ODV Gridding Methods

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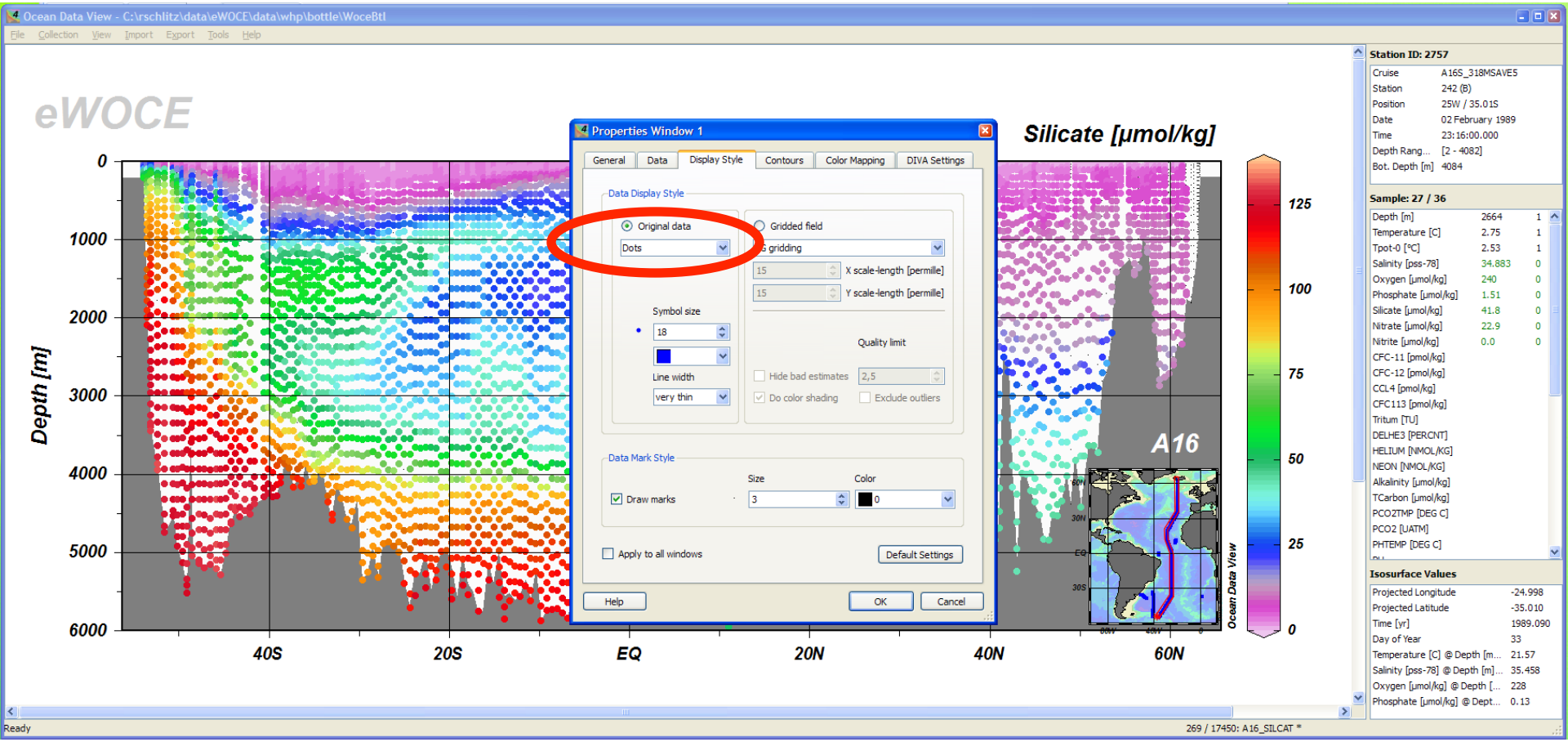
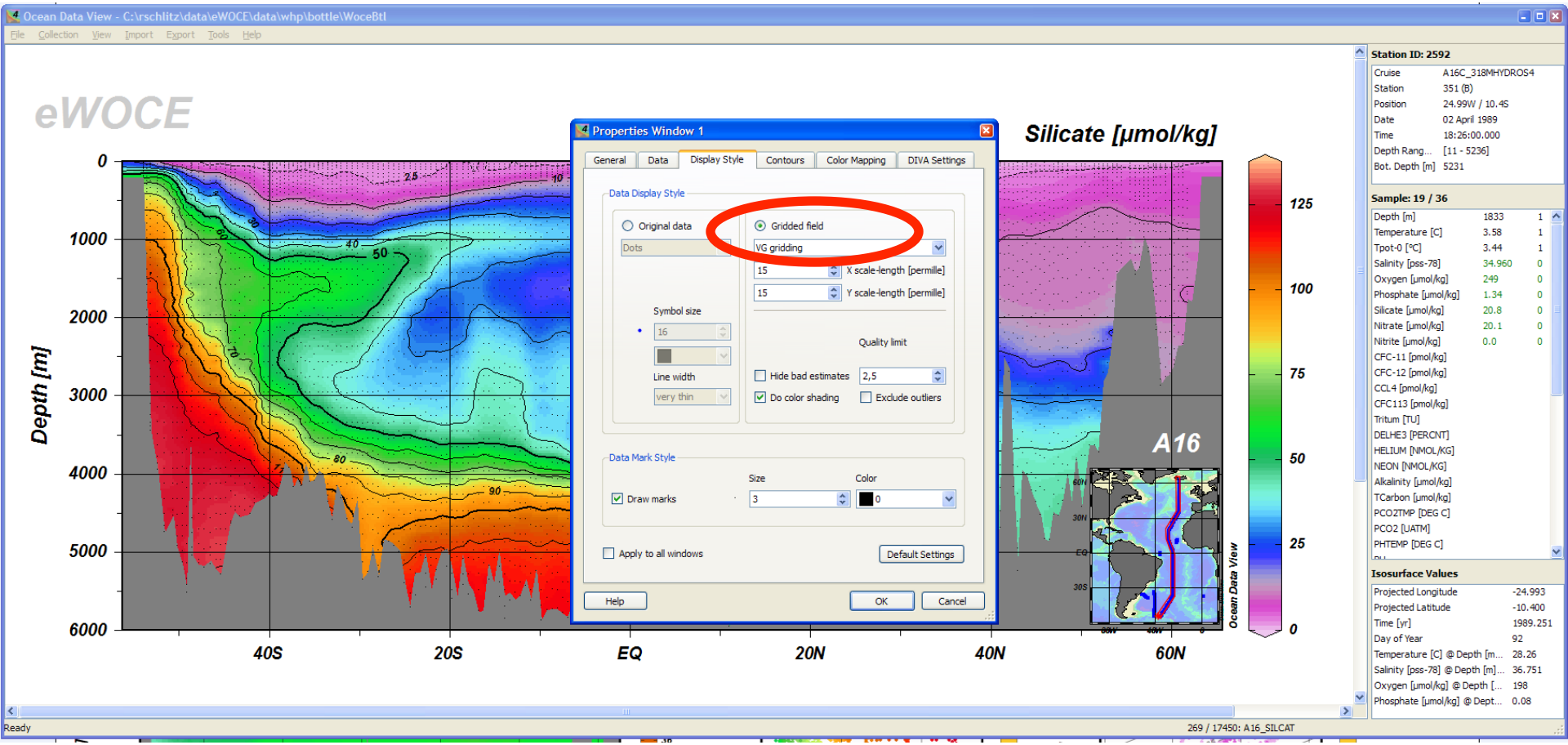
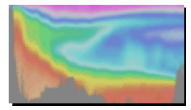
Data Visualization – Honest Way



Data Visualization – Gridded Field

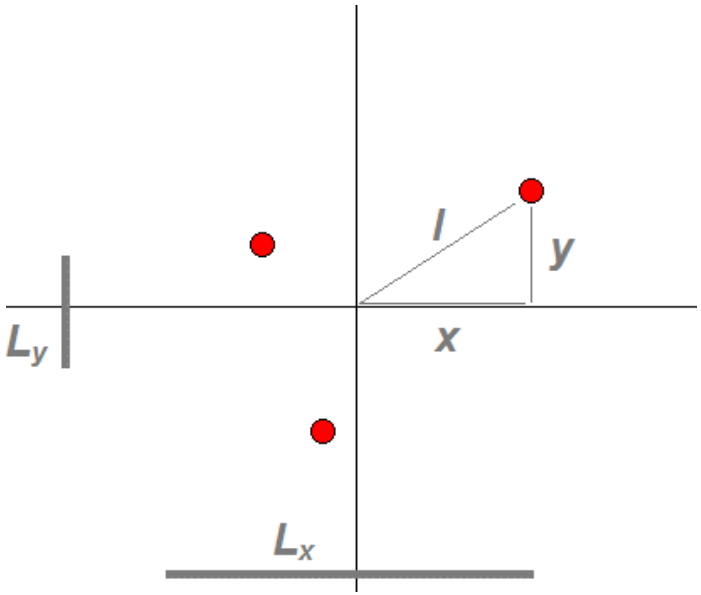




Requirements:

- *easy-to-use, fast and „reliable“,*
- *usable for large datasets of >100000 points*

Grid Value Estimation by Weighted Averaging

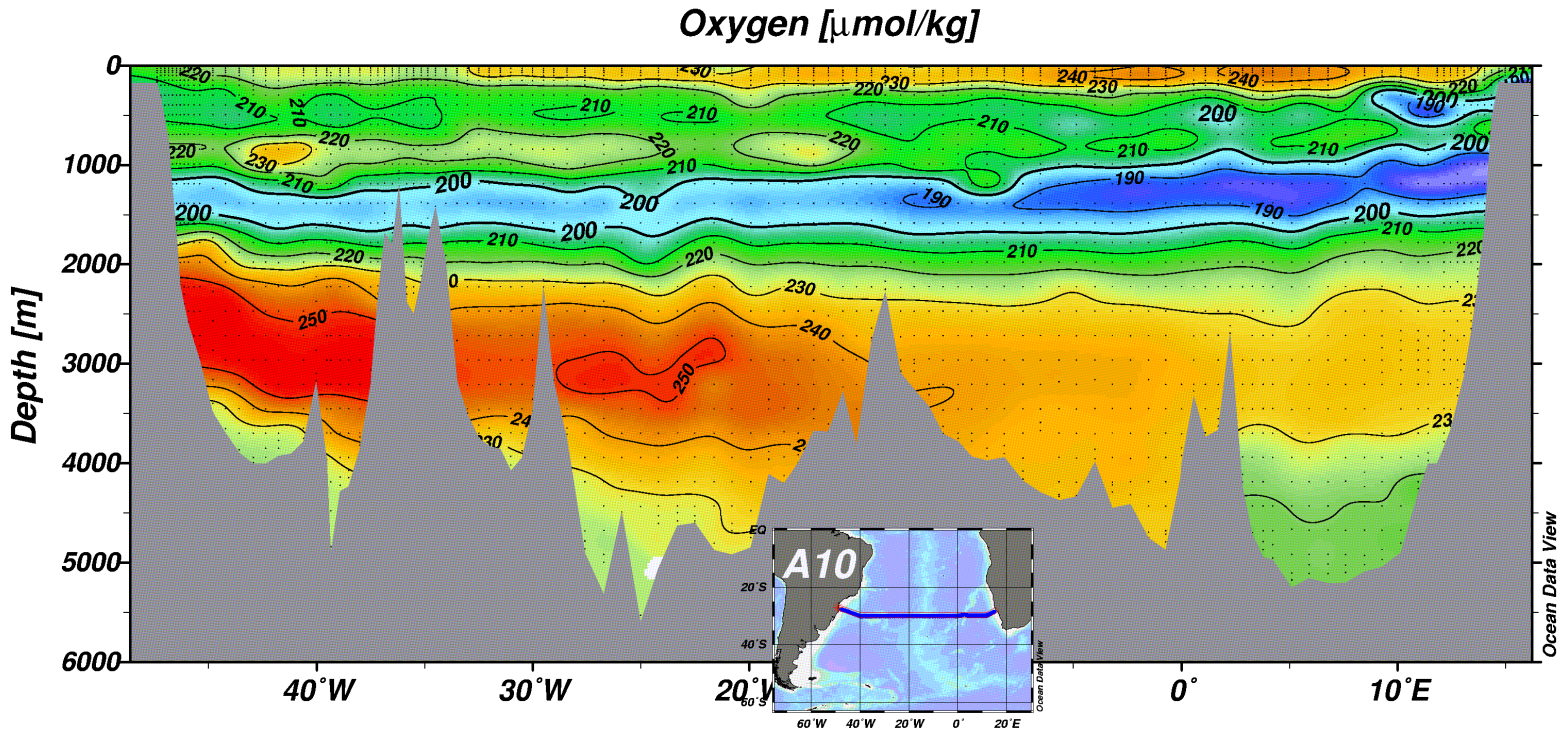


$$estimate = \frac{\sum w_i d_i}{\sum w_i}$$

$$w_i = e^{-r}$$

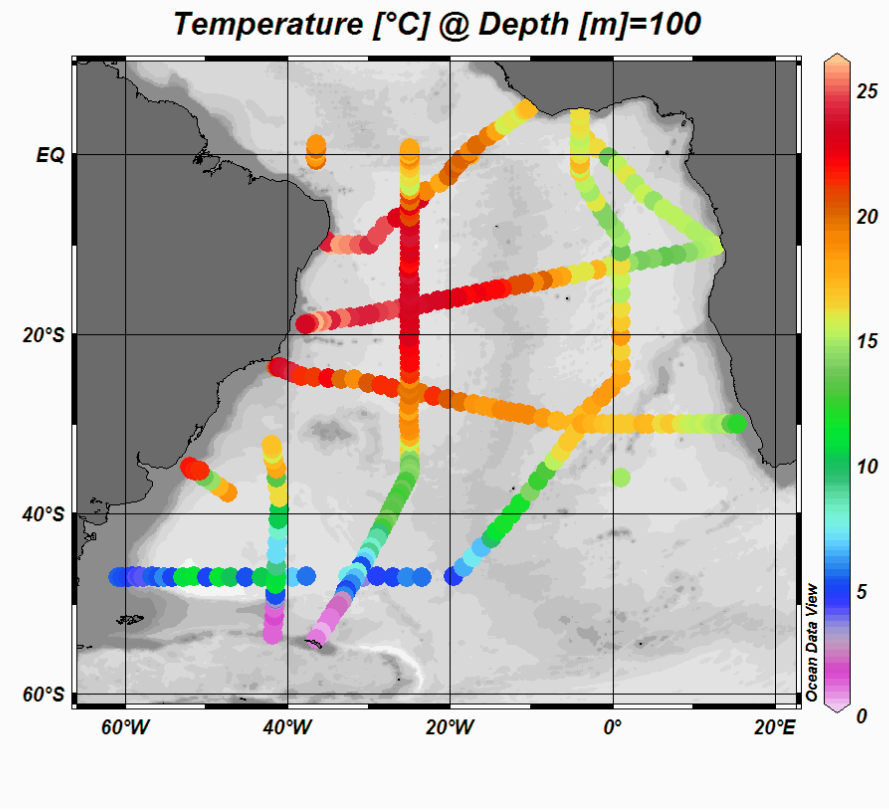
$$r = \left(x/L_x\right)^2 + \left(y/L_y\right)^2$$

Variable Resolution Grid

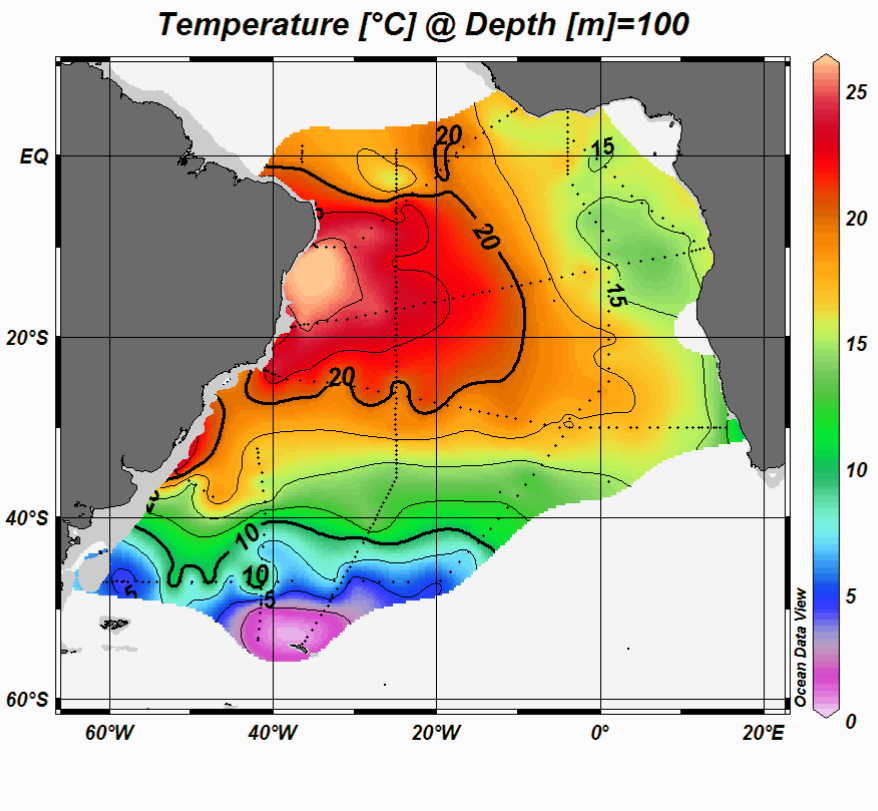


Data Visualization (2)

„Honest“ Way



Gridded Field



Gridding Methods

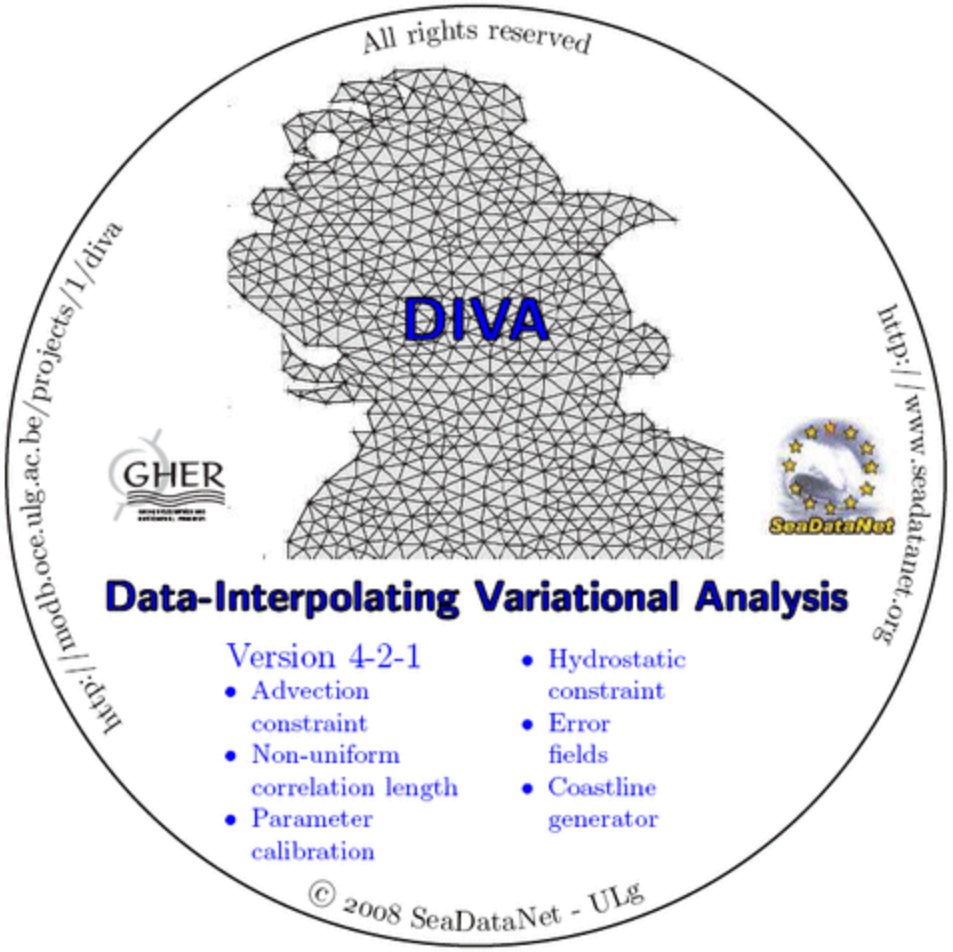
Gridding is …

- important and definitely needed
- challenging mathematical problem
- obtaining reliable fields is an „art“

Methods

Inverse distance weighting	Pros: fast, good results for homogenous data coverage Cons: erodes extrema; poor results for sparse and inhomogenous data coverage
Objective analysis	Pros: optimal estimation Cons: very slow, requires knowledge of data statistics, „small“ datasets only
Variational data interpolation (DIVA)	Pros: quite fast, optimal estimation, supports domain separation, anisotropic statistics and rotated correlation ellipses

DIVA



- ***Developed at U Liege***

- ***2-Step procedure:***

  (1) Triangular mesh generation on possibly complex domain(s)

  (2) Variational fitting to data and estimation at arbitrary points

- ***Supports:***

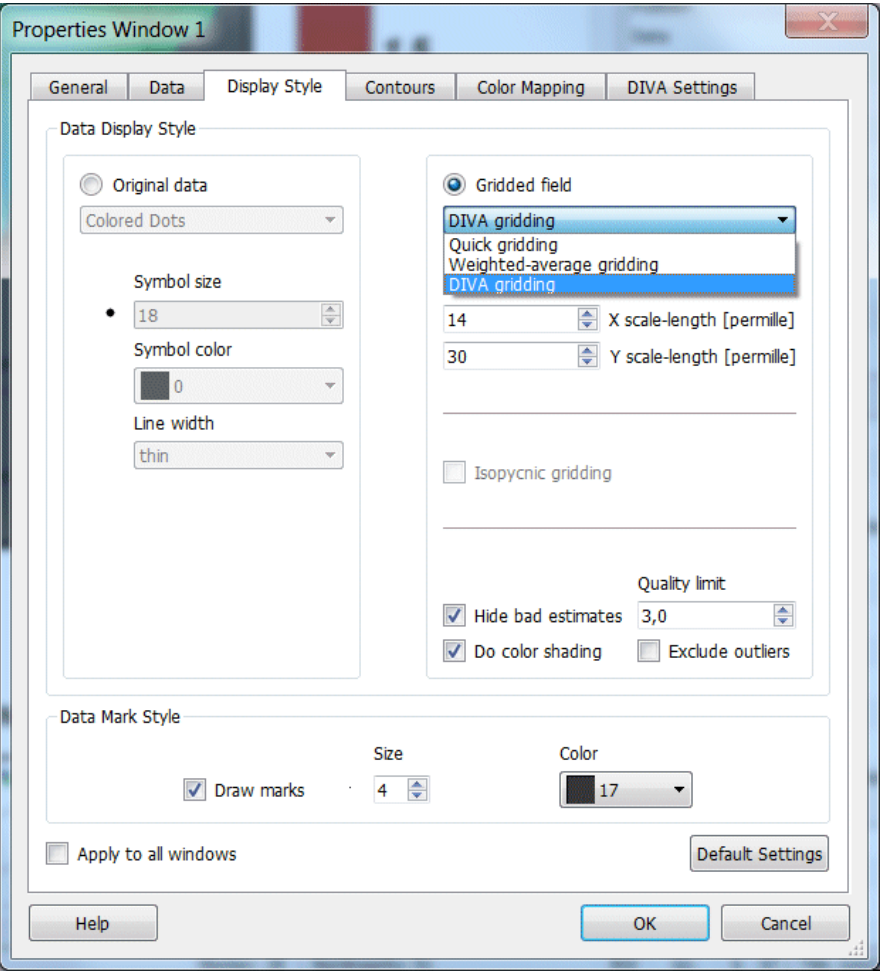
  (1) Variable mesh resolution

  (2) Multiple sub-domains

  (3) Anisotropic statistics

http://modb.oce.ulg.ac.be/projects/SeaDataNet/DivaUserGuide2008.pdf

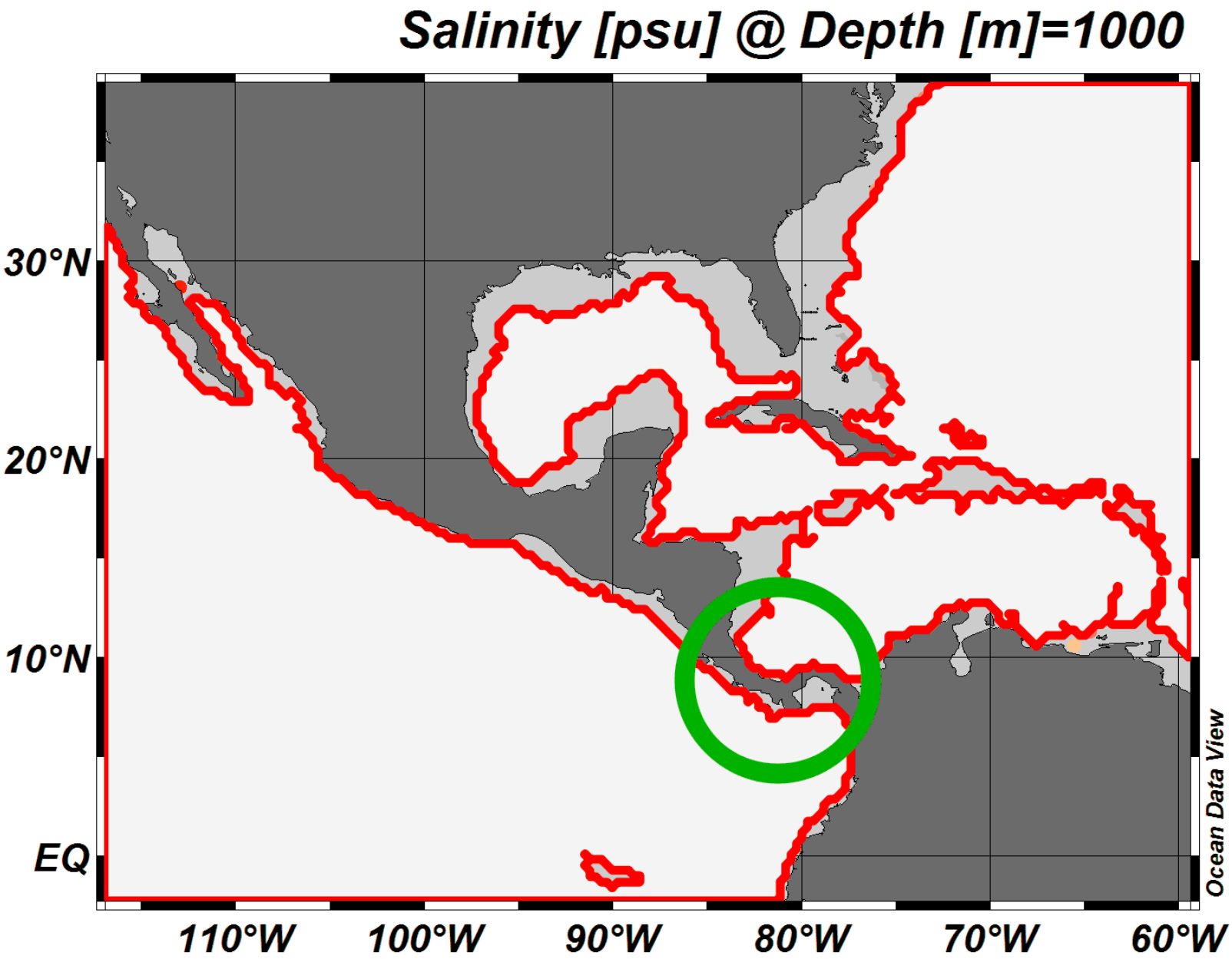
DIVA Integration in ODV



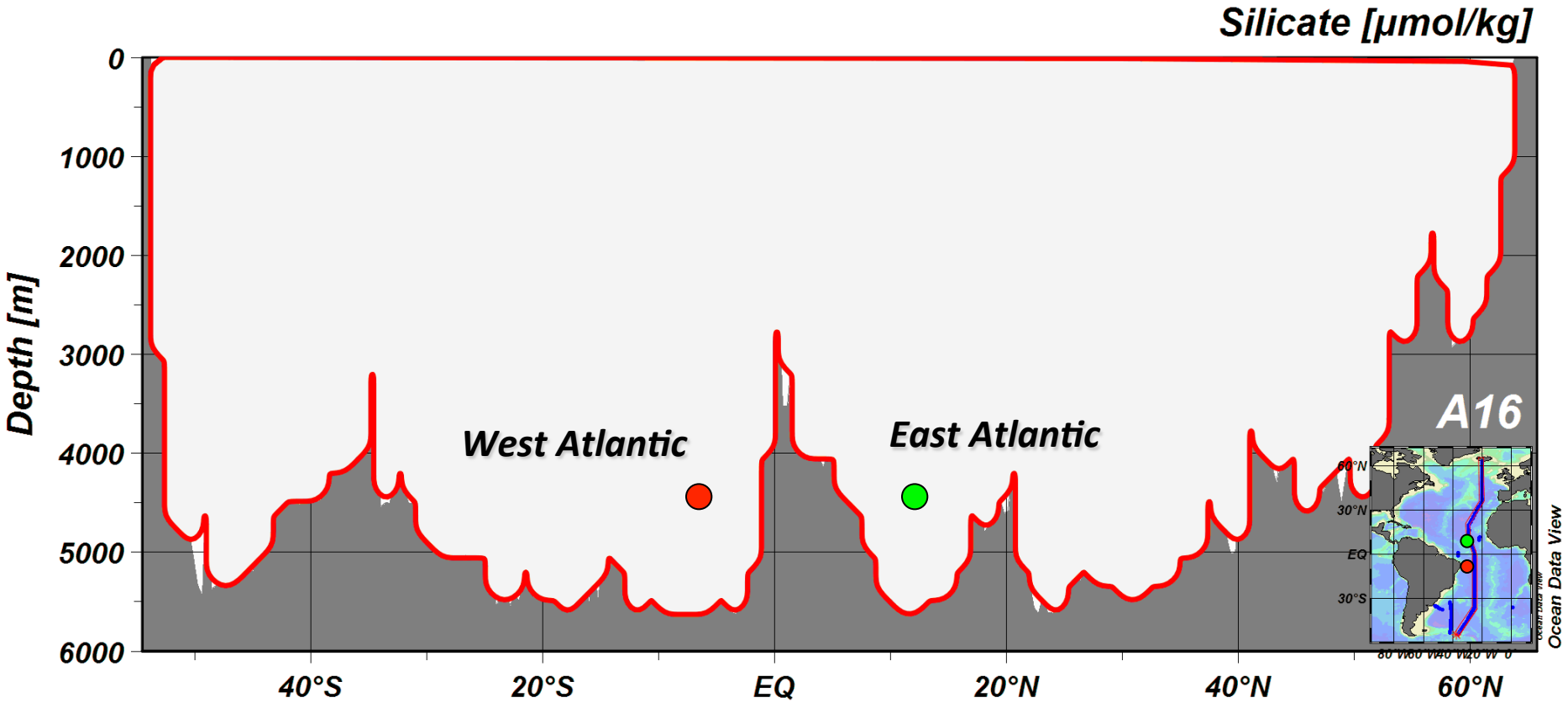
ODV will automatically…

- ***create all files for DIVA***
- ***run DIVA mesh generation and estimation***
- ***read and display the gridded field***

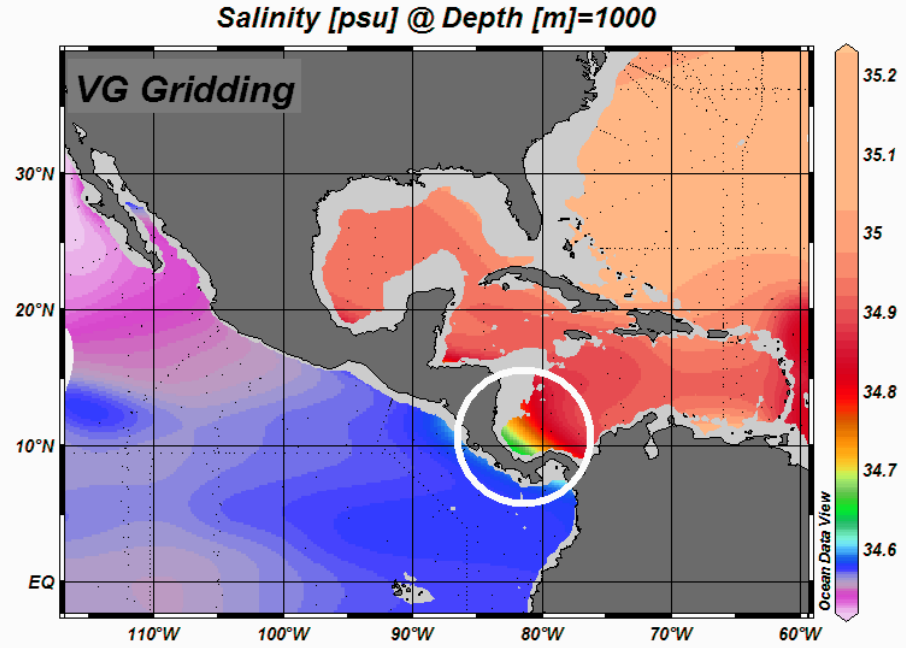
Domain Example 1

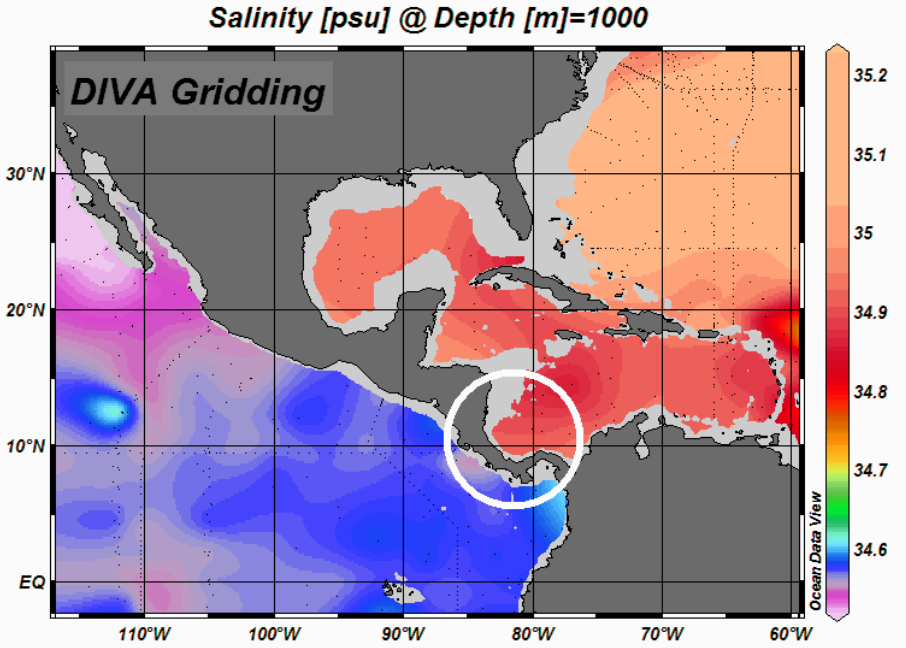


Domain Example 2

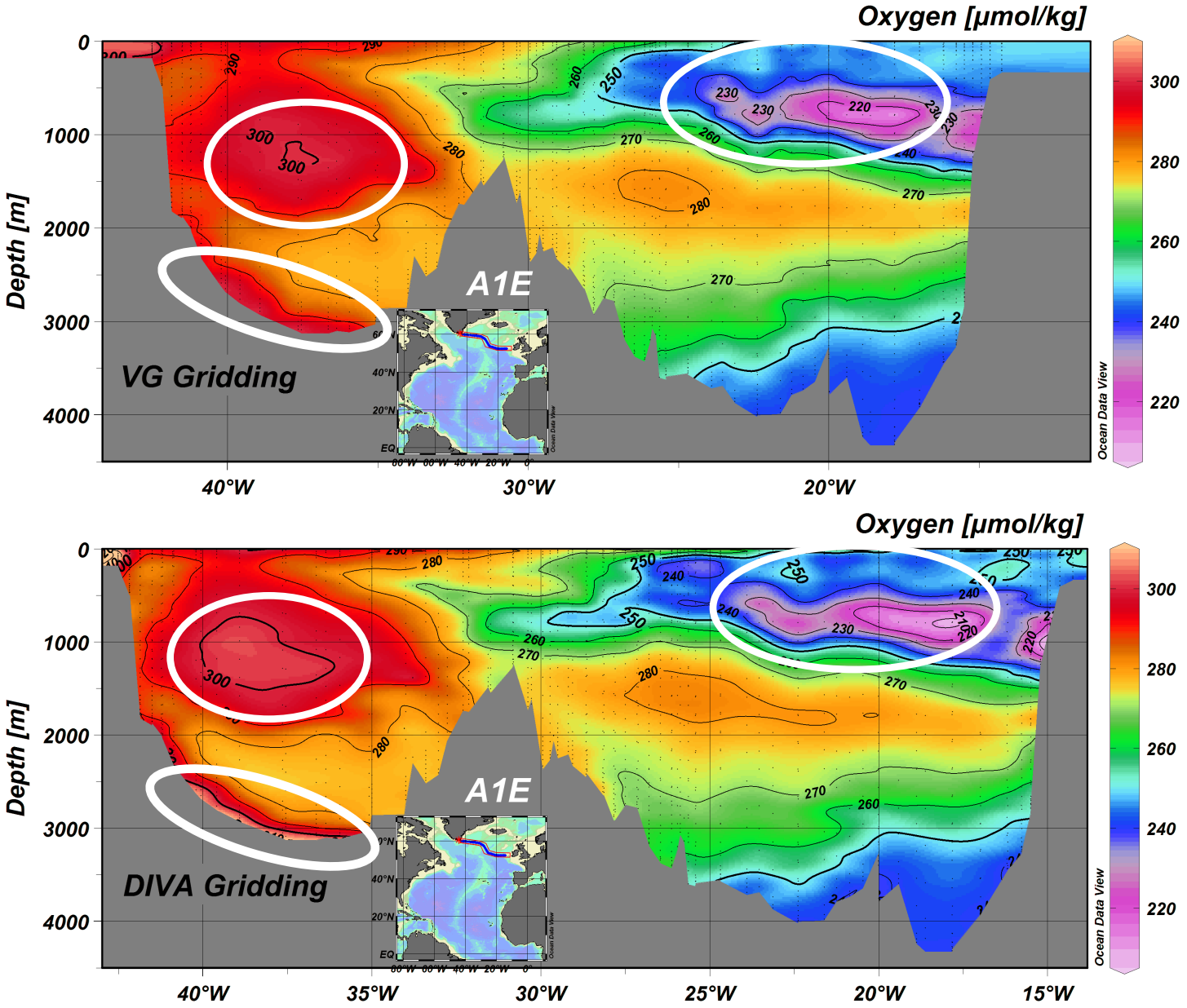


Example (1) - Separating domains…

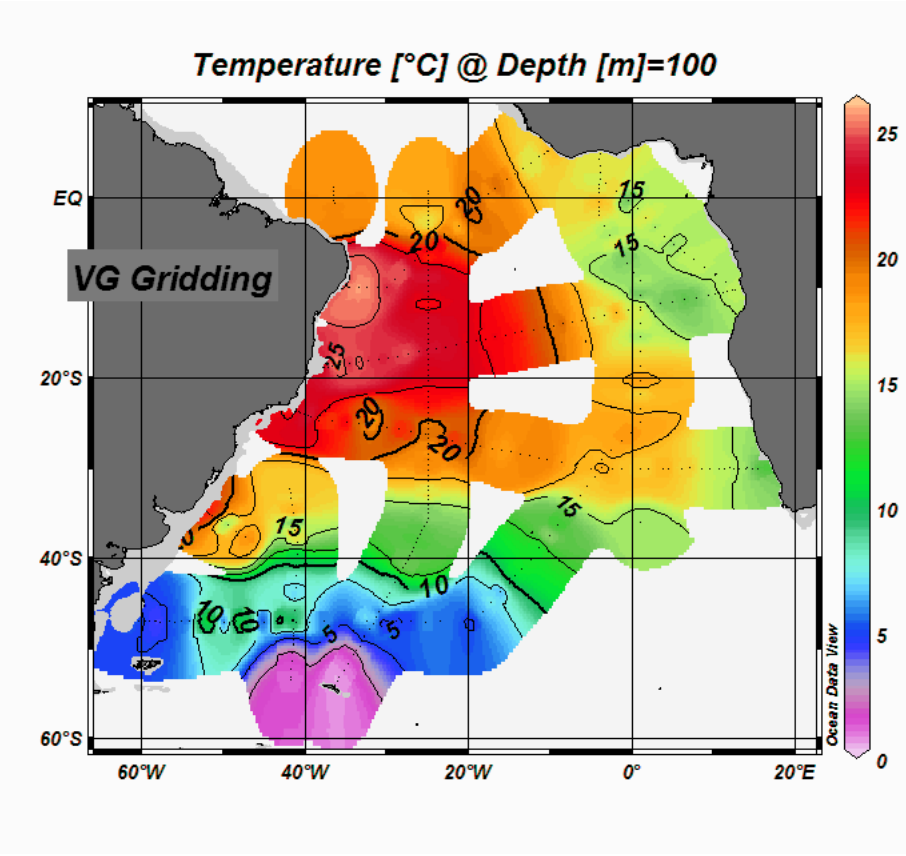


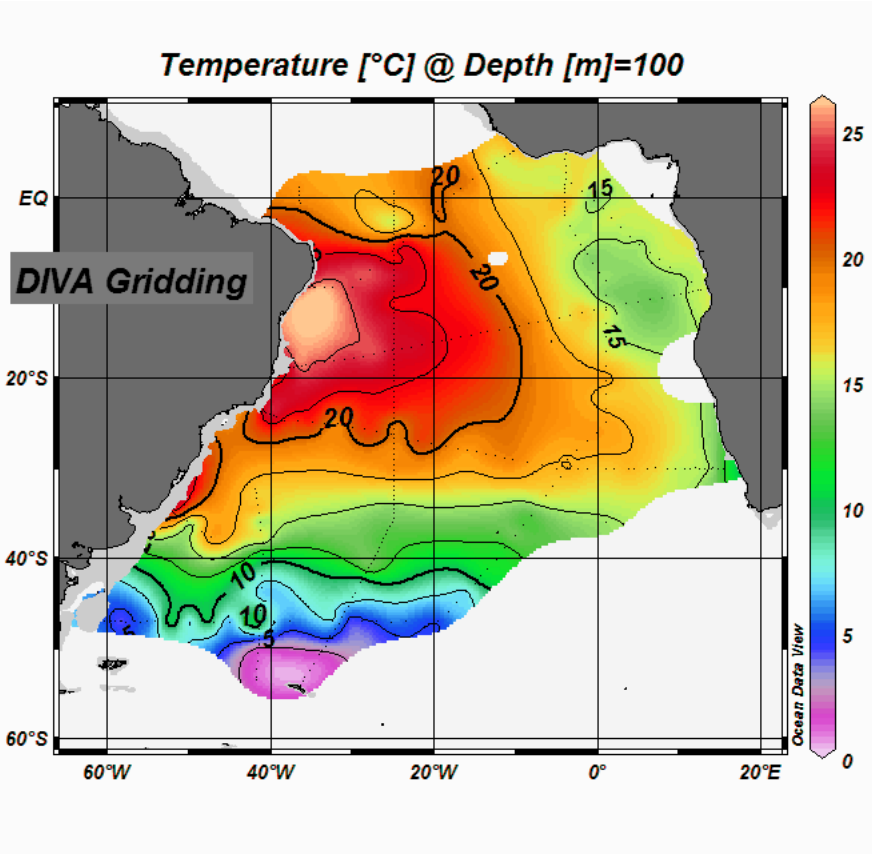


Example (2) - Maintaining extremes…



Example (3) - Filling large gaps…





Availability

https://odv.awi.de

Download and install latest version of ODV 4.7.6.

DIVA is included.

Available for Windows, MacOS, and Linux.