



Sea Level CCI project

Phase II 1st annual review





WP 2420 - Improvement of atmospheric corrections thanks to new atmospheric reanalyses

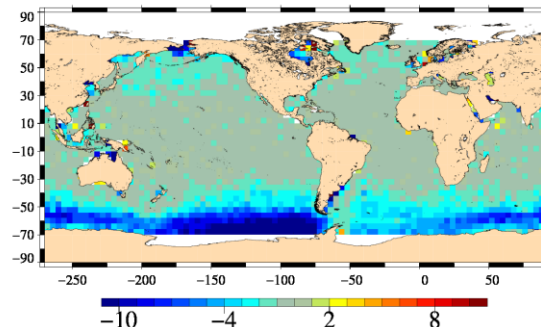
L. Carrere

Improvement of atmospheric corrections thanks to new atmospheric reanalysis



- In phase 1 of SL CCI project, very interesting results have been obtained using ERA-interim reanalyses.
 - Strong improvements of sea-level calculation especially in the first altimetry decade where the quality of operational model (ECMWF) was lower compared to recent years.
 - Some weakness in ERA-interim have been also described and improvements are still foreseen (spatial resolution, recent years ...)

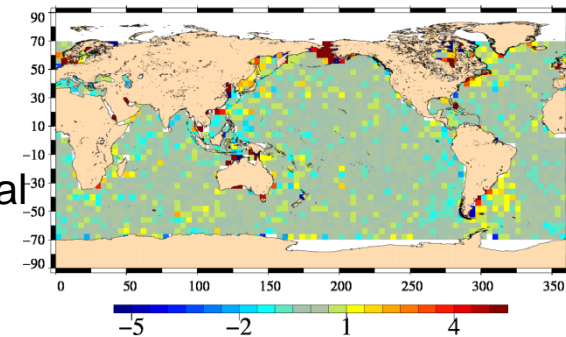
VAR(SSH with MOG2D_ERA) – VAR(SSH with MOG2D_ECMWF)
Mission tp, cycles 1 to 481



Variance reduction at TP crossovers using DAC ERA-interim instead of operational DAC (cm²)

Variance reduction at J2 crossovers using DAC ERA-interim instead of operational DAC (cm²)

VAR(SSH with DAC_ERA) – VAR(SSH with DAC_ECMWF)
Mission j2, cycles 1 to 91



- In phase 2 of SL CCI project, the objective is to use **a new meteorological reanalysis** to try to improve these atmospheric corrections.
- A paper « *Using ERA-Interim reanalysis to improve the pressure derived corrections for altimetry* » is about to be submitted to Ocean Sciences revue.



Progress Status of the task

1. Select the a priori best atmospheric-reanalyses available for the study

- Discussions with atmospheric community
- => new ECMWF reanalysis ERA-NRT won't be available before mid-2016 (ECMWF project ERA-CLIM2)
- => ECMWF advised to use the Japanese reanalysis JRA-55
 - http://jra.kishou.go.jp/JRA-55/index_en.html
 - S. Kobayashi, Y. Ota, Y. Harada, A. Ebita, M. Moriya, H. Onoda, K. Onogi, H. Kamahori, C. Kobayashi, H. Endo, K. Miyaoka, and K. Takahashi: *The JRA-55 Reanalysis: General Specifications and Basic Characteristics*. DOI:10.2151/jmsj.2015-001
 - Available from 1958 to present in NRT

2. Some JRA-55 test data have been downloaded

- Definition/description of fields is not very clear
- Pressure and wind-speed components are available for DTC and DAC
- 2m Due Point T° field is missing => problem to compute de WTC...



Next steps

1. Download the entire JRA-55 time series
 2. Compute the atmospheric corrections using this atmospheric reanalysis, on the entire altimeter period [1993-2014]
 1. **DTC:** computed from the pressure fields using a basic analytic formula and check interest compared to ERA-interim.
 2. **DAC:** if interest is demonstrated, compute the new DAC using JRA-55 pressure and wind fields.
 3. **WTC:** as the 2m due point T° is missing in JRA-55 database, we might not be able to compute the WTC.
- ⇒ Task to be completed by the end of June 2015