



ESA Sea level CCI+

Meeting report

KO Meeting (29 Mar. 2019)

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Participants:

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See agenda of the meeting SLCCI+_KOmeeting_20190329_Agenda_v1.docx

1. Introduction

JFL and JB introduce the meeting.

See presentation: 1_SLCCIp_20190329_Cazenave_Intro.pptx

AC reminds the two main objectives of the SL_cci+ project: production of coastal sea level products and improvement of the sea level uncertainties from global to coastal scales.

Results have been obtained during the previous SL_cci bridging phase and are illustrated with the different sea level trend behaviours (versus coastal distance) observed along some tracks in coastal regions.

This approach will be extended within the SL_cci+ project focusing in three regions (Africa, Indian ocean and South East Asia and small islands of the south west Pacific ocean, with other LRM missions and analyzing the SAR missions from 2002 to present.

Results will be validated, and it will be important to interpret the observed results.

BM: Experts on mangrove met during the CCI colocation meeting have suggested that a very close link can be found between sea level rise and the mangrove displacements. These in-situ information could be of high interest for the validation of the sea level CCI+ coastal products.

Action 1: BM to provide AC with the expert contact on Mangrove.

BM then presents the description of the overall objectives regarding the sea level uncertainties. Further details are provided in the dedicated presentation further during the meeting.

JFL and BM have made a status on the discussion during the ESA colocation meeting, held earlier in the week in Oxford, UK:

- Future of the CCI program (> 2022) is expected to focus on the analysis of the Earth System cycles (carbon, water and energy).
- It has been suggested that C3S program may include some R&D funding in the future in order to contribute the evolution of the products (including CCI products).

Regarding the sea level product, it has been reminded that the sea level products (from CCI and Copernicus) are not correct before 1998 due to the TOPEX-A instrumental drift anomaly. This drift may not be corrected for by the JPL/CNES on-going reprocessing. Thus, the sea level community should clarify how to provide the best sea level indicator? One possibility is to use external data (closure budget approach, comparison with tide gauges), the other is to start the sea level record in 1998 at the beginning of TOPEX-B only.

2. Project Management (CLS)

See presentation: 2_SLCCIp_20190329_Management_CLS.pptx

JFL first presents the organization and management of the project. He reminds that a reduced consortium is available in this new phase of the program, though with high level of expertise to cover the contracts activities.



JB: a project management reporting is needed on ESA side (deliverables, invoices status...). JFL suggests that such a document will be proposed.

Action 2: JFL to find agreement with ESA on the content of a project management reporting document.

AC suggests that regular meetings (telecon) should be planned with all sub-contractors to discuss science issues (in addition to managements discussions). It is suggested that they could take place during the second part of each quarterly progress meetings (telecon with ESA).

The list of project meetings is presented and the payment plan is presented.

JFL then briefly describes the objectives and overview of each work package and presents the list of associated deliverables, identifies the partner in charge of the different deliverables and list of expected contributors. A suggestion of table of content is provided for the documents.

MP doesn't want to endorse the responsibility of a deliverable document, and suggests that CLS should merge the contributions of the different partners. JFL: CLS will provide support for document management, but technical documents will be mainly written by the ones performing the work (here TUM & LEGOS mainly). In the specific case of the System Specification Document (aiming at describing how the production system has been designed), it will essentially include LEGOS contributions and thus, this sub-contractor will be responsible for this document. Similarly, LEGOS will also be in charge of the delivery of the Climate Research Data Package (ECV sea level products in coastal areas).

MP: algorithm provision on TUM side will in fact be dataset provision. JFL agrees that no algorithm delivery is expected from TUM.

The discussion then focuses on the importance of clarifying the planning of each work package and ensuring that outputs of work packages that are needed for further work within the project are delivered on time. TUM and LEGOS have planned to interact later during the day to clarify which TUM output dataset are expected and when so that LEGOS can start the production phase for the different altimeter missions and the different regions. MP can deliver the extension (SLCCI-BP heritage) to new regions of LRM data (including Jason-3) by June.

Action 3: FB to provide TUM with the needed information before summer 2019.

JFL will clarify and coordinate the planning of the interaction between the different WP.

Action 4: JFL to develop the planning of the interaction between the different WP

There should be a planning discussed about whether the priority is to extend to new areas or to new missions/periods. AC suggests that given the numerous interaction with many interested colleagues, the priority should be to extend to new areas.



3. WP1: Requirement analysis

See presentation: 3_8_SLCCIp_20190329_Cazenave_WP1_WP5.pptx

AC presents the input information available that will feed the coastal sea level requirements. It is highlighted that the difference of sea level trends behaviours observed near the coast and in the open ocean may be related with the wave energy.

Three versions of the User Requirements document are expected at KO+3, KO+15 and KO+27.

4. WP2: Algorithm development (TUM)

See presentation: 4_SLCCIp_20190329_Passaro_TUM.pdf

MP presents the role of TUM in the project which focus on the algorithm development and the provision of range and SSB correction to the system processing (LEGOS).

ALES+ on SAR is experimental: if validation shows it is not worth it, the official product (SAMOSA retracker) will be used.

As discussed previously, within WP3.1, TUM will not be responsible for the System Spec. Document (LEGOS responsibility).

JFL asks how possible SAR instrumental drifts are taken into account in the algorithm? It should be clearly assessed during the project whether SAR altimetry can be used to assess sea level trends. This will be discussed depending on external validation results.

5. WP3: System development and Processing (LEGOS-CTOH)

See presentation: 5_SLCCIp_20190329_CTOH.pptx

FB reminds the details of the X_TRACK processing system, what has been already performed within the SL_cci BP (processing, corrections, regions, missions).

Two releases of the X_TRACK/ALES 20hz L3 products have been produced, validated and delivered.

Illustrations of the evolution of the coastal products firstly from 1hz to 20Hz and then to the combination of 20Hz + ALES are shown.

Work planned includes improvement of the processing system, adaptation of the system to more regions and missions including SAR processing.

TUM can provide ALES ranges as well as other official retracked measurements (SGDR + Zaron correction) so that the different solutions can be further validated by the validation team.

In addition, JB proposes to provide different PTR solutions from ESA missions.



6. WP4: Validation (NOC)

WP4.1: validation with tide gauges (NOC/SkyMAT)

See presentation: 6_SLCCIp_20190329_WP_4.1_NOC_SKYMAT.pptx

FC describes the aim of the activity that will be carried out by comparison with tide gauges. He describes the datasets used (altimetry, TG and model) and then presents the approach used with different illustrations and examples of existing results.

BM suggests that the model should also be corrected for GIA effect.

AS then reminds the achievements of the SL_cci BP: grouping the TGs based on decorrelation length scales. This allows the analysis of the sea level trends from different tracks that are expected to have homogeneous behaviours.

The best optimal distance to the coast found was 4km, based on the lowest noise and the standard error from the altimeter trends.

The official sea level product delivered to the users will be kept as simple as possible and an additional version of the products will be available (under request only) including different altimeter sea level corrections.

AC: it has been observed that large sea level differences can be observed from one track to another. She wonders if such behavior can be detected by this validation approach (based on averaging the information from different altimeter tracks)?

Tide gauge validation should be not only in terms of trends but also annual cycle and inter-annual variability.

FC and AS agree and confirm that individual comparisons with single tracks will have to be carried out.

BM: for comparison purposes, we should add in the summary table of statistics the collocated trend values from available altimeter sea level gridded products (about 15km from the coast). The outcome of this task could be that the uncertainty of the approach is too high to distinguish the different altimeter products. In this case, the agencies should be warned that we don't have any reliable validation method for altimetry. This may be of real interest.

BM wonders how to deal with altimeter corrections that may be not accurate enough in coastal zones (ex. ocean tide in altimetry)? FC mentions that NEMO does not include ocean tide.

WP4.2: uncertainties (CLS/LEGOS)

See presentation: 7_SLCCIp_20190329_Uncertainties_CLS.pptx

PP first presents the context and what has been achieved during the SL_cci BP. Coastal sea level trend uncertainties are not correctly known today and the approach used in Ablain et al. 2019 for the GMSL can not be applied at regional coastal scale.

The different SL_cci+ objectives are presented.



The error covariance modelling (how to populate the variance-covariance error matrix) includes bias, drift and noise.

Difficulty is illustrated with the GIA correction (uncertainty is low at global scale but high at regional scale).

Given the complexity, a smoothed and subsampled error matrix could be estimated.

AS comments on the possibility to reduce the size of the matrix considering sea level length scales (time and spatial). To keep only the relevant information. BM agrees that this may be a good approach.

7. WP5: Product Assessment (LEGOS)

See presentation: 3_8_SLCCIp_20190329_Cazenave_WP1_WP5.pptx

AC presents the interactions and the approach envisaged for the products quality assessment at global and regional scales and also at coastal local scale. Interactions with the uncertainty evaluation will be important.

Use cases focused on the African coast and the Mediterranean Sea will be clarified during the course of the project depending on new collaborations regarding the two regions considered.

MP comments on the possible cooperation with sea state CCI project.

8. Conclusions

As a conclusion, JFL reminds that:

- The Sea Level Bridging phase (2018) has allowed a smooth transition between SL_cci phase II (2014-2017) and the Sea Level CCI extension activities (SL_cci+)
- The 3-year long project focuses on development and production of coastal altimeter sea level products in three specific regions of interest.
- Consortium with a high level of expertise.
- Coastal sea level activities are of interest for public and media. Effort should focus on communication (publications, international conferences,...).
- Output of the project should contribute to provide recommendation to ESA regarding the future of CCI+ activities (>2022): Earth system cycles (Water, Energy, Carbon).

JFL thanks all participants for their contribution to the project.



9. List of actions

No	Description	Affectation	Open date	Deadline	Closed date	State	Comments
1	BM to provide AC with the expert contact on Mangrove	Benoît M.	29/03/2019	30/06/2019		Open	Cf contact at ESA colocation meeting
2	JFL to find agreement with ESA on the content of a project management reporting document.	JFL	29/03/2019	30/06/2019		Open	
3	FB to provide TUM with the needed information before summer 2019.	Florence B	29/03/2019	05/04/2019	29/03/2019	Closed	FB email to MP
4	JFL to develop the planning of the interaction between the different WP	JFL	29/03/2019	30/06/2019		Open	