“High-resolution ocean general circulation models”

Summary of the ocean splinter session

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Summary of scientific contributions

E Zaron and C Rocha: Perspectives on the wave-balanced motions interactions in high-resolution OGCM (a summary of the Portland workshop).

J Le Sommer and A. Ajayi: Spatial and Temporal Variability of Coherent Structures in the North Atlantic in preparation for SWOT. Updates on the simulation plans with NEMO in Grenoble for 2018/2019.

B Arbic: Comparisons of global and regional internal wave simulations with observations and theory.

A Sinha, D Balwada , N Tarshish & R Abernathey : Modulation of Lateral Transport Barriers by Submesoscale Eddies and Inertia Gravity Waves

H Torres, P Klein, Z Su & D Menemenlis : The JPL global simulation: last results and perspectives in in terms of balanced motions and internal gravity waves.

R Samelson et al.: “Ocean mesoscale regime of the reduced-gravity quasi-geostrophic model.”

+ a number of posters

Key take home messages from the talks

- **a lot of interest on the interaction between internal waves and balanced motions**
  - impact of waves on mesoscale energy dissipation
  - impact of high frequency motions on tracer transport
  - implications on the wave-balanced motion separation from SWOT data (seasonality)
- **still a lot to learn about small mesoscale eddies :**
  - dispersive versus non-dispersive nature of small eddies
  - seasonality of the distribution of eddy scales, robustness of models in that respect
- **still a lot of validation to do with models both in terms of general circulation and high frequency motion**
  - impact of numerical and physically motivated damping on model solutions still needs further investigation

Outcome of the discussion sessions

a large audience for an extra splinter session in the evening after drinks !

Models that have been discussed :

- MITgcm (global 1/48°),
- HYCOM (global 1/25° and North Atlantic 1/50°),
- NEMO (global 1/12° and North Atlantic 1/60°)

1. Models assessment and models inter-comparison

- the status of model assessment with respect to observations varies from model to model
- we probably don't rely enough on existing assessment chains in operational centers
- in practice, the processing should be as close as possible as used for observations
- we need to share more information on these assessments

actions :

- establish and maintain list of publications and metrics used
- a fraction of the audience is keen on sharing more systematically analysis code with papers

2. Science questions on IGWs and balanced motions

- we still don't understand how the IGW spectrum develops
  role of internal waves in discontinuity of SSH wavenumber spectrum at scales <50km
- several surprising results regarding the role of high frequency motions in tracer vertical transport
  role of superinertial balanced motion ?

3. Towards improved coordination and interactions among groups:

- need to review the way how we share model data, information about model runs and analysis codes
- a key bottleneck : transfert of model data between groups
- more reproducible model analysis is probably needed to make faster progress on pressing questions

actions :

- a number of people are keen on sharing distributed data servers (e.g. at FSU, U-Mich) and investigating cloud-based solutions (Pangeo initiative)
- a fraction of the audience is keen on sharing more systematically analysis code with papers