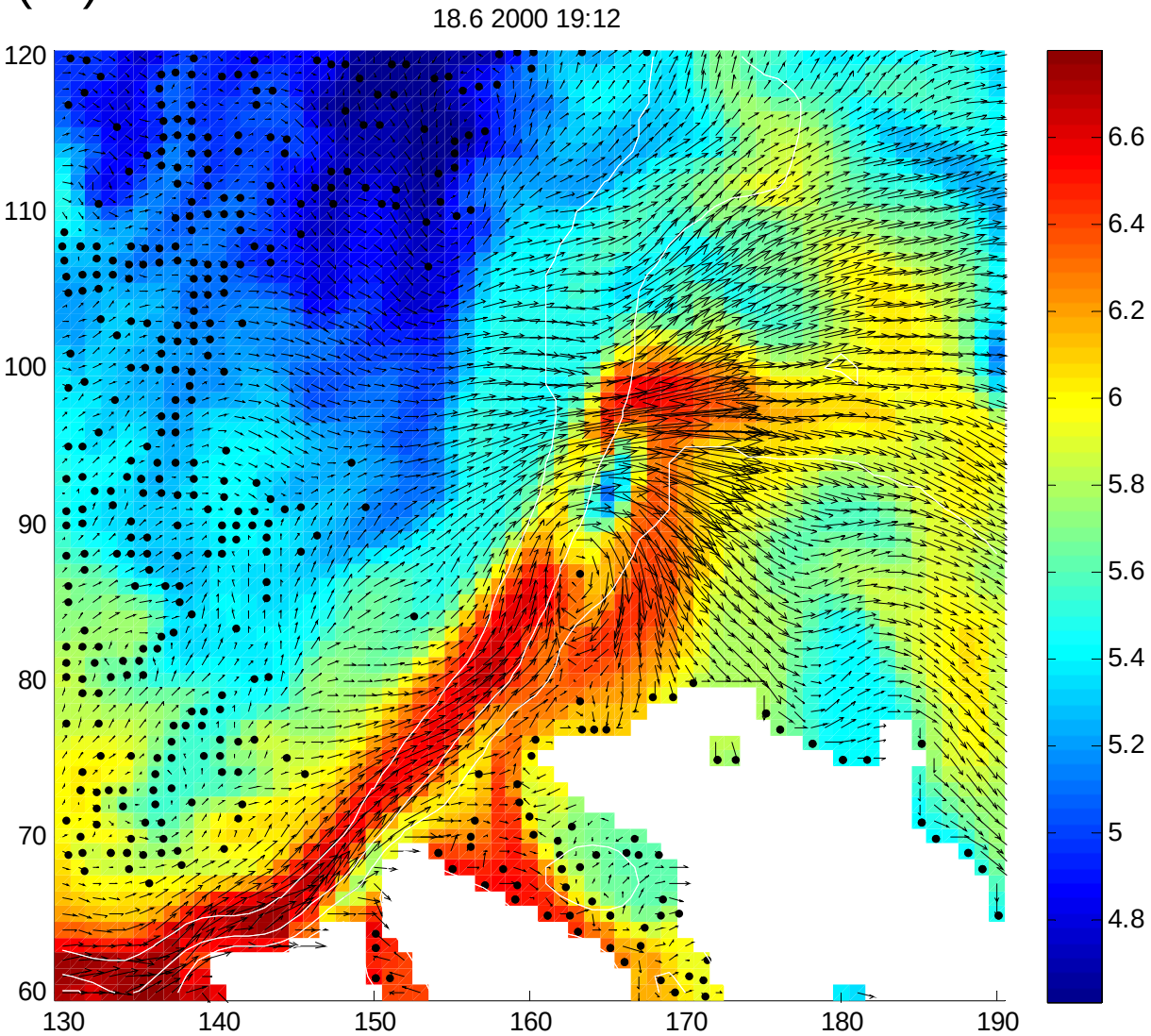
Depth 250 m



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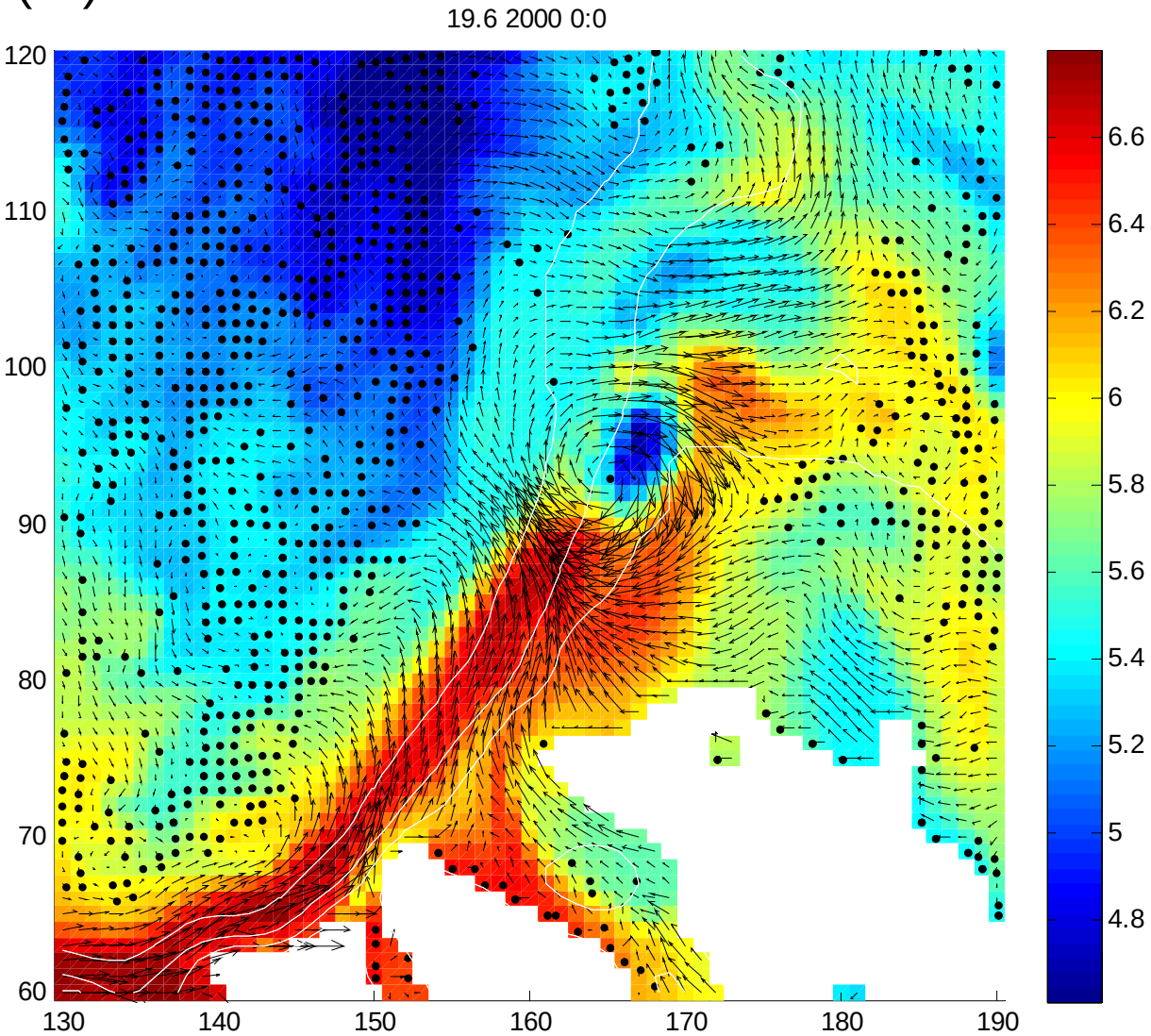
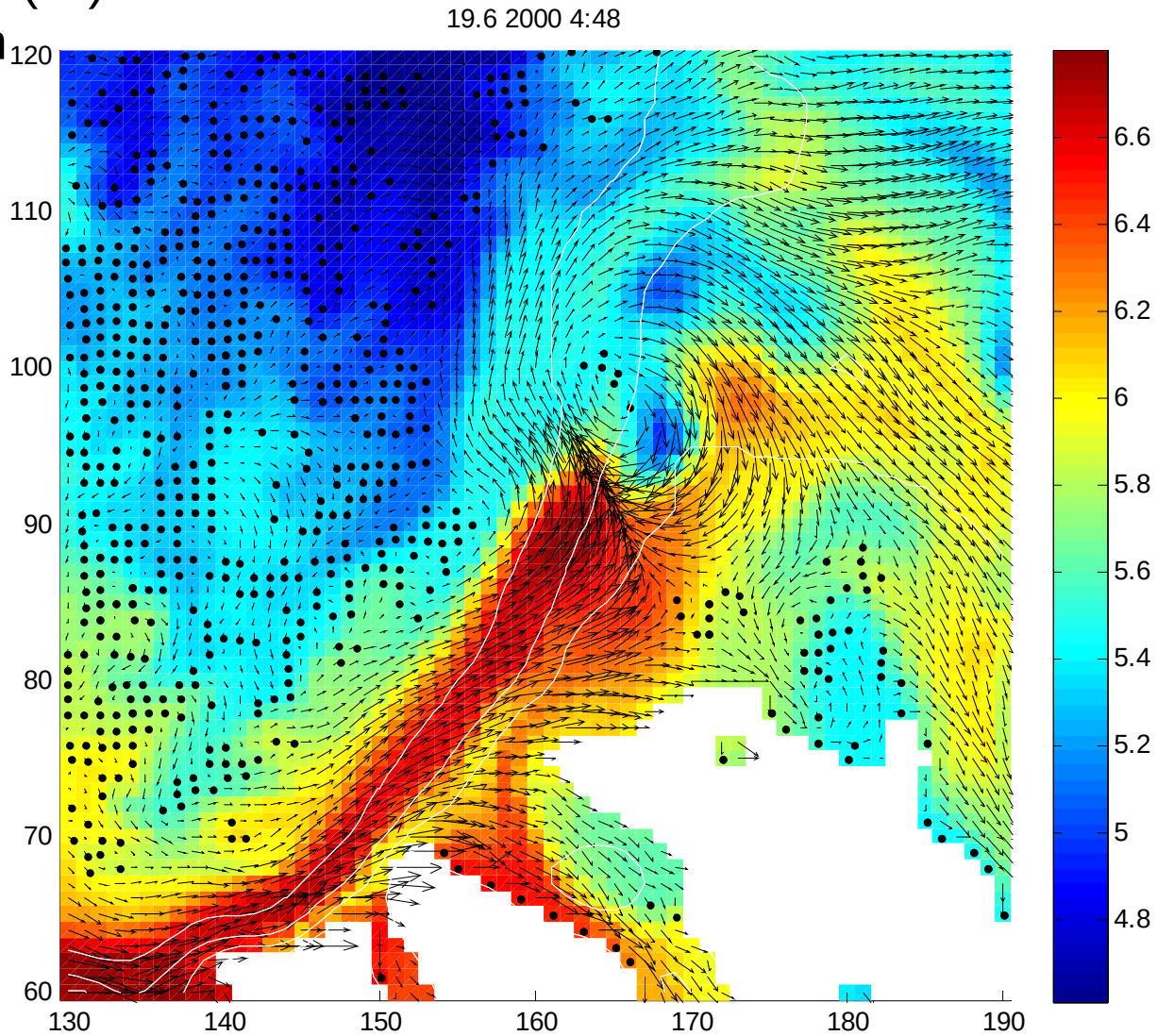
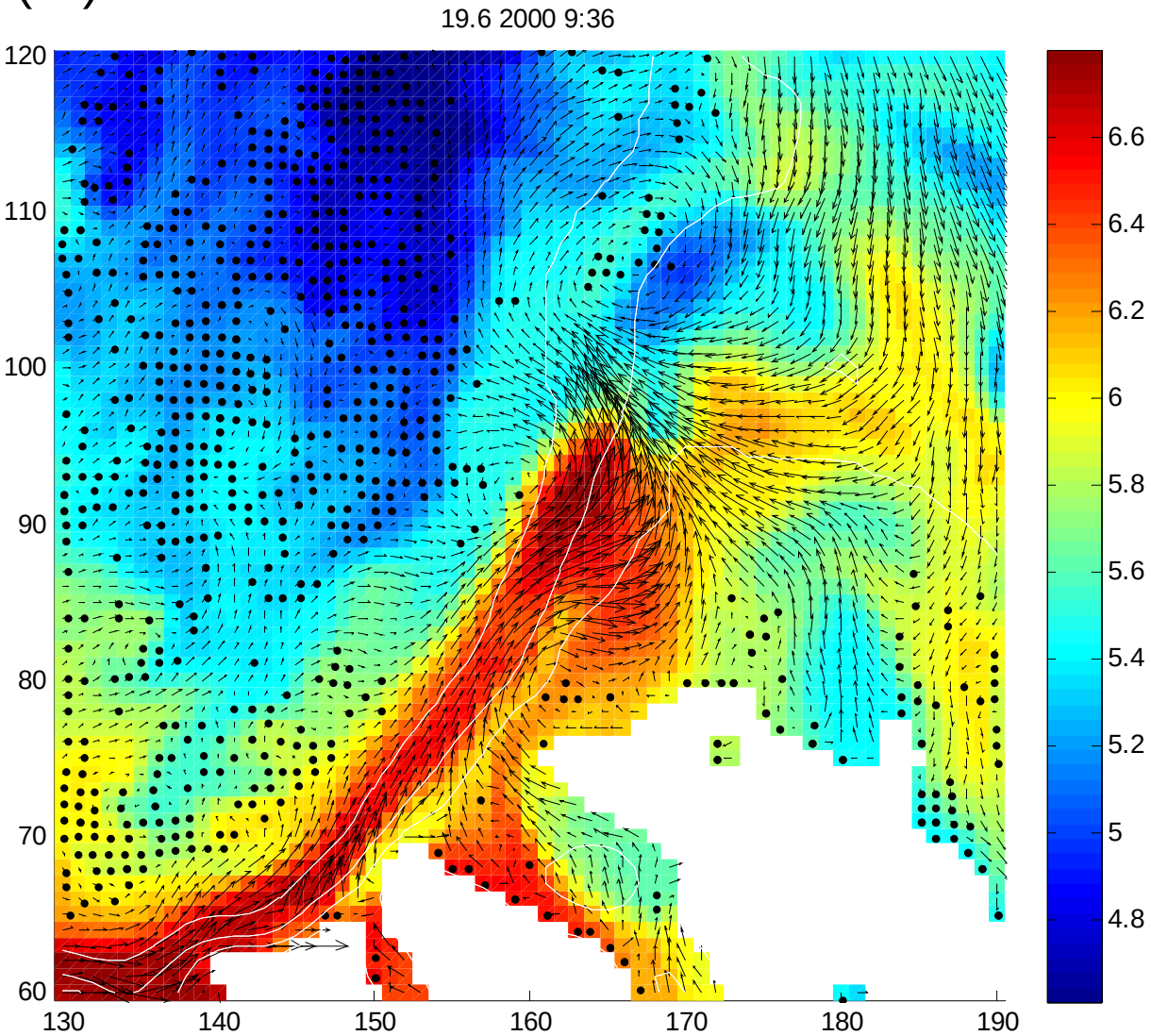


Temperature (°C)
Depth 250 m



Temperature (°C)
Depth 250 m



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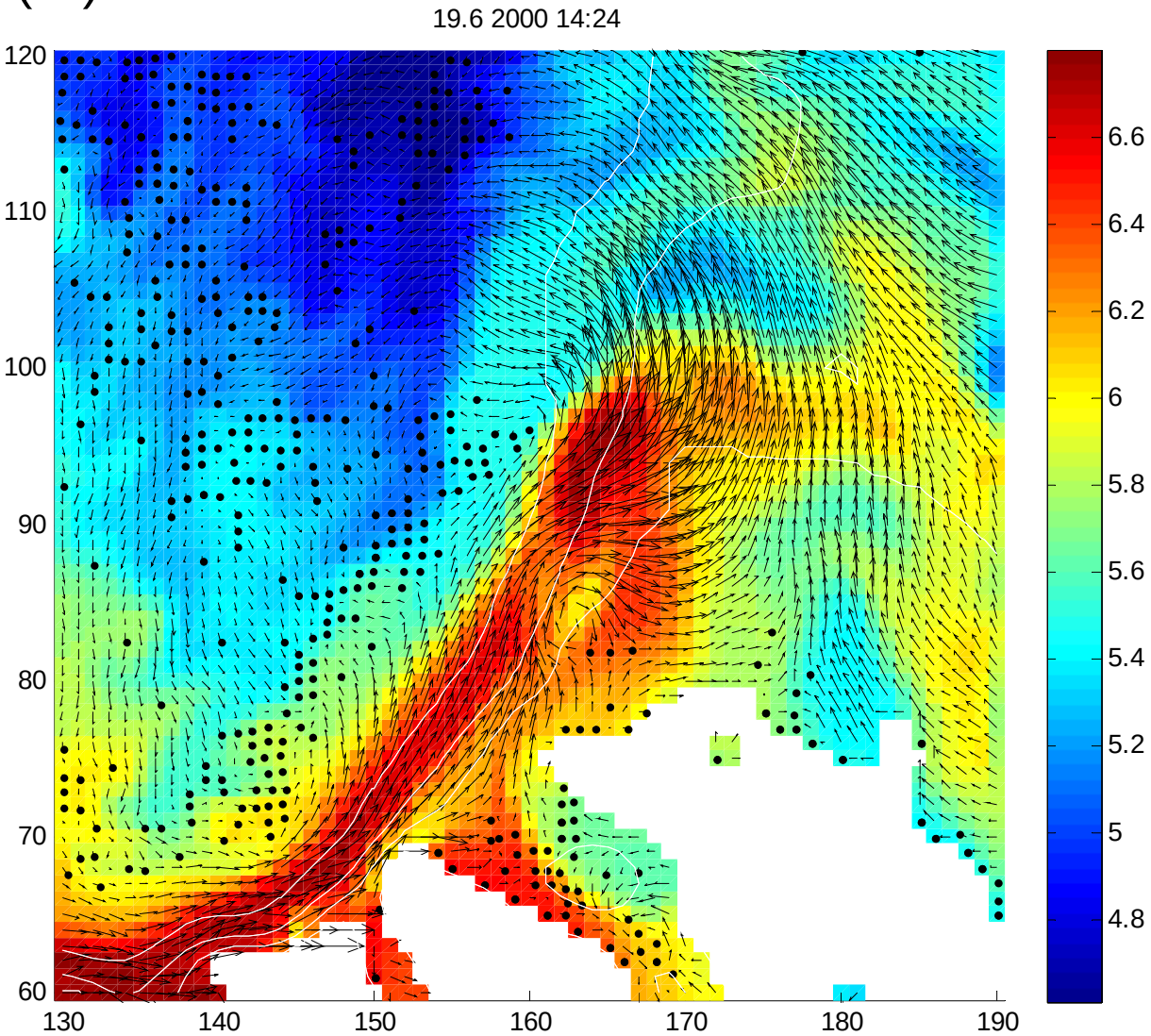

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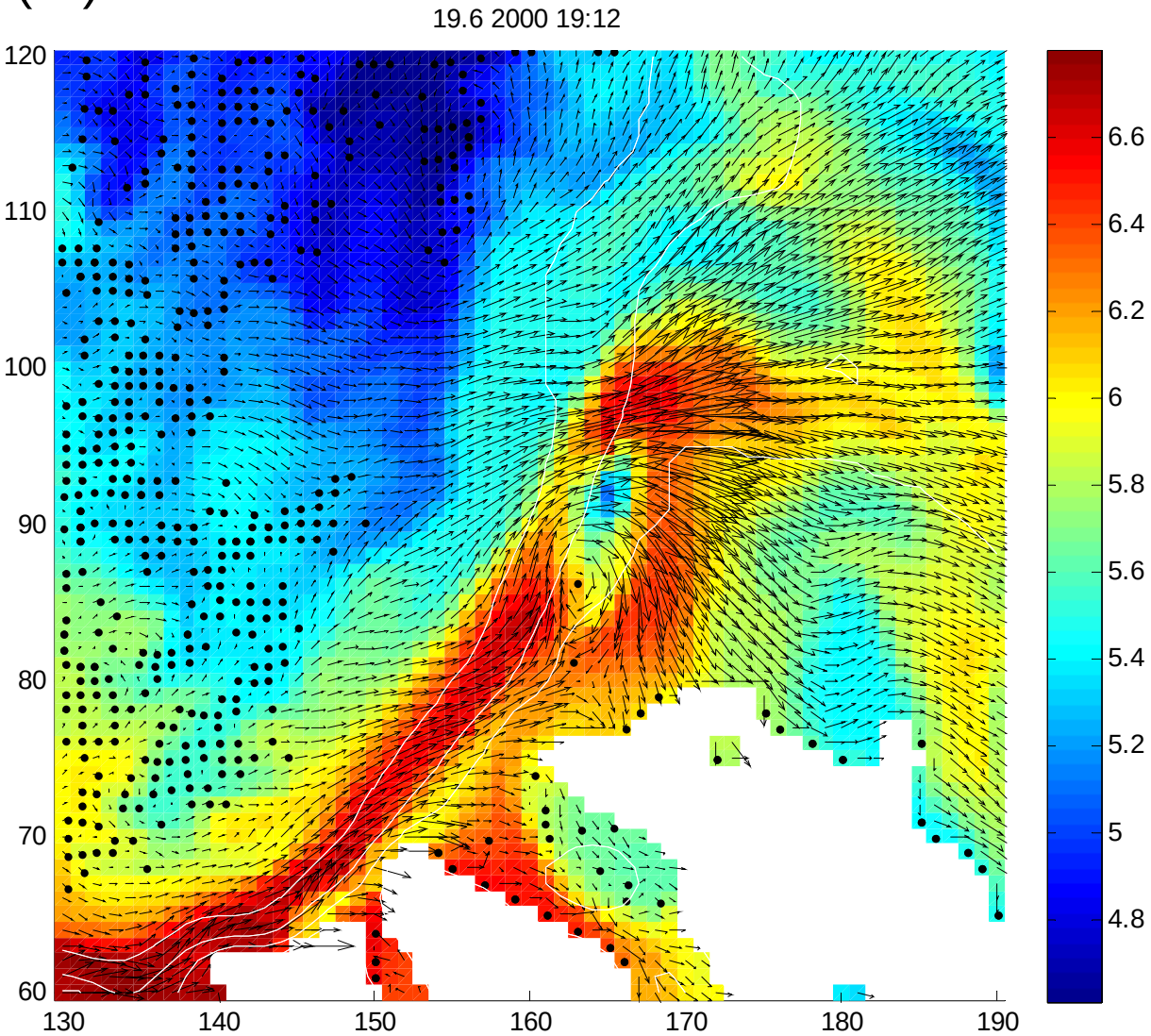
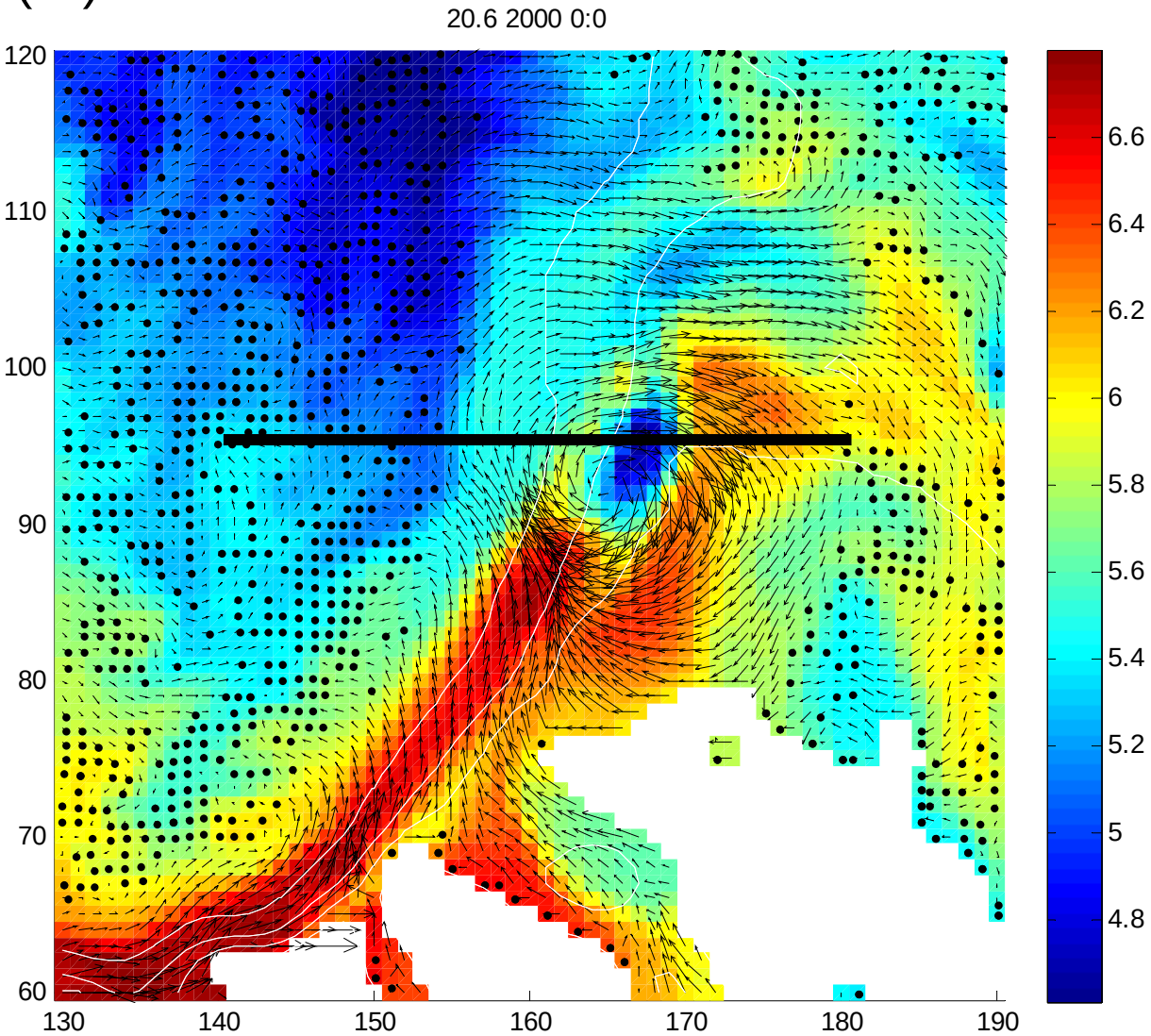
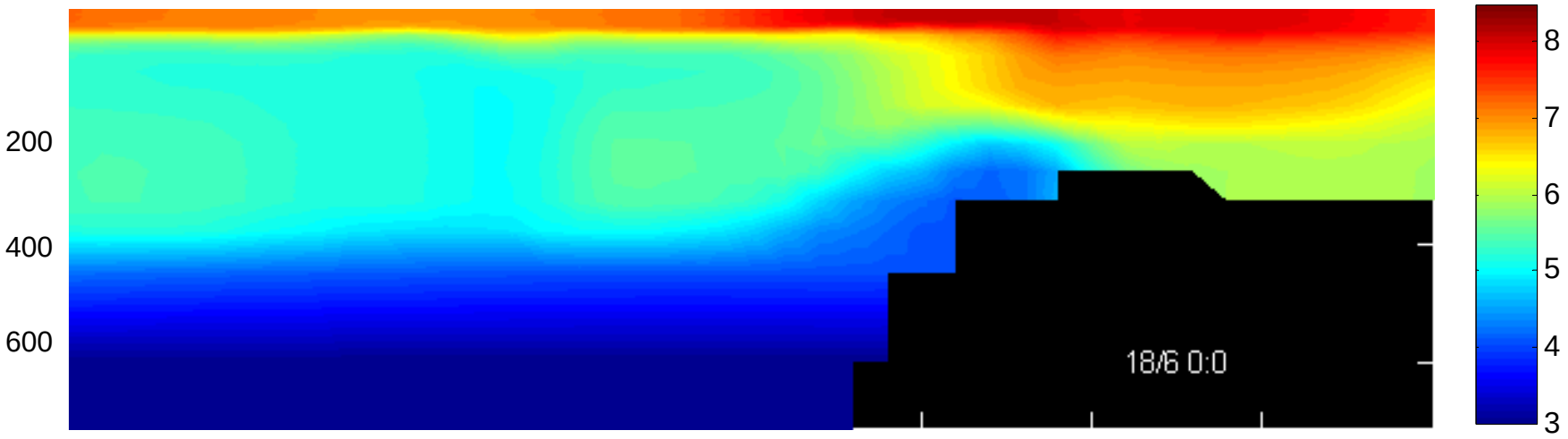


Temperature (°C)
Depth 250 m



Temperature (°C), x=140:180, y=95



Forcing mechanisms

Tidally induced topographic wave

Kasajima 2001:

- diurnal tides (K1) enhanced at the BSO
- vortex at Tromsøflaket (steep slope) dies out in Bjørnøyrenna (gentle slope)
- resonance between K1 tides and free oscillation → topographic vorticity wave

Forcing mechanisms

Tidally induced topographic wave

- Effects of wind and stratification?
- Similar eddies further south along the shelf slope?

Relevance

- Mixing between NCC and NwAC waters
- Affecting the splitting of NwAC ?
- Deeper water onto the shelf

→ nutrients? Calanus?

Further simulations

Particle tracking

Other seasons and wind regimes

Thank you!