Tides/HF session summary

chairmen Lyard F., Ponte R., Ray R.

Fewer presentations than usual, to be understood as complementary with 20YPRA's presentations on these topics (G. Egbert, B. Arbic, M. Cancet…)

Improving the dynamic atmospheric correction for mean sea level and operational applications of altimetry, L. Carrère et al., *CLS/CNES/ESA*

59-Day Oscillations, β′, and All That– or –Subtle S2 Errors from Satellite Altimetry, Richard Ray, *NASA Goddard Space Flight Center*

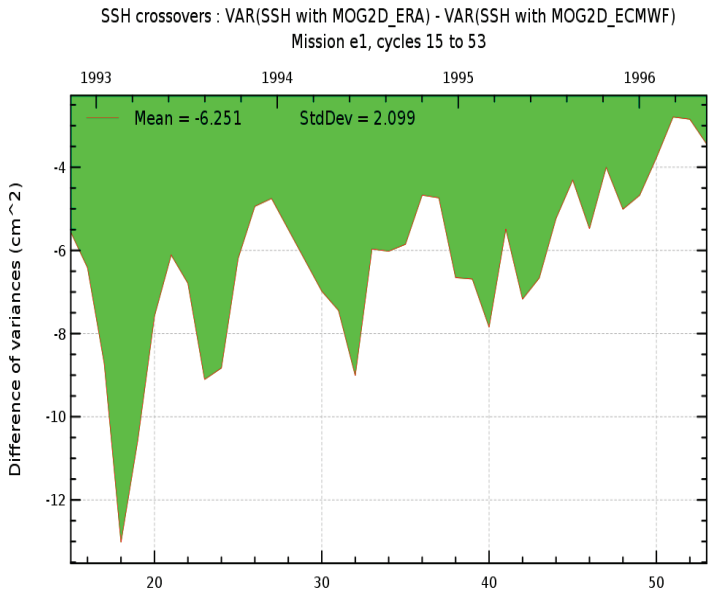
Evaluation of CTOH new along-track tidal constants database for dealiasing coastal altimetry over the North-West European continental shelf, Laurent Roblou et al., *CTOH/CNRS/LEGOS*

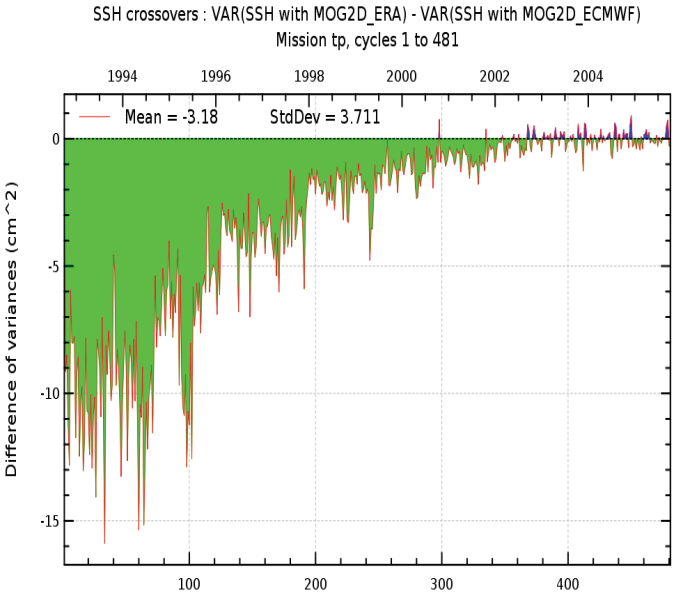
FES 2012 : a new tidal model taking advantage of nearly 20 years of altimetry measurements, L. Carrère et al., *CNES/CLS/Noveltis/LEGOS*

Evaluation of Contemporary Ocean Tide Models, C.K. Shum, Hoksum Fok, Yuchan Y, *Division of Geodetic Science, School of Earth Sciences Ohio State University, USA*

use of ERA Interim – impact on mesoscale

Temporal evolution of the mean variance difference at Xovers when using ERA-interim DAC instead of operational DAC, for E1 and TP (cm²)





- Improvement evolves with time
- Maximum on the first years of altimetry, where quality of operational ECMWF analysis was not as good as today
- ERA Interim and operational DAC have similar results from 2002-2003

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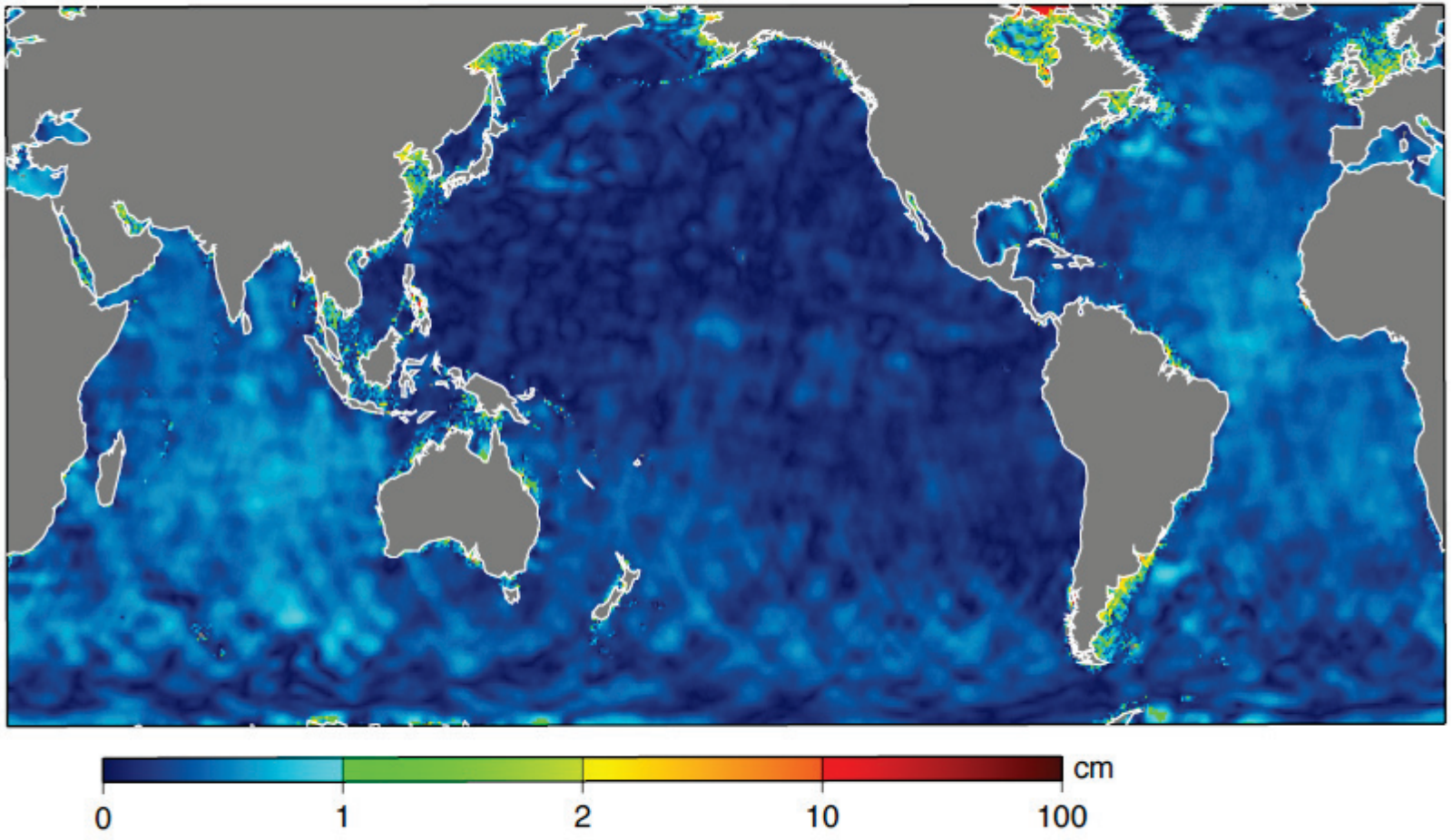
S2 Vector Differences
GOT4.8 - GOT4.10

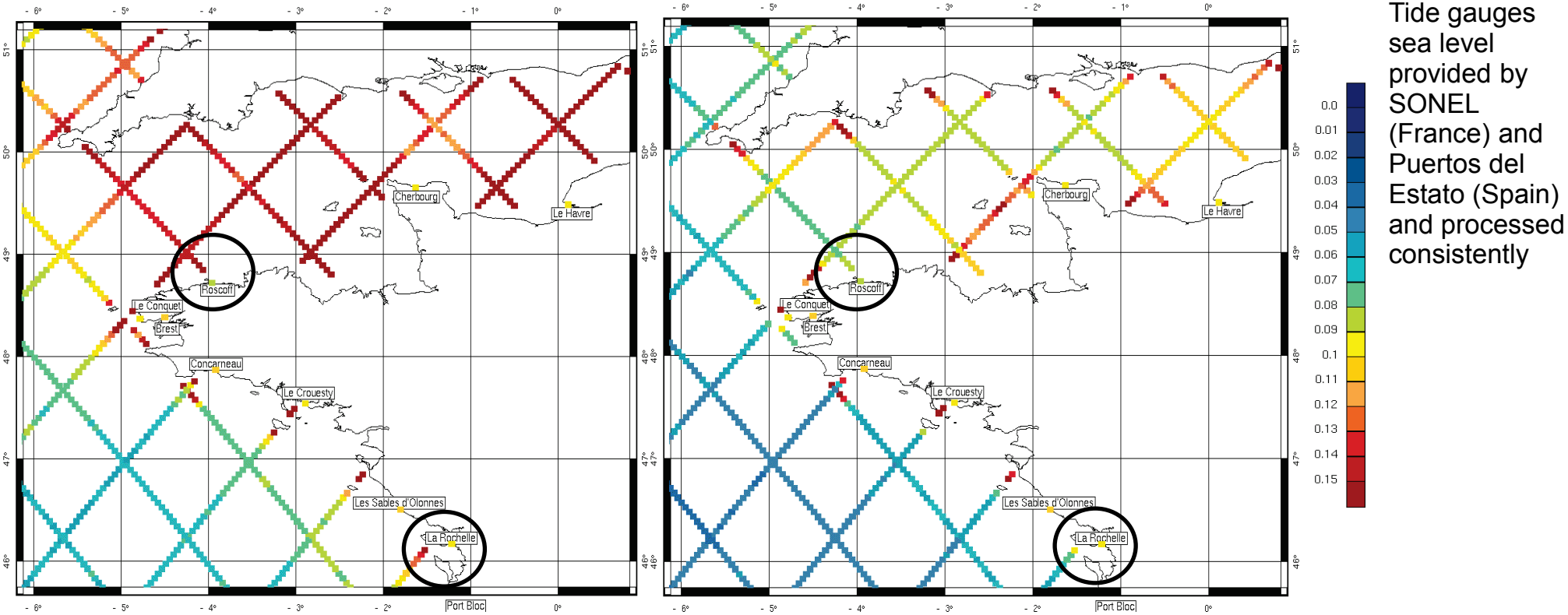
S2



Basin-scale differences approaching 1 cm.

59-Day Oscillations, β′, and All That– or –Subtle S2 Errors from Satellite Altimetry, Richard Ray, *NASA Goddard Space Flight Center*

SLA standard deviation



Tide gauges sea level provided by SONEL (France) and Puertos del Estato (Spain) and processed consistently

SLA std. dev. w/ GOT4.7 correction

SLA std. dev. w/ empiric correction

- SLA standard deviation is dominated by a shelf-block pattern when applying GOT4.7 tide correction
- Coastal features emerge when applying the empirical tide correction

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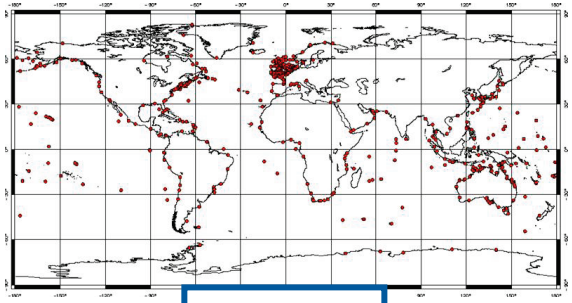
Validation in spectral domain

Performances vs tide gauge databases

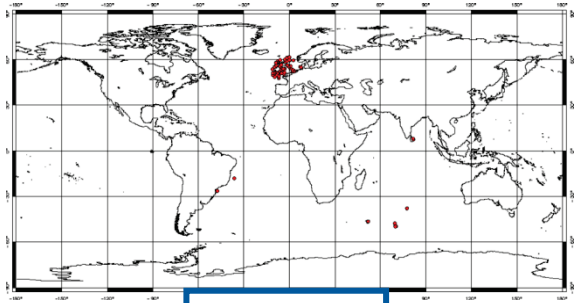
Coastal = BODC + WOCE + R. Ray database (shallow_fes09) + SONEL

Shelf = GLOUP (shelf) + ROSAME

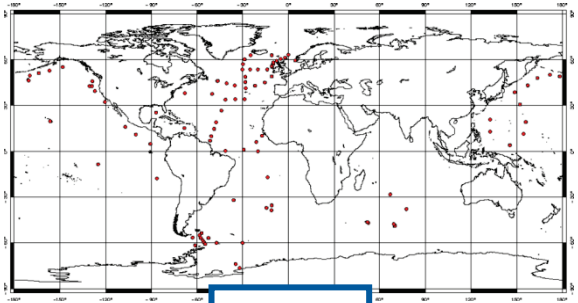
Deep = ACCLAIM + DART + GLOUP (open ocean)



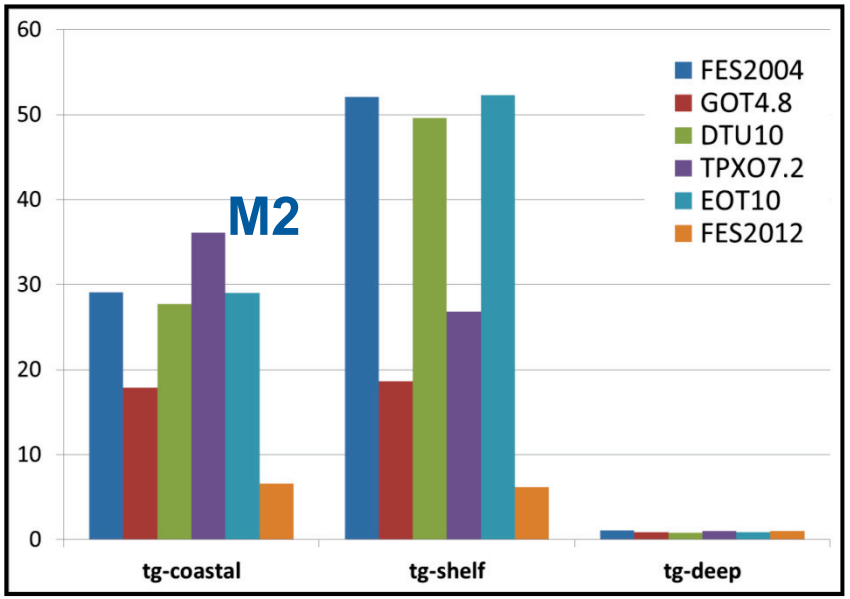
Coastal



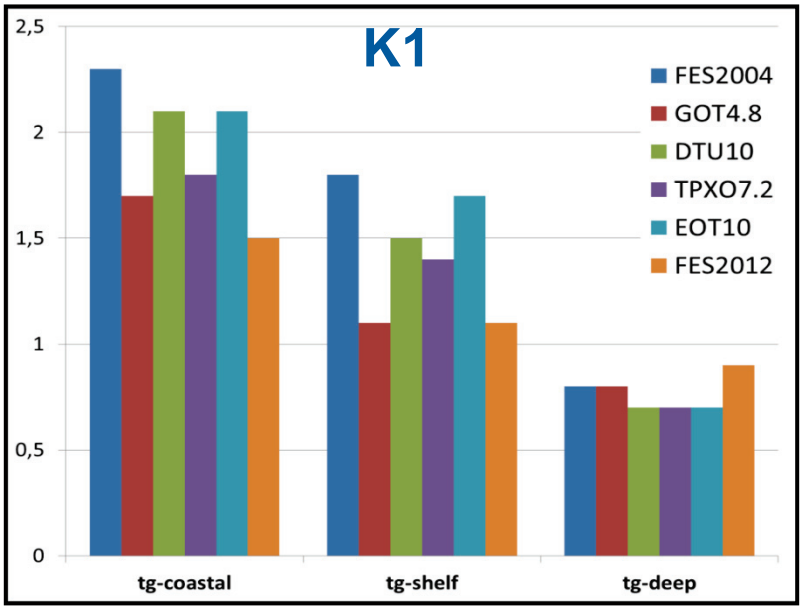
Shelf



Deep

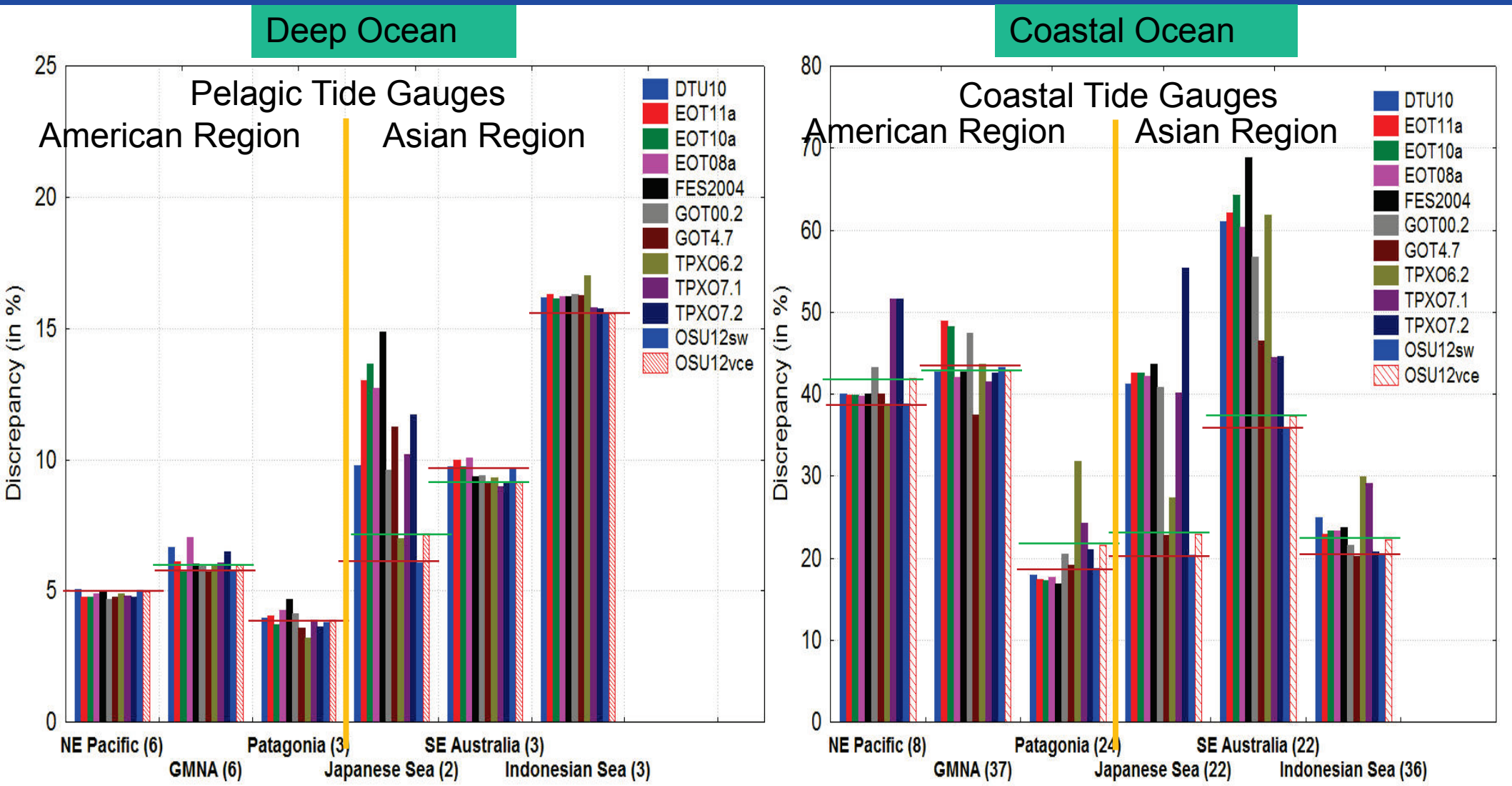


Vector differences (cm)



FES 2012 : a new tidal model taking advantage of nearly 20 years of altimetry measurements, L. Carrère et al., *CNES/CLS/Noveltis/LEGOS*

Regional accuracy assessment – using tide gauge data



* Note that **GOT00.2/4.7 model** include several regional hydrodynamic models in **shallow and inland seas**, in addition to a-priori **FES model** (Ray, 1999)

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Tides/HF recommendations (I)

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Tidal isues:

- Error assesment:
  - Shelf/coastal errors and accuracy
  - Deep ocean (large scale ?) residual errors (in particular 59 days oscillations : no clues yet on what to do)
- Internal tides (SWOT)
- Temporal variability (seasonal, interannual to secular) in tides: baroclinic AND barotropic

Non tidal issues:

- How effective are the current non-tidal corrections at removing aliased variance?
  - Compare with high sampled data (tide gauges, BPRs), focus on strict variance metrics, address questions of scale,…
- Do we understand the structure and type of errors? Model errors (e.g., atmospheric forcing errors) or representation errors (e.g., lack of baroclinic processes)?
- Can we improve the removal of non-tidal high frequency variability?
  - Forcing fields
  - Added physics (baroclinicity, self-attraction and loading, parameterized dissipation, etc.)
  - Enhanced methodologies (optimization and data constraints, use of new data sets like GRACE) including NRT Products

Tides/HF recommendations (II)

chairmen Lyard F., Ponte R., Ray R.

Encourage a wider range of presentations and audience:

- **Global/regional tide-resolving ocean circulation models**
- **Specific internal tide related work, even if not using altimetry data, but of interest for internal tide correction issues and other satellite altimetry topics**
- **Use of OGCM's in estimating/removing non-tidal SSH signal at tidal aliased frequencies**
- **High-frequency data assimilation in OGCMs**
- **Satelllite gravimetry tidal errors/analysis**