Sea Level CCI (SL_cci) project

What data set are you producing and how will they be used?
1. Part 1 (M. Ablain) :
   - SL_cci products status, algorithms improvement,
     uncertainties characterisation, SL_cci users

2. Part 2 (A. Cazenave)
   - Climate Research Group assessment
SL_cci products status

SLCCI ECV release: V1.1 [1993-2013]
Available via: http://www.esa-sealevel-cci.org/
Please contact us: info-sealevel@esa-sealevel-cci.org

Extension over year 2014 will be available in November 2015

Mean Sea Level SL_cci
Date: 01/1993

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- A full reprocessing is planned in June 2016 (→V2.0) over the period [1993,2014]
- An extension over year 2015 is also planned
Status on the algorithm improvement

- The development of new algorithms/altimeter standards is finished
- The evaluation is on-going, and a selection meeting is planned (25-27th, November 2015, Toulouse) to select the best algorithms for SL_cci V2.0

- **New tides (model) corrections:**
  - GOT4.10 and FES2014 was evaluated

- **New orbit solutions**
  - New GFZ and CNES orbit solutions

- **New atmospheric fields**
  - From model and the Japanese reanalysis (JRA-55)
  - From radiometer correction (University of Porto)
Status on the algorithm improvement

- New Seal-Level Arctic products significantly improved over the frozen Arctic Ocean
  - Very good coverage over leads and SLA quality seems good
  - Continuity between open and ice covered ocean (thanks to new retracking)

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Envisat SLA from 20 Hz Envisat Data

Evaluation on-going

6th Collocation meeting - September 28th, October
Sea-level uncertainties

- Altimetry measurement uncertainties at climate scales have been characterized (Ablain et al, 2015) (CCI phase I) → work has been continuing in phase II

⇒ We have refined the budget error at climate scales
⇒ We have estimated an envelope error of the GMSL evolution
⇒ We have calculated the error map of regional MSL trends within a realistic confidence interval
SL_cci Users

Number of users has increased significantly for 1 year
Before delivering new data sets to users, these have to be validated.

Validation of the SL_ECV_V1.1 product

Two approaches:

1. Evaluation by comparing with ocean and/or coupled models outputs → Assessment of the performances of ocean models assimilating these new products

2. Evaluation using a ‘Sea Level Budget Closure’ approach

Both approaches show that the SL_ECV_V1.1 product provide better results compared to SL_ECV_1.0, SL_ECV_0, and other existing products.
What data set are you producing and how will they be used?

One example: why use of the CCI_SL_ECV_V1.1 for studying the sea level budget?

GMSL = Ocean Mass + Steric Sea level

Still much difference between the different GMSL products

Source: Dieng H., Cazenave A., Ablain M., Meyssignac B.
The CCI SL_ECV_1.1 product is the only one giving rise to closure of the sea level budget.
Conclusions and perspectives

- The evaluation of the SL_ECV_1.1 product based on different approaches indicates significant improvement compared to previous (and other existing) data sets, both in terms of global mean trend and regional variability.

- Next main steps within SL_cci Phase 2:
  - Selection meeting 25-27\textsuperscript{th} of November 2015 (Toulouse)
  - Delivery of the next SL_cci ECV release (V2.0 \([1993,2014]\)) in September 2016
  - Extension of V2.0 over year 2015 in December 2016

- Further developments are needed to improve SL_cci ECV:
  - to develop better altimeter standards (e.g. orbits, ocean tides, etc…)
  - to improve the stability of the wet troposphere corrections
  - to reprocess levels 1 and 2 of old altimeter missions: e.g. TOPEX/Poseidon
  - to improve the sea level calculation in Arctic ocean and Coastal areas
  - to better characterize sea-level uncertainties
Conclusions and perspectives

After the end of CCI phase 2 what happens?

- The SL_cci ECV production might be taken over in C3S: To be confirmed

- However, what will contain exactly the “production” activities?
  - evaluation and selection of best new algorithms? C3S or CCI+?
  - assessment by CR group? C3S or CCI+?

- Furthermore, further developments are needed to improve SL_cci ECV:
  - Sea Level improvements in Arctic ocean
  - Sea Level improvements in Coastal areas
  - Better characterize error uncertainties
  - All the altimeter standards (e.g. orbits, ocean tides,…)

If not support by CCI+, no major improvement expected: end of the story?