ECV Inventory and Gap Analysis

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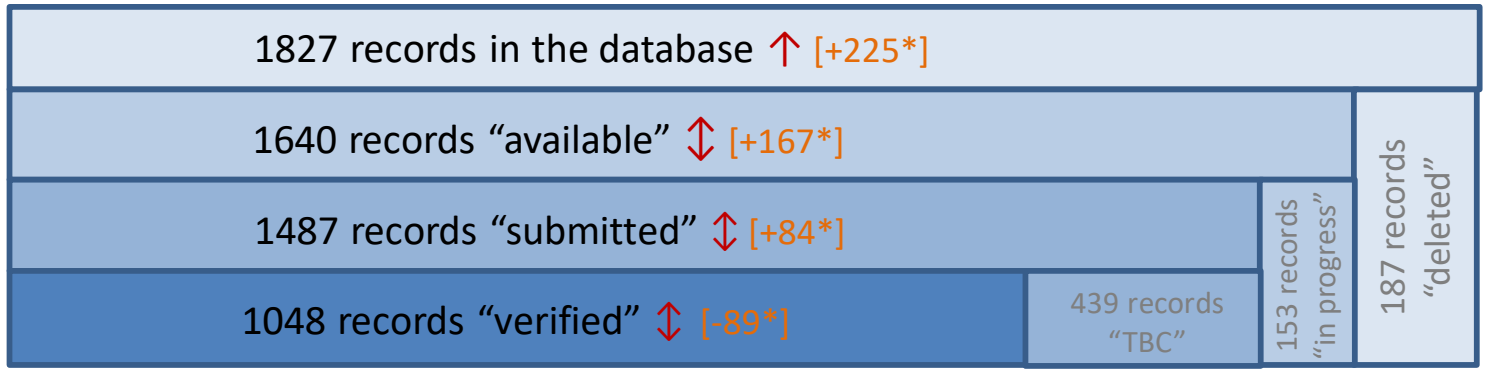
Status of ECV Inventory

Status ~ WGC#15 ← (live database: continuous data collection, update, and review) ← [*] delta wrt. v3.0 [07.2020]



Status ~ ECV Inventory v4.0 (35th CEOS Plenary): > 1200 records published*
[last verified for v2.0 (2017), v3.0 (2020), or v4.0 (2021)]

[GCOS-200 (space-obs): 37 ECVs = 13 Atmosphere + 15 Land + 9 Ocean]

ECV Inventory: 36 ECVs = 13 Atmosphere + 14 Land + 9 Ocean

- Total gaps [Level of ECV]: Anthropogenic GHG fluxes (Land) → any hints?

Progress in contributions since publication of v3.0 (highlights):

- MODIS Land (Albedo, LAI, FAPAR, Fire, Land Cover, Land Surface Temperature, Snow, Above-ground Biomass), Atmosphere (Clouds, Aerosols), and Ocean (Sea Ice) products (NASA) [to be published in 2022*]
- Closed "gaps" on Temperature of deep atmospheric layers (NOAA) and Surface Currents (C3S), both with "existing" datasets [in v4.0]
- CMA contributed its first entries [in v4.0]
- JAXA and KMA expanding and consolidating contributions [to be published in 2022*]
- Progress on C3S and CCI [in v4.0 and 2022*]

** Considerable delays in the verification process and preparation for publication due to high impact of COVID-19 Lockdowns on contractors*

Evolution of ECV Inventory (v4.0 and beyond)

Progress / changes on technical side:

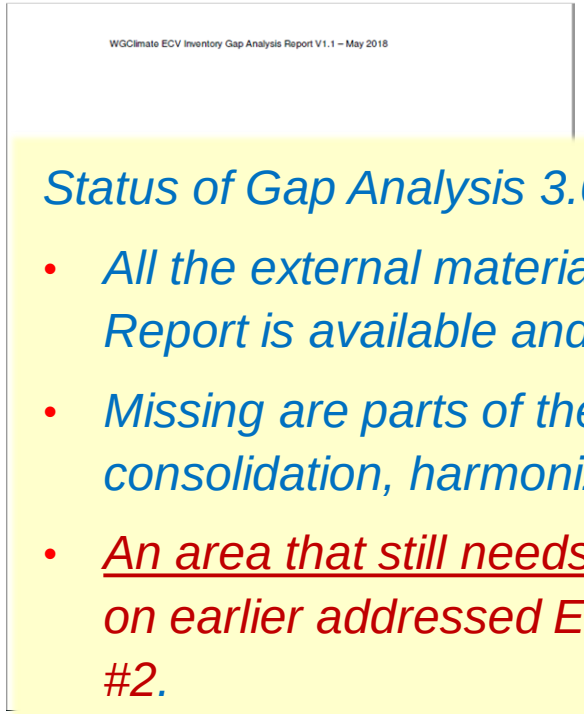
- Migration to new server with increased security and certification, and easier maintenance -- following results of pen-testing in Q3.2020 that revealed potential exposure to hackers **[Ready for deploy on live (late October)]**
- Update of DB structure and tools to accommodate coexisting versions of database (v2.0, v3.0, v4.0, …) **[Ready for deploy on live (late October)]**
- WMO OSCAR Space: development of API to connect ECV Inventory (EUM/WMO joint effort) **[Just released by WMO, being tested]**
- New URL (version-independent) to be made available to users when all the tools undergoing updates are ready for deploy **[Ready for deploy on live (late October)]**
- *(Additional technical developments have been on hold due to scarcity of resources and impact of COVID-19 Lockdowns on contractors)*

Beyond:

- Verification process to be resumed in November, aiming at a new (sub-)version of the ECV Inventory to be published in early 2022, mostly in support of the upcoming Carbon-cycle Gap Analysis exercise (more on this later)
- Plan to finally move into incremental mode for releases of the ECV Inventory, with more than one database being published every year – depending on progress of review process (with defined priorities and goals) and / or needs (e.g. theme for Gap Analysis)

Gap Analysis on ECV Inventory #3

Gap analysis status for ECV Inventory v3


WGClimate ECV Inventory Gap Analysis Report V1.1 – May 2018

- Automatic assessment
- Statistical analysis tools and

Status of Gap Analysis 3.0

- *All the external material that is needed for the GA Report is available and the graphics are produced;*
- *Missing are parts of the text (introduction, completion, consolidation, harmonization) to be written by Jörg;*
- *An area that still needs some analysis is the progress on earlier addressed ECVs compared to ECV Inventory #2.*

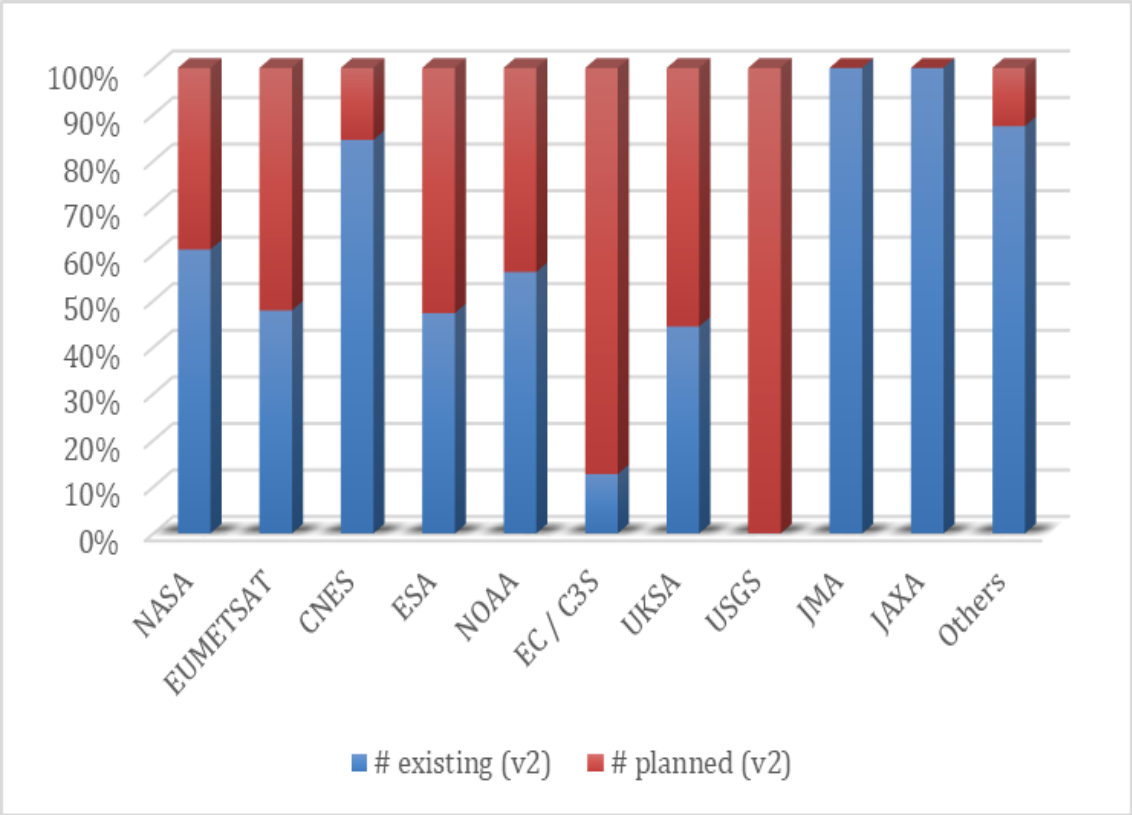
  → *If a member of WGClimate would commit to help with the latter, it could speed up things. Otherwise finalisation is expected for end of 2021.*

- Statistical analysis tools and graphical display on the web interface
- Analysis of delta to version #2

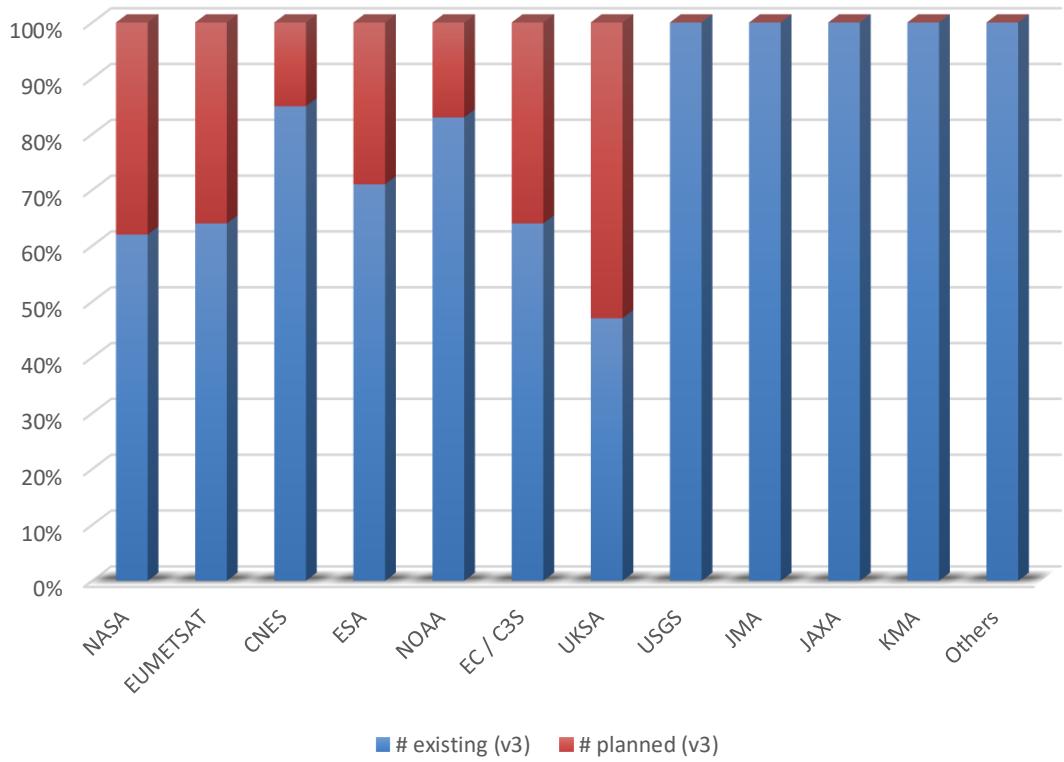
- Detailed analysis per ECV / ECV Product:
  - Assesses progress for 8 ECVs addressed for V2.0
  - Selected 13 additional ECVs (5 atmosphere, 5 land, 3 ocean) not addressed before that are specifically part of 2016 GCOS-IP actions
  - Postponed 2 land (FAPAR, Glaciers) and 1 atmosphere (Lightning) due to missing support and late availability of Inventory inputs
  - Addressed are: Aerosols, Surface winds, Upper-Air Winds, Water Vapour (UT/LS), Fire, Land Cover, Soil Moisture, Sea Level, Sea State, and Ocean Surface Heat Flux

Relative number of existing and planned data records per agency

ECV Inventory #2

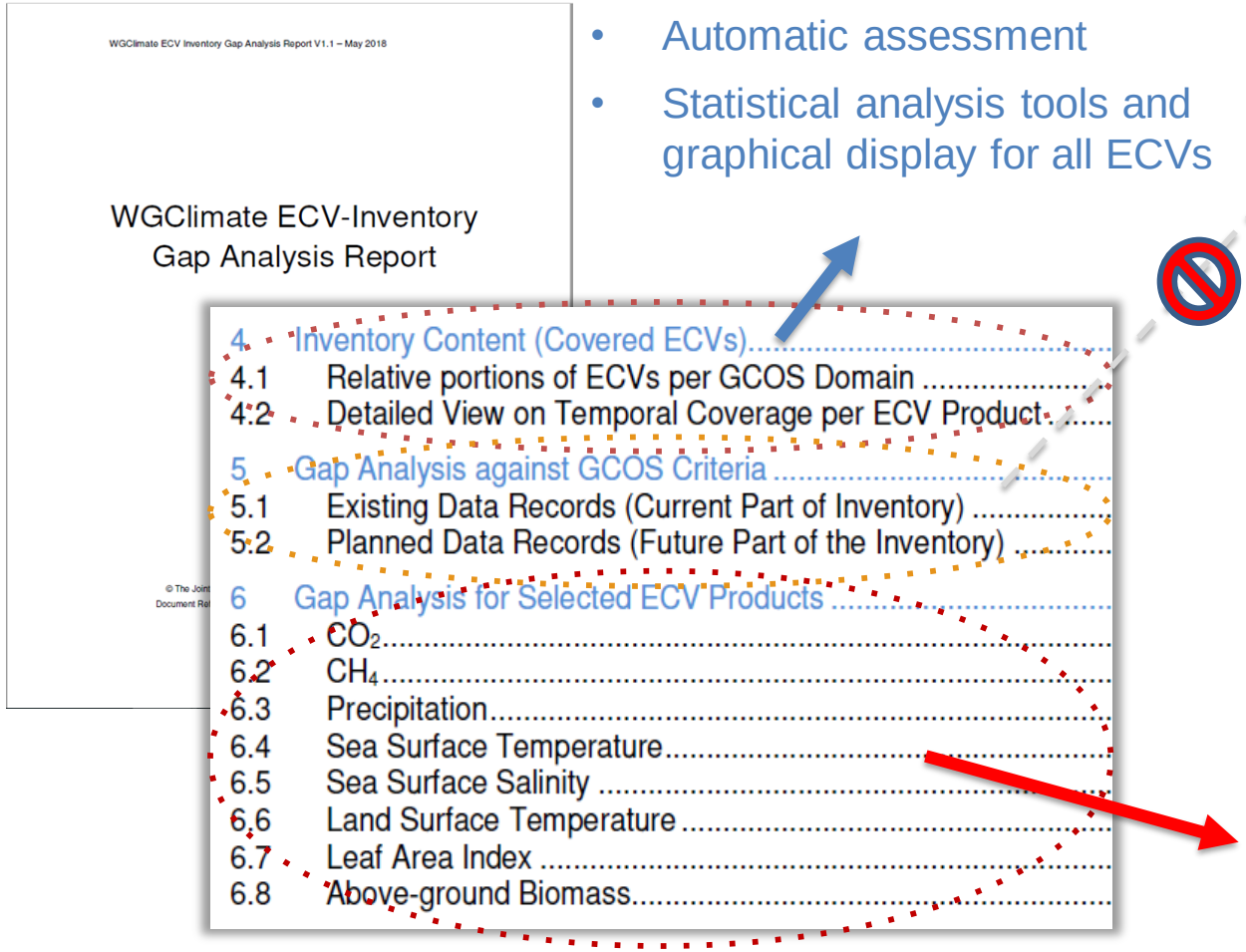


ECV Inventory #3



Gap Analysis on ECV Inventory #4.x

Gap analysis concept for Carbon-Cycle exercise



- Automatic assessment
- Statistical analysis tools and graphical display for all ECVs

- Statistical analysis tools and graphical display on the web interface & Analysis of delta to version 3.0 not to be done for upcoming exercise! NEED DISCUSSION ON WAY FORWARD.

→ A new approach needs to be envisaged to replace this overly time-consuming step, in which experts painstakingly assess the compliance status of each record (and each database field!*) with respect to the GCOS criteria.

- → Keep current approach and (simply) reduce number of fields to be "manually" assessed (by experts)?
- → Re-think the whole process and its goals asking ourselves if the more than 10 year old GCOS guidelines are still valid? (could change format and/or focus)
- → This might result in change/simplification of ECV Inventory questionnaire!

(* in spite of a lot of automation having been developed within the dedicated web interface)

- **Gap Analysis Workshop** (Q1.2022, with experts to be identified): detailed analysis per ECV / ECV Product, for set of variables related to the Carbon Cycle (to be defined), in support of the 1st GST.

CEOS GST Strategy Recommendations – GHG MVS and mitigation

Following an earlier discussion with WGClimate leads plan to connect the ECV Inventory #4.x Gap Analysis with the needs stated in recent CEOS GST Strategy recommendations 1 and 2.

Recommendation 1: *WGClimate GHG Task Team should consult with the relevant elements of CEOS, including Associates such as ISC, WCRP and GCOS, together with modelers, to check the GHG Implementation roadmap on completeness concerning requirements for terrestrial observation (SIF; NPP, land cover, biomass, etc.) for supporting mitigation actions through the development of MVS. The actions in Annex C of the roadmap shall be complemented as needed.*

Status: Ongoing. GHG Task Force has augmented its membership to help address this recommendation. It has implemented this in part already but some delay has been caused by cancellation (due to Covid) of a workshop, now planned at JRC in Q4 2021. Will contribute to RSO Report to CoP26.

Recommendation 2:

The need for parallel inputs to ocean models deemed necessary for the support of MVS and for a wider validation of carbon flux estimates globally should be considered and appropriately combined into the actions in Annex C of the GHG roadmap. This should also be led by the WGClimate GHG TT in cooperation with Ocean VCs and modelling groups, together with GCOS, GOOS, WCRP and individual agencies.

Status: due to be implemented after Recommendation 1 above, as second priority.

Gap Analysis Workshop

Questions for discussion:

1. Theme
2. Goals
3. Prerequisites
4. Timing and potential dependencies
5. Format
6. Organisation
7. Participants

1. Theme

- Assess space-observable ECVs and other variables needed for modelling related to the Carbon Cycle

2. Goals

- Address questions for individual variables in GA: status of observation system and potential future gaps on data availability, status and sustainability of data set production / availability and missed opportunities, crucial gaps in the ECV Inventory
- Work out bulk material and text for GA Report including Recommendations
- Assistance in the fulfillment of the Implementation Actions in support of the Recommendations from the CEOS Strategy to support the Global Stocktake of the UNFCCC (Recommendations #1 and #2, of which the WGClimate GHG Task Team is the lead actionee)

3. Prerequisites

- ECV Inventory v4.1 to be prepared for GA Workshop, with emphasis on Carbon-cycle relevant ECV Products
- Need a list of variables to be addressed in gap analysis, in particular for the non ECV variables
- **Need to assess prior to the workshop what the availability for the non ECV data sets is, as they are not in the Inventory.**

Gap Analysis Workshop

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4. Timing and potential dependencies

4. After / in connection or coordination with **"MD's workshop"** (pave way, identification of experts, co-location, …)?
5. Are there any time constraints regarding support to the 1st GST?
6. If no constraints: propose late February 2022 (21-25) for virtual workshop

5. Format

- Likely virtual (vs. physical)
  - ↑ Travel regulations are too uncertain to be well predicted for early 2022, and travel budgets may also be strongly affected → hints?
  - ↓ Keeping pace and focus, and working together in small groups and gather back in bigger groups is much easier in a physical meeting
  - ↓ Time zones and "Zoom fatigue" will pose extra challenges (for an estimated 4 full days meeting, if physical)
- Can still try a physical meeting if later in the year (~June?) → time constraints?
- Decision on the above will impact the detailed format of the workshop (sessions, time span, support,…) and people involved

Gap Analysis Workshop

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6. Organisation

6. Should establish Organising Committee from WGClimate / GHG TT / AFOLU (Europe, USA, Asia) – Jörg and Albrecht to lead
7. Local support from Alexandra **(and EUMETSAT)**
8. Organising Committee to be involved in all steps of the process

7. Participants

6. Organising Committee
7. EUM Support Team
8. Experts
    6. Expertise should cover list of variables to be analysed **(and different communities?)**
    7. Group should have experts from Europe, America, and Asia
    8. Need to commit to timeline → support from Agencies?
    9. Urgent to identify → assistance?