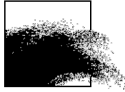


Temperature in Belgian marine waters : from monitoring to management through modelling

V.Pison and J.Ozer

presented by G.Pichot

CLIMAR II Workshop - Brussels- 17-22 November 2003



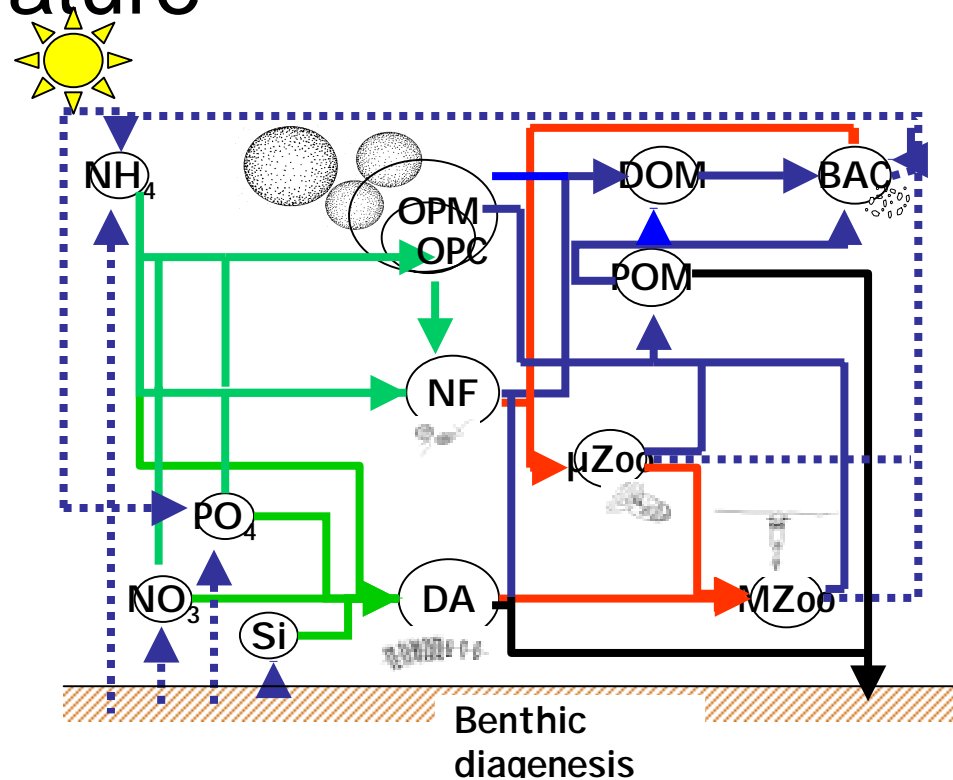
Why do we need seawater temperature?

- Biological dynamics
- Physical processes
- Public concern



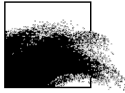
Biological dynamics

All the ecological processes are depending on temperature



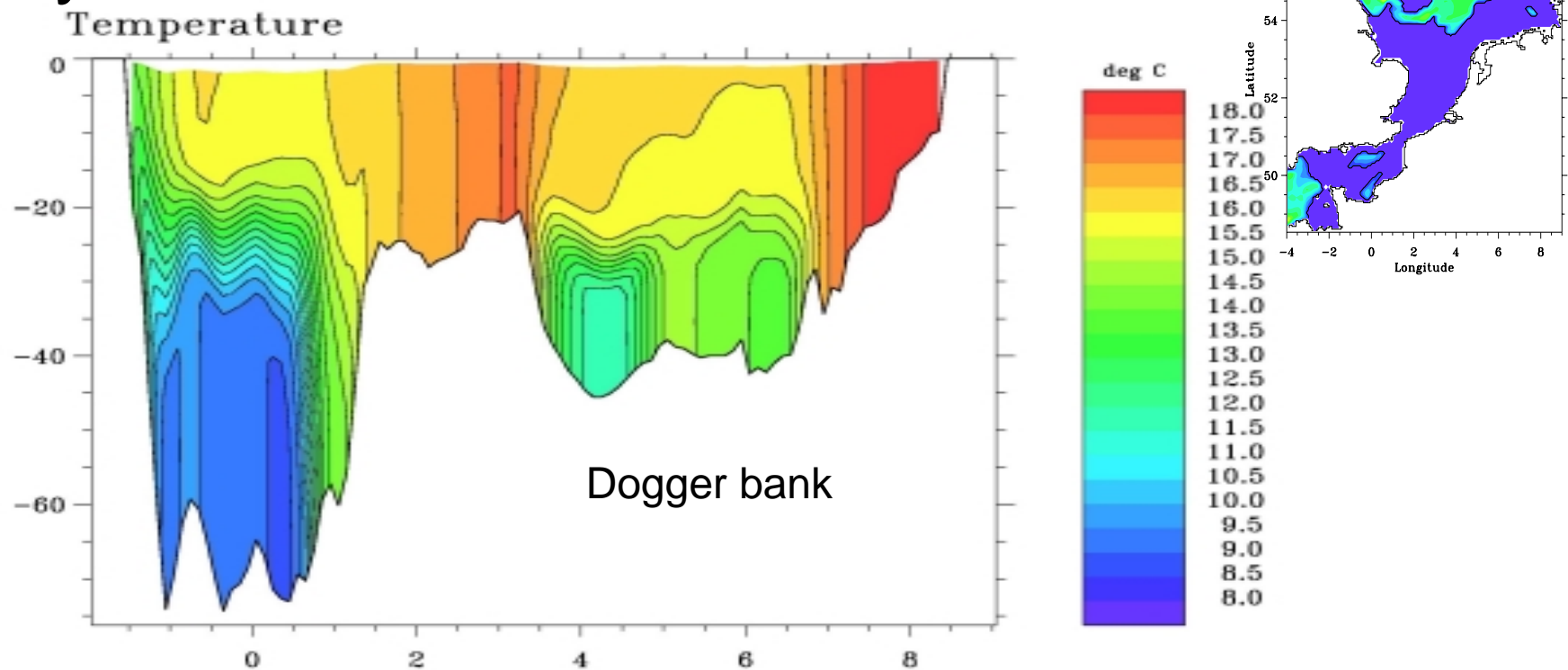
32 state variables
117 parameters

The MIRO model structure: C, N, P, Si cycling (Lancelot et al.)

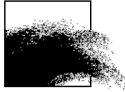


Biological dynamics at short time scale

Control of phytoplanktonic productivity by stratification



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Biological dynamics at pluri-annual timescale

to check a possible northerly shift of invertebrates (barnacles...) and fishes (anchovy, red mullet, pilchard/sardine, hippocampus, wrasses...)

linked to a long term increase of sea water temperature

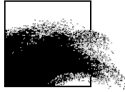


Physical processes

Measurements based on acoustics
(ADCP, multi-beam...) are temperature
dependant



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Public concern

Temperature of bathing waters

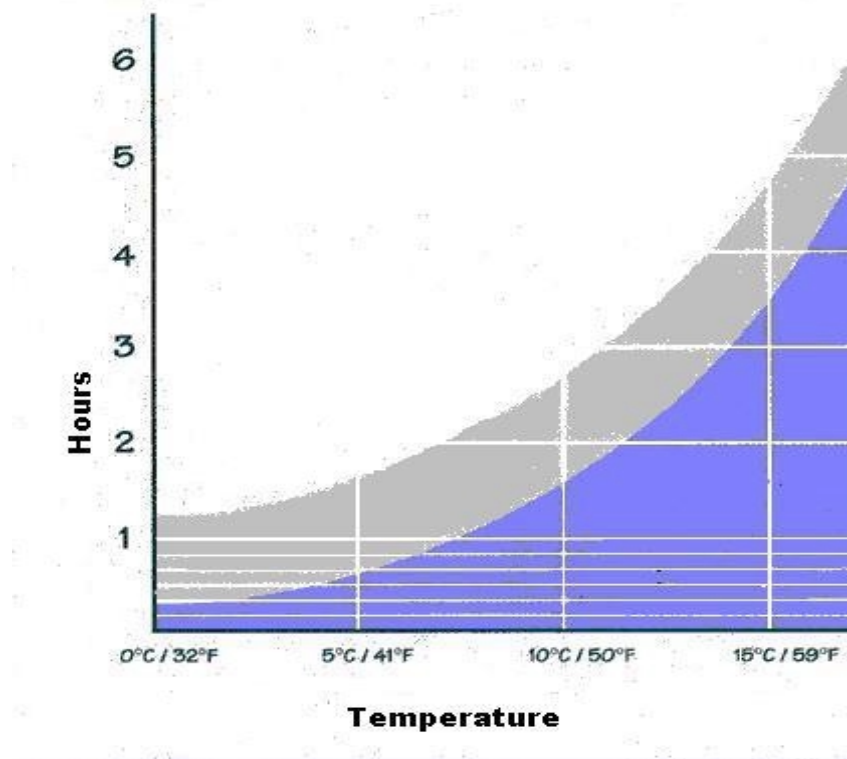


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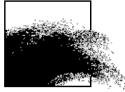
Public concern

Survival time in sea



Source : Survival in cold water - Canadian Red Cross

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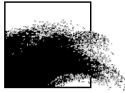


Sources of temperature observations

- In situ
 - From space
- ... assembled in an interactive database

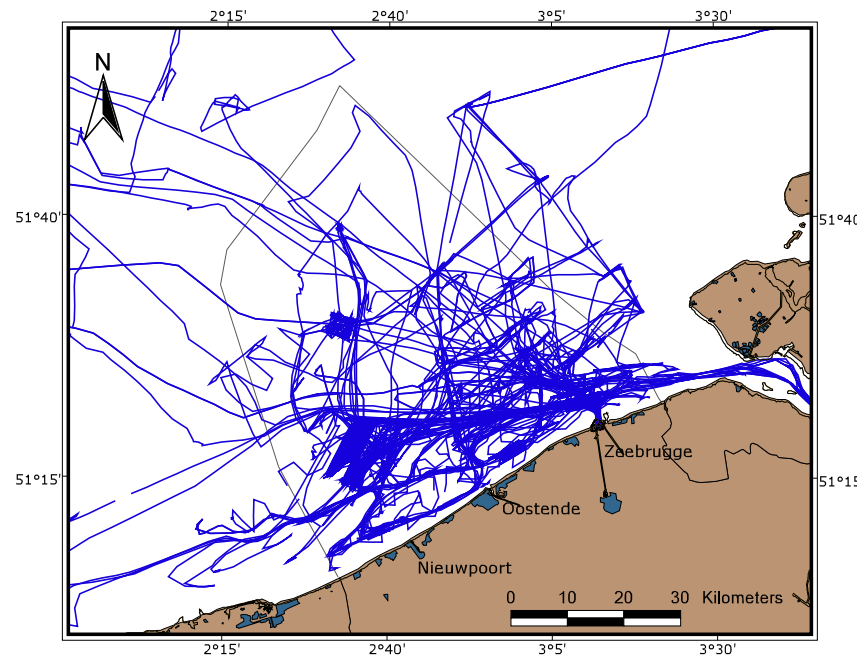
Modelling of temperature distribution

- Description
- Results
- Limitations



In situ observations

Real-time measurements of subsurface temperature



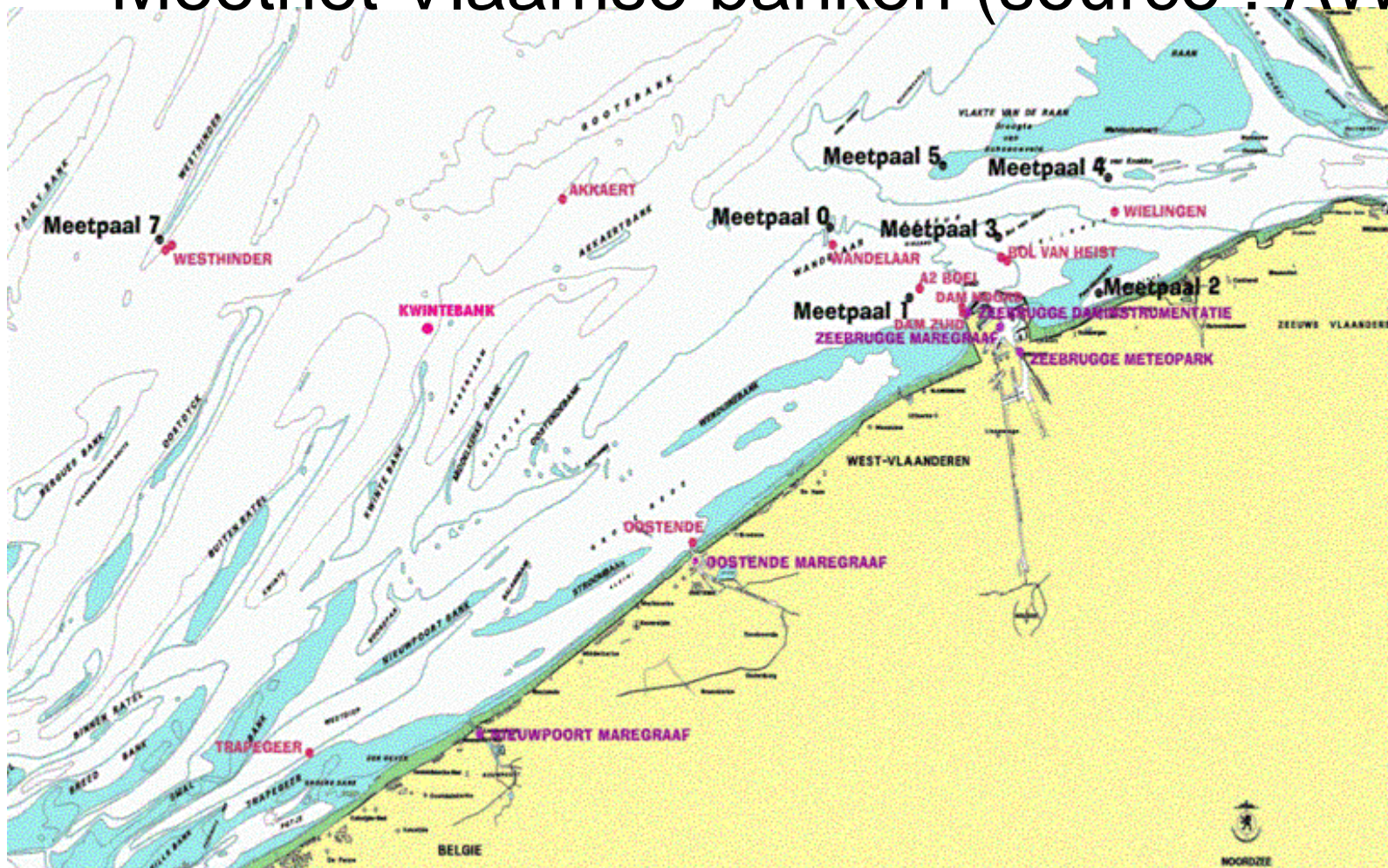
Trajectories of the R/V Belgica in 2002

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In situ observations

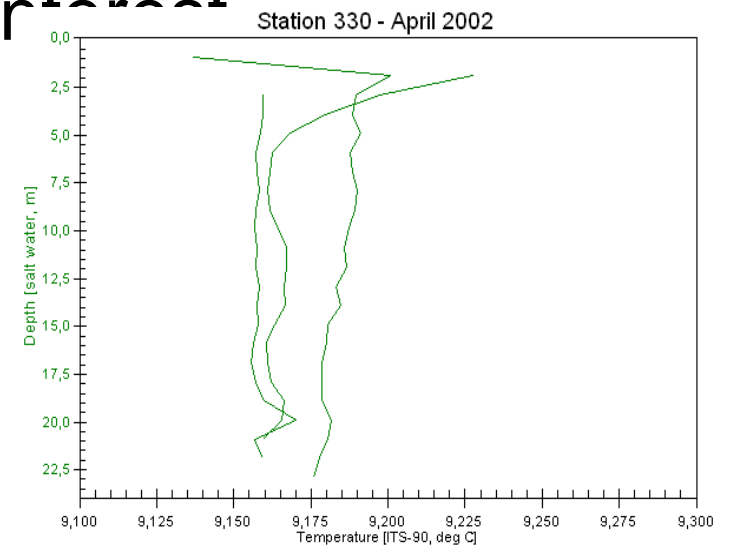
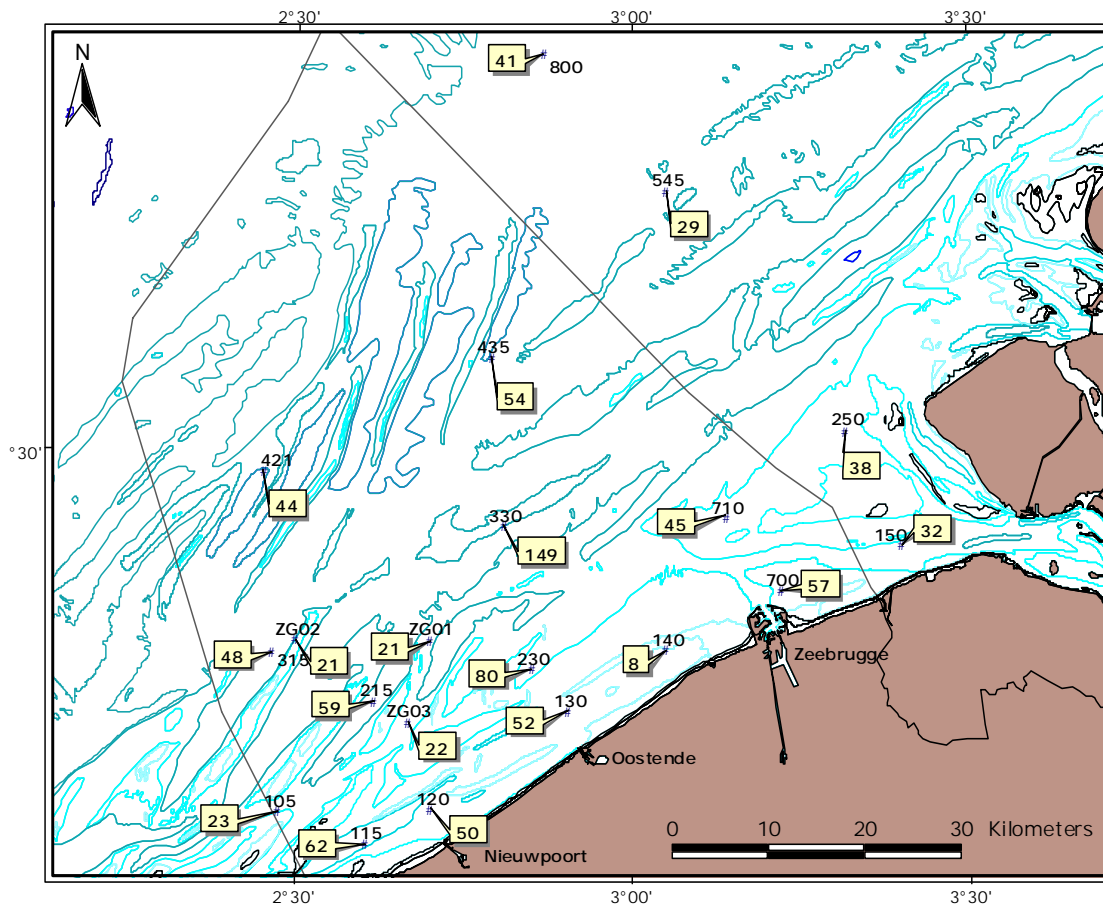
Meetnet Vlaamse banken (source : AWZ)



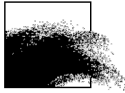


In situ observations

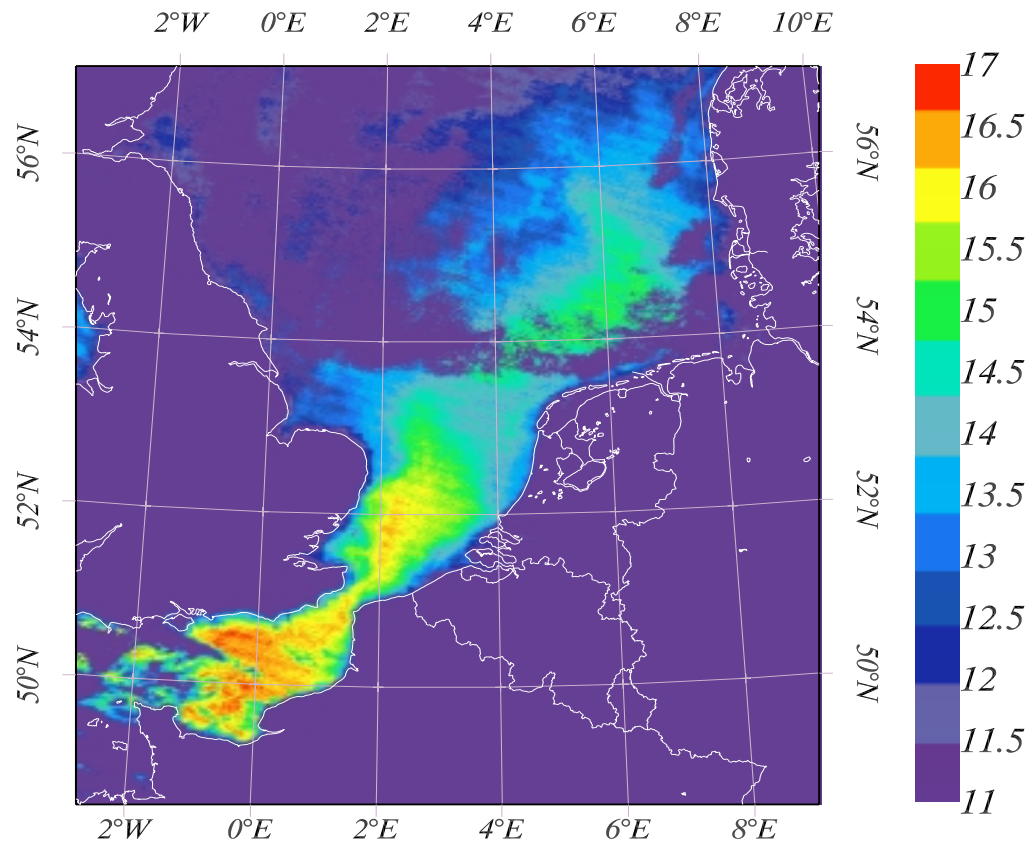
On a 10 years period about 2500 profiles in the Belgian zone of interest



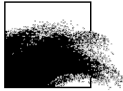
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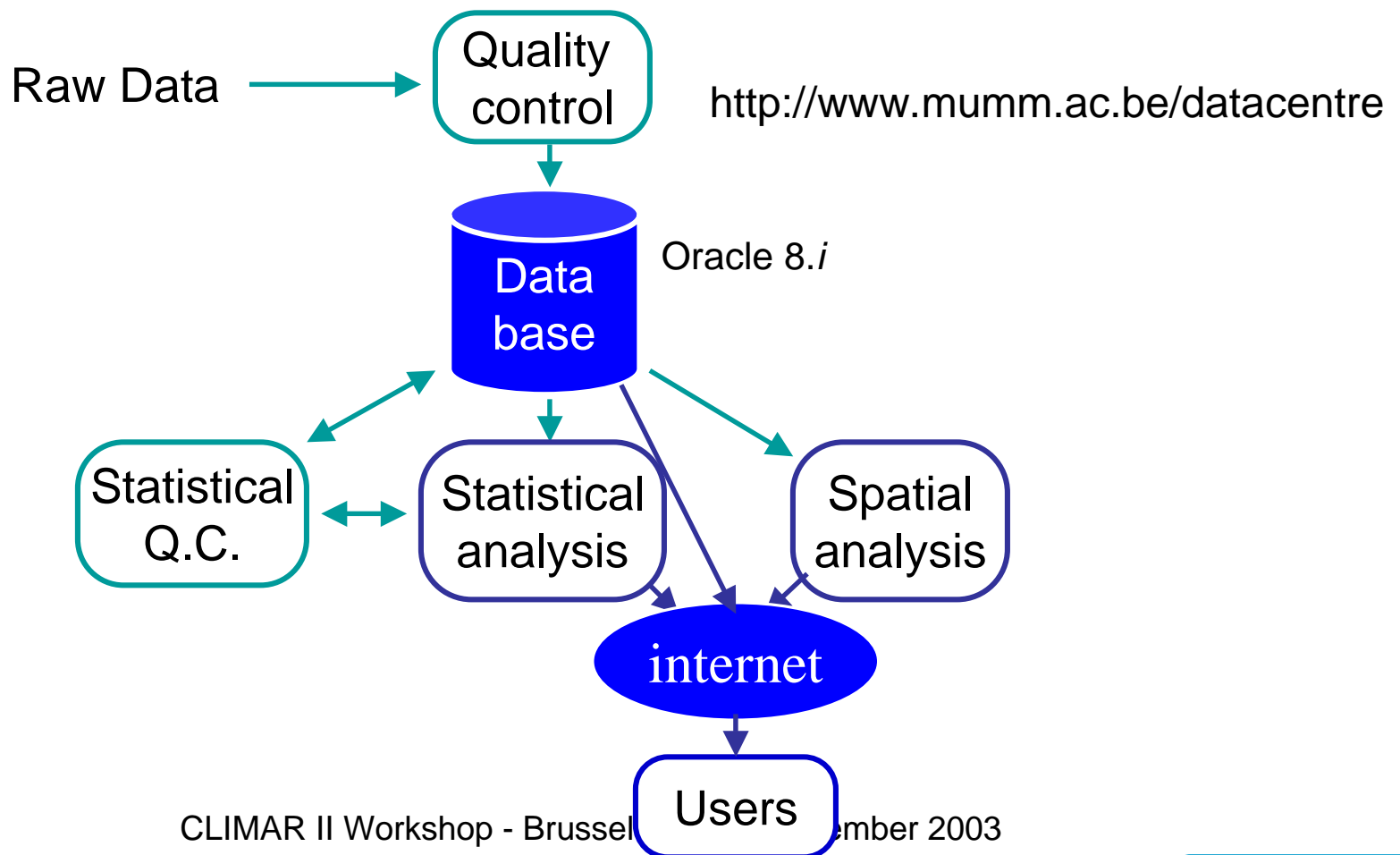
Observations from space



MODIS uses infrared bands optimally placed to determine SST. Data are then processed by GSFC to obtain SeaWiFS-like pictures which are retrieved at MUMM between 11h30 and 13h30 (UTC) with a geo-reference.



Database principles guiding the BMDC

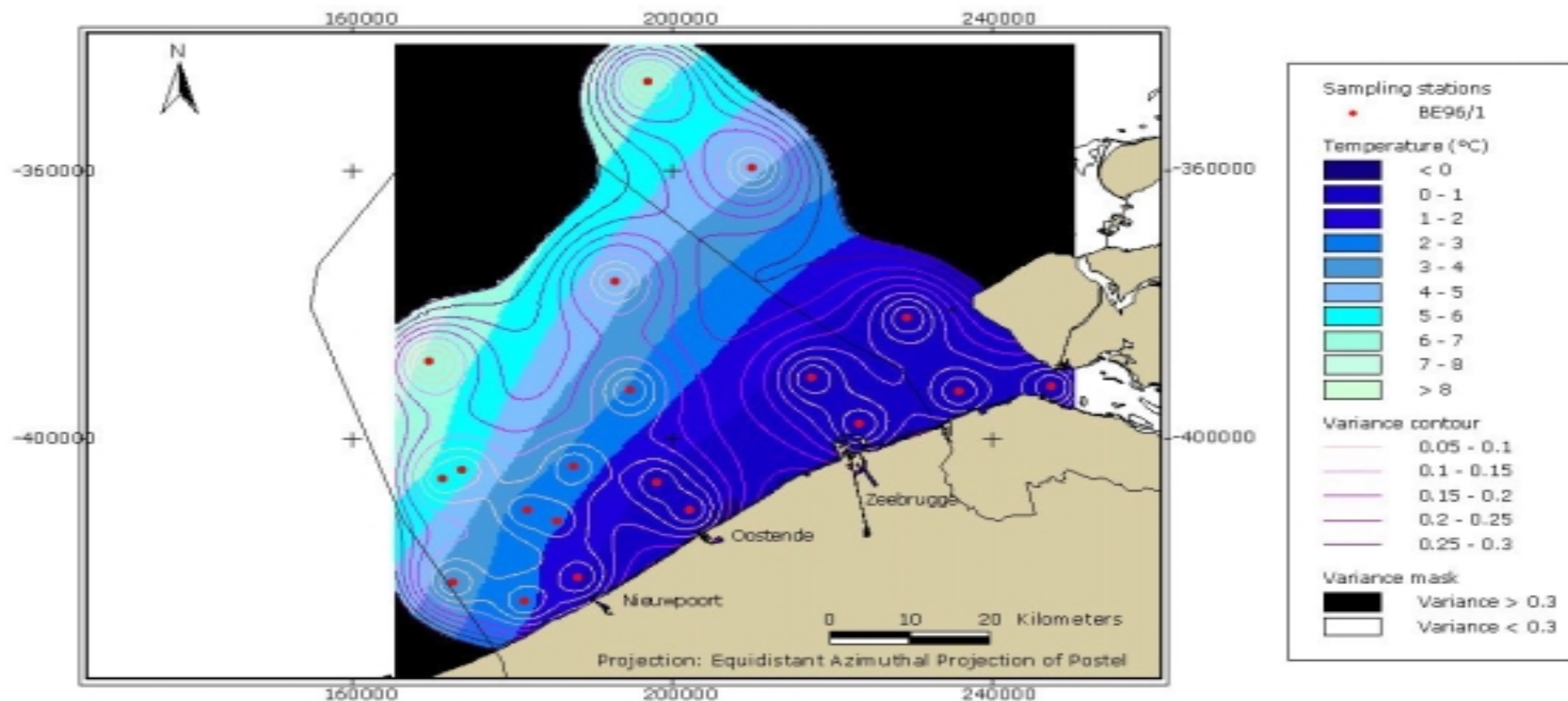


CLIMAR II Workshop - Brussel, 11-12 November 2003

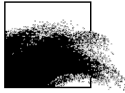


Spatial analysis

Surface temperature – campaign 96/01

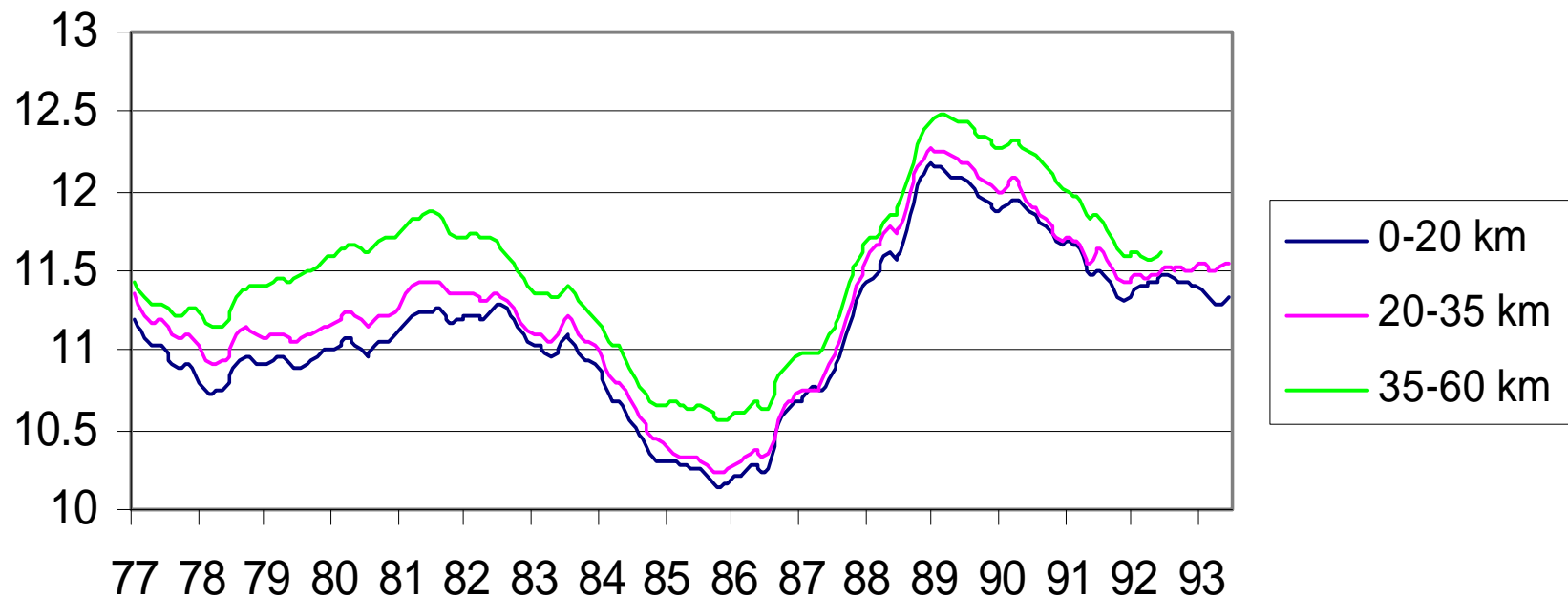


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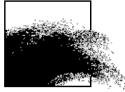


Temporal analysis

Running mean over 3 years- long-term variability
source: NOWESP project



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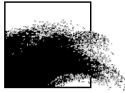


Modelling of temperature distribution Coherens



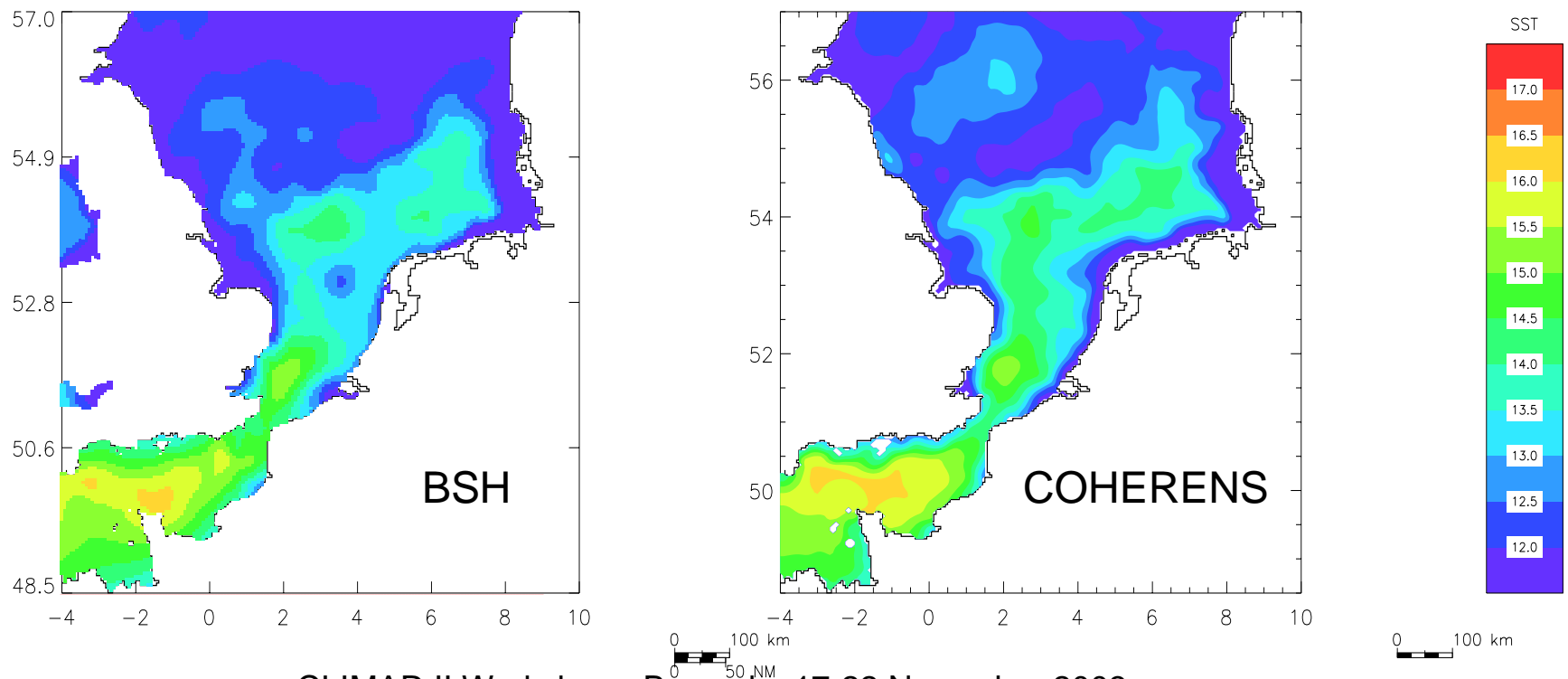
- 3D numerical model for coastal and shelf seas
- Coupled hydrodynamic-biological-resuspension and contaminant models
- Developed in the frame of EU-FP4 program
- Fully documented
- Freely available for the scientific community already more than 800 registered users

<http://www.mumm.ac.be/coherens/>

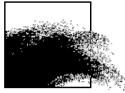


Model results

Simulation from 11.10.2003 pm to 29.10.2003
output : SST – average 22-29.10.2003



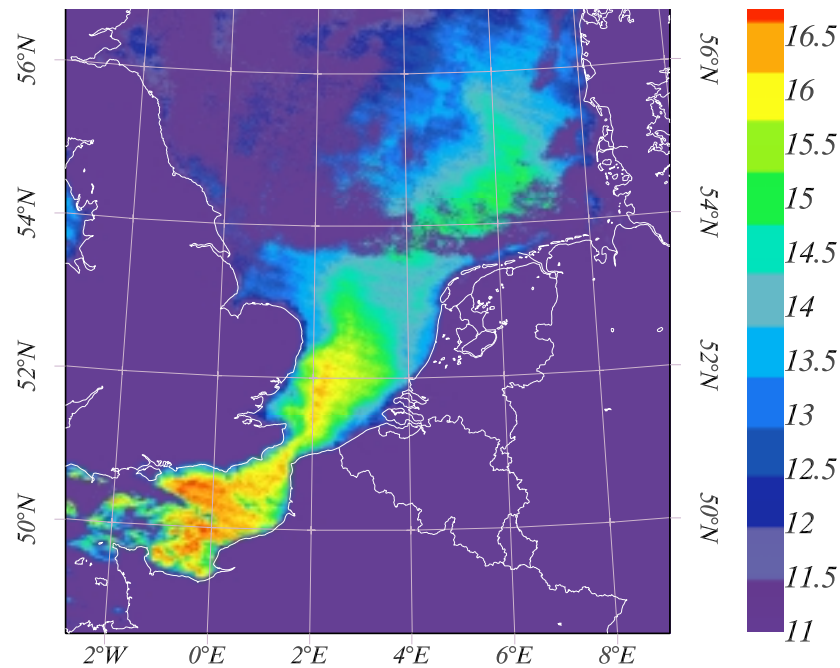
CLIMAR II Workshop - Brussels- 17-22 November 2003



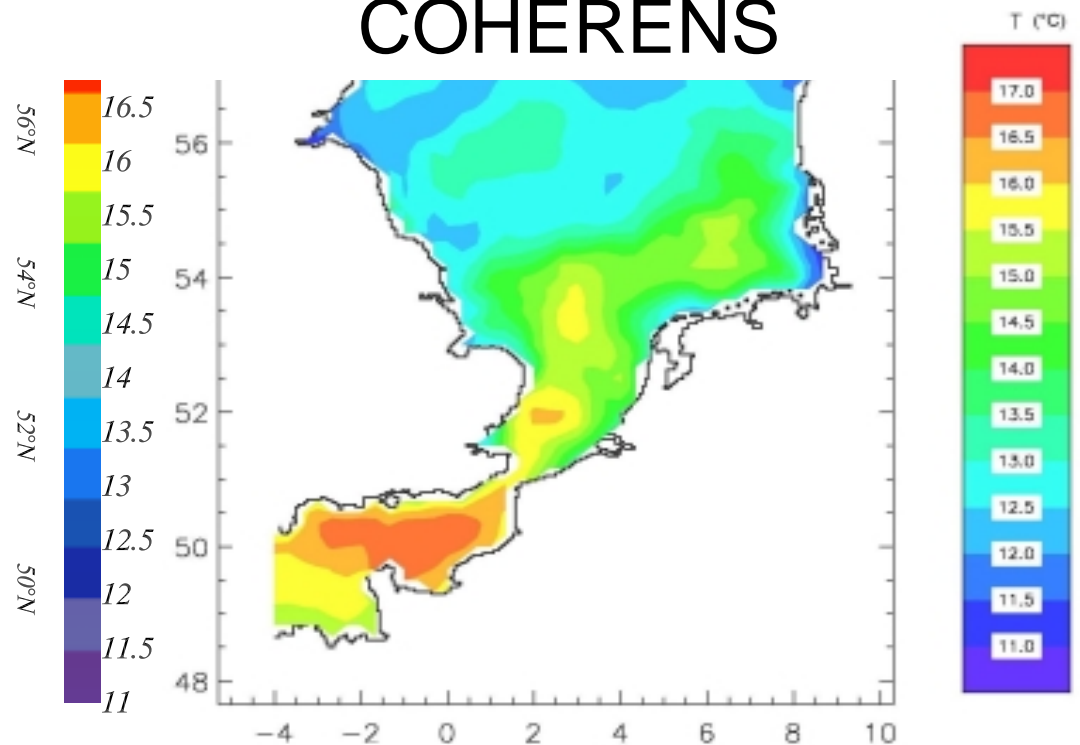
Model results

output : SST -16.10.2003 12h

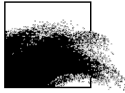
MODIS



COHERENS



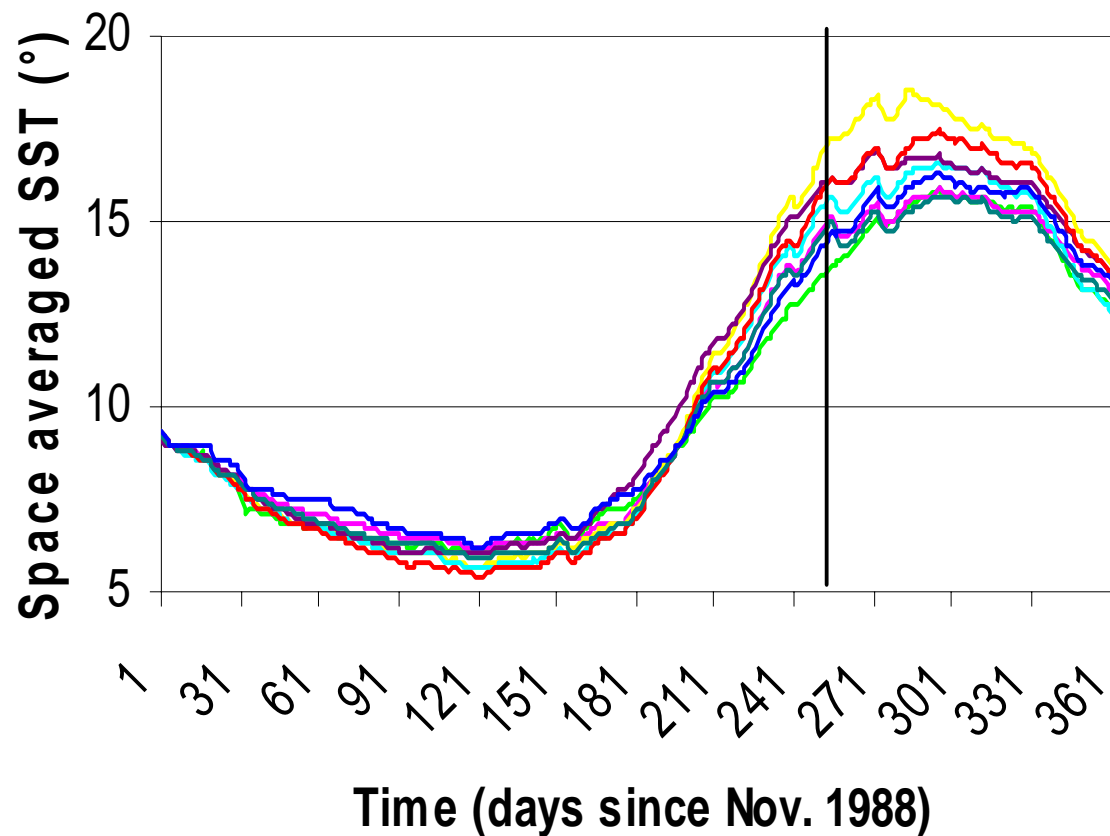
CLIMAR II Workshop - Brussels- 17-22 November 2003

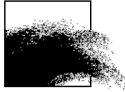


Models limitations

source : NOMADS2

8 models
diff. up to 3.5°C
(17.2 – 13.7)





Conclusions

- Forecast of coastal temperature quasi-operational
- End users identified
- Cooperation in place in the frame of NOOS (affiliated to EuroGOOS)
- Need for model validation on a quantitative basis
- Need to improve the accuracy by assimilation of data from all sources (ODON FP5 project)



contact : V.Pison@mumm.ac.be