DIVA and OceanBrowser viewing service

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Outline

- DIVA
 - Analysis 3 (or more) dimensions
 - Error field
 - Binning of observation
 - Variable correlation length based on depth
- OceanBrowser
 - Layer with observation identifiers
 - WFS integeration

DIVA: test with 3d analyses (diva-nd)



- Top left: RMS difference (averaged over time) between 2-D analysis and the model reference climatology. Top right: idem for 3-D. Bottom: difference of RMS error of the 2-D analysis minus the RMS error of the 3-D analysis.
- Barth, A. et al. 2014, Geosci. Model Dev.

DIVA-nd

- Improved documentation
- Software can work with Matlab and Octave
- Code available in octave forge repository
- Easily installed from within octave

DIVA: error field



at a depth of 30 m in July for the 1980–90 period.

- Computing the error field is very CPU intensive
- Previous version of DIVA: "poor man", hybrid and exact
- New variants: "clever poor man" and "almost exact"
- Beckers, J.-M. et al, 2014, J. Atmos. Oceani c Technol.







DIVA: error field

- "Almost exact" method:
 - Efficient error calculation on the location of the observations
 - Add pseudoobservation
 - Analysis the error field with DIVA



Correlated observational errors with DIVA

- When deriving monthly or seasonal climatologies, we use instantaneous observation
- Instantaneous observation do not represent the same a climatological averaged → error of representation
- This error of representation can be correlated in space
 - For example, if certain observation come from the same measurement campaign
- Correlated observational errors can produce unrealistic estimates of correlation length and signal-to-noise ratio
- Solution implemented in DIVA is to "bin" (average) observation from a measurement campaign when estimating analysis parameters

Depth dependend correlation length



- The correlation length spreads the information from areas with observation to areas without observations
- In the coastal zone, the spacial scale are generally smaller than in the deep ocean
- To take this into account, the correlation scale can be estimated based on the ocean depth

Other improvements of DIVA

- Development version:
 - Better file structures (input and driver better separated from command) in 4D loops
 - Automatic selection of solver (parallel, serial, iterative) depending on the problem type and size
 - Retrieval of topographies from diva on web for easy setup
 - Improved version of the almost exact error calculation with boundary effects
- Next version:
 - Improved handling of errors DIVA 3D/4D (script "godiva")
 - Possibility of binning the data before the parameters optimization (script "divabin" + program "binning_lines.f90")
- New bug fixes
 - Correction of the example in 4D (datasource)
 - Correction of the script divaguessformODV4
 - Exact match needed between variable name in "varlist" and its real name in the data file.

OceanBrowser

- Horizontal views
- Vertical views
- Animations
- Layers can be customized
- Download (NetCDF/ OpeNDAP/KML/ Image/Movie)



Overlay of different data products

Vertical section based on depth or distance from coast



- Interesting to see the change of ocean properties along some isobath
- For mangement of the coastal ocean on need often rather the ocean properties at a given distance from coast

Integration with ODV Viewer from Deltares



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- Inventory of measurements (CDIs) displayed on a map
- For every data location, one can retrieve some metadata and plot a time series
- Open problem:
 - Many CDI represent a point measurement
 - How to aggregate CDIs in a time series?¹²

Conclusions

- Benefit 3D analysis versus combination of 2D analysis
- More efficient error fields computations in DIVA
- Binning of observation estimate correlation length and signal-to-noise ratio
- Custom vertical section in OceanBrowser
 - Depth
 - Distance from coast
- Start integration with ODV Viewer from Deltares