

# **CAMS-84, phase 2**

## **Minutes of the**

### **PM-2 progress meeting**

WebEx teleconference

Minutes compiled by  
Henk Eskes, Jacques Claas  
KNMI

Date: 7 February 2019

REF.: CAMS84\_2018SC1\_D0.2.1\_2019Q1\_PM2\_minutes\_20190207

## Agenda

PM-2 meeting of CAMS-84,

9:30-12:30, Thursday 6 February 2019, via WebEx

### Agenda

1. Welcome,
2. Announcements by the Service Manager:  
Closing of phase 1, 2018 Q4 deliverables, reporting, contract, news from CAMS SLBs
3. WP 2: way forward; progress (Henk, Sander)
4. WP 3: evaluation of new experiments
5. Status of the WP1 report, SON 2018 (short statement from editors) and WP4 report (John)
6. WP 5: status of reanalysis evaluation
7. WP 6, scoring document: approach (Michael)
8. Reanalysis paper, status (Annette)  
*Coffee break*
9. Presentations by all groups (5 minutes), with results on WP1 SON report, WP4 (regional), innovations and unusual results
10. AOB

## Participants

Bavo Langerock, BIRA-IASB  
Harald Flentje, DWD  
Sara Basart, BSC  
Eleni Katragkou, AUTH  
Michael Schulz, MET-NO  
Abdelhadi El Yazidi, LSCE  
Annette Wagner, MPG  
John Kapsomenakis, AA  
Sander Niemeijer, S&T  
Antje Inness, ECMWF

Yves Christophe, BIRA-IASB  
Kaj Mantzius Hansen, AU  
Michel Ramonet, CEA-LSCE  
Anna Benedictow, MET-NO  
Yasmine Bennouna, CNRS-LA  
Anne-Marlene Blechschmidt, IUP  
Thorsten Warneke, UBC  
Christos Zerefos, AA  
Anna Benedictow, METNO  
Henk Eskes, KNMI

Excused: John Douros (KNMI), Jacques Claas (KNMI), Natalia Sudarchikova, MPG

## Action items and deadlines

See Redmine for overview of the planning related to the deliverables.

- Henk: Invite Board Members for CAMS-84 Phase 2
- Henk: Contact CAMS-50 on synchronising the use of PM data for Europe (access Sara?)
- Henk: Ceck with Richard on case-study report
- Henk: Check invoices Q2, Q3 for AUTH (question Eleni)
- Henk: Forward email of Michael to Sara/Harald (done)
- Henk: Next version sub-contracts before the end of February
- Anne Blechschmidt: send feedback on subcontract before 14 Feb.
- Henk: discuss the “end date” of the contract with Uni Bremen: Anne and Thorsten
- Henk: email to Vincent-Henri that some partners have problems with the unclear ending date of the CAMS-84 contract
- Henk: Think about the “data use policy”, e.g. a document describing networks + policies, linked to the validation server (question Thorsten)
- Henk: New version of the Technical Specification Document (February)
- Antje: Check dates for meeting on CAMS data extraction / download
- All: Have a look at the first 137L test data, announced by Antje
- Michael + Henk: review of the scoring approach (Feb-March)
- Henk: send reminders on deliverables (request Annette)
- Henk: D2.1.2
- Antje, Yasmine: Check with Luke about scripts for in-flight IAGOS validation (not only take-off and landing).

## Action items from last meeting

- Henk, Jacques: Put phase 2 actions for first 3 months on RedMine, initiate phase-2 on RedMine (done)
- Henk: CAMS-84 phase 2 - Invite Board members (open)
- Henk: Check email list (done)

## Announcements by the Service Manager (Jacques, Henk)



Unfortunately, since Christmas Jacques is suffering from a neck hernia, which is causing a lot of pain, and he is on sick leave. Although there are some hints of a slight recovery, it is unclear when Jacques will be able to start working again. It will at least take several weeks...

The KNMI is mobilizing staff to take over the tasks of Jacques:

- Jacqueline Baas will be involved in the invoicing, contracts.
- John Douros will take over some tasks.
- Henk Eskes will take over the other activities of Jacques for CAMS-84.

### Closing of CAMS-84 phase 1:

All documents are delivered. All milestones are reached. Notably:

- A final version of the report “*Compendium of case studies for the period 2015-2018*” was delivered, in response to the comments of Richard. This completes the full list of deliverables for phase-1 which ended 30-9-2018. The compendium contains a large number of major events, 37 in total (!), for the past 3 years, with a focus on biomass burning events, dust episodes and regional European case studies. It will be published on the CAMS site (check with Richard).
- Audit: CAMS-84 was selected by ECMWF for an audit performed by audit organization BDO. The audit took place during 5-9 October. The audit report was sent to ECMWF.
- Audit Report 2018 (this is a KNMI internal audit and different from the BDO audit mentioned above) has been delivered.
- Update of the Final Report was submitted on 17 December, dealing with comments of ECMWF (Richard). Final report was approved, and signed version will be sent to ECMWF on Thu 24 January 2019.

### Contract for phase 2:

- Phase-2 contract with ECMWF is finalised and was signed on 16-11-2018.

## 2018 Q4 deliverables:

Status of the deliverables and milestones: (yellow: delivered; green: approved; red: delayed)

CAMS_84		KNMI			
Deliverables and milestones list					
WP number	Deliverable / Milestone number	Responsible	Nature	Title	Due
1	D1.1.1-JJA2018	KNMI	Report	EQA report of the CAMS Real-Time Atmospheric Composition Service JJA 2018	30-11-18
1	M1.1.1-JJA2018	KNMI	Milestone	Availability of D1.1.1-JJA2018 draft validation report two weeks before publishing	30-11-18
2	D2.1.1	KNMI and partners	Website, graphics	Initial set of verification websites with up-to-date content	30-11-18
4	D4.1.1-JJA2018	KNMI	Report	EQA report regional services JJA 2018	30-11-18
0	D0.2.1-2018Q4	KNMI	Report	Minutes of internal progress meeting with CAMS-84 partners	31-12-18
2	D2.2.1	KNMI and partners	Report	Operational Validation Requirements document	31-12-18
2	D2.2.2	KNMI and partners	Report	Operational Validation Architectural Design Document	31-12-18
3	D3.1.1-2019	KNMI	Report	EQA plan 2019 for experimental suite(s) and global development experimentation	31-12-18
5	D5.1.1-2017	KNMI	Report	EQA report for the global reanalysis, year 2017 (2003-2017), CHEM+AER	31-12-18
5	D5.1.1-2018-initial	KNMI	Note	Initial assessment of the global reanalysis, year 2018, CHEM+AER	31-12-18
5	D5.1.2-2010-initial	KNMI	Note	Initial assessment of the global reanalysis, years 2006-2010 GHG	31-12-18
0	D0.1.6-2018	KNMI	Other	Preliminary financial information 2018	15-01-19
0	D0.1.1-2018Q4	KNMI	Report	Quarterly Report Q4 2018	20-01-19
4	M4.1.2-SON2018	KNMI	Milestone	Availability of SON 2018 summary for the ensemble, five weeks before publishing the full report, for inclusion in the CAMS-50 reports	25-01-19
2	D2.1.2-2018Q4	KNMI and partners	Website, graphics	Up-to-date websites with EQA graphics, incorporating the developments from WP2 and WP6 - Q4 2018	31-01-19
4	M4.1.2-SON2018	KNMI	Report	Availability of D4.1.1-SON2018 two weeks before publishing	15-02-19
0	D0.1.2-2018	KNMI	Report	Annual implementation report 2018	28-02-19
0	D0.1.4-2020	KNMI	Report	Draft Implementation plan 2020	28-02-19
1	D1.1.1-SON2018	KNMI	Report	EQA report of the CAMS Real-Time Atmospheric Composition Service SON 2018	28-02-19
1	M1.1.1-SON2018	KNMI	Milestone	Availability of D1.1.1-SON2018 draft validation report two weeks before publishing	28-02-19
4	D4.1.1-SON2018	KNMI	Report	EQA report regional services SON 2018	28-02-19
0	D0.2.1-2019Q1	KNMI	Report	Minutes of internal progress meeting with CAMS-84 partners	31-03-19
5	D5.1.1-2018	KNMI	Report	EQA report for the global reanalysis, year 2018 (2003-2018), CHEM+AER	31-03-19
5	D5.1.2-2010	KNMI	Report	EQA report for the global reanalysis, year 2003-2010, GHG	31-03-19

To conclude: CAMS-84 has submitted all deliverables, and passed the milestones for Q4-2018. Reporting due in the first weeks of January was delivered (somewhat late, related to illness of Jacques).

## Reporting:

The following reporting docs were delivered:

- Preliminary Financial Information 2019
- Minutes of PM1 (Kick-Off)
- Final Implementation plan 2019
- Quarterly Report Q4-2018

## Validation reports, Q4-2018:

The following deliverables were completed:

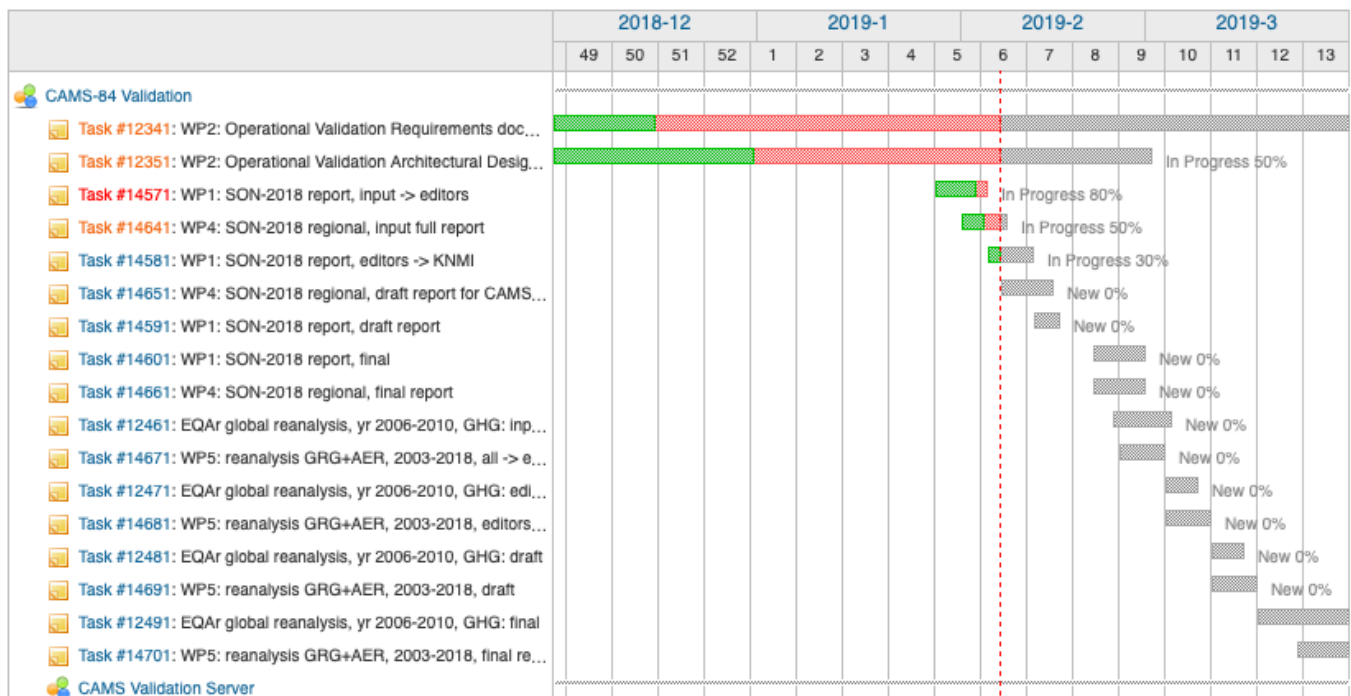
- JJA-2018 report for the global CAMS forecasts (WP1)
- JJA-2018 report for CAMS-regional
- Reanalysis GRG+AER, 2003-2017
- Reanalysis GRG+AER, 2018, initial assessment
- Reanalysis GHG, 2006-2010, initial assessment

It has been an active and busy first four months!

### Feedback from CAMS SLBs:

- There is an action item to discuss possible inconsistent results to organise a meeting to discuss AERONET observations, with Luke, Sam, Michael.  
*Action: Michael, Luke and Henk exchanged emails on this topics. Michael has summarized the main results. This summary was forwarded to ECMWF and this should close the AI.*
- Vincent Huijnen: at the SLB Vincent discussed interesting comparisons with the AQABA and CAFE campaigns. Question to Natalia: Could CAMS-84 make use of these datasets as well (at least for the reanalysis)?
- Johannes Flemming: Raised a question on synchronising the use of PM data for Europe with CAMS-50. In particular this concerns the choice of AIRBASE stations/datasets. It is a good idea to contact CAMS-50 on this. Sara mentioned she does not have access to the CAMS-50 datasets. (Action for Henk)

### Upcoming activities:



The project is on track, but WP-2 is somewhat delayed (see below).

Next on the list:

- Signing of all subcontracts CAMS-84 Phase 2. Henk is taking over from Jacques. Anne promised the feedback from University Bremen will come within a week.

## WP2 – websites and verification server

### Websites:

Antje noted that a few websites were not up-to-date. This has been communicated with the partners involved.

- The MOPITT comparisons are now up-to-date, including SON-2018. <http://www.mpimet-cams.de>.
- The GOME-2 website is now up-to-date, up to, and including, January 2019. Antje noted that some months of comparisons against the control run were missing.

With these updates Henk will prepare D2.1.2 .

### Specification of the verification server:

Two telecons have been organized with the partners on December 4 and 5 to discuss the details on the *architectural design* of the operation validation server. Main focus is on:

- conversion of measurement data to HARP format
- definition of metadata for enabling operational measurement data streams
- format of the information to be provided to S&T on how to perform the inter-comparison between CAMS model data and measurement data.

A first draft of the Architectural Design Document was prepared and was delivered before the end of the year (due December 31). This is now called “**Technical Specification Document**”.

CAMS84\_2018SC1\_D2.2.2\_201812\_TechSpec\_v0.3.docx. The document contains input from Bavo on NDACC, as example for the other groups to see what is required, and also because the NDACC will be the first dataset to be included in the operational server, first release in June. This version is therefore still incomplete, hence the “version 0.3”.

- Several other partners (5) have sent input, which will be included in a next draft. When all partners have sent their input the document will be finalized.

Because of the absence of Jacques, Henk will start to work on the next draft.

Note: Normally the requirements document comes before the design document. However, for CAMS-84 KNMI+S&T have decided to switch the order. There are two reasons:

- When the partners have specified the technical aspects, it is then clear what is needed, and the requirements document can be written in detail.
- We do not want to delay the implementation, and the technical specification is the main document needed for the implementation.

Sander mentioned that it was discussed with Jacques to combine the two documents. Henk will check this with Jacques.

Sander further clarified the procedure and priorities:

- It is important to identify the aspects relevant to start the further implementation
- Another priority is an estimate of the volume of data at the server at BIRA
- Start with pre-collocation of CAMS data: detailed info from the partners needed (e.g. point profiles, or area around the station needed, station list).

- Then the intercomparison approach. Partners should distinguish baseline comparisons vs more “fancy” comparisons

### **Development of the verification websites:**

Sander: The focus has been on the specification, see above. The S5P-VDAF developments are in part more general, also to the benefit of CAMS-84.

Thorsten asked if the data use policies can not be formalized somewhere, e.g. in a document with the networks and their policies. Bave suggests this is linked to the server.

### **WP 3 - evaluation of new experiments**

Richard is planning to organise a meeting with CAMS-84 to discuss the move to 137 levels (to see how the extra extraction/download burden can be minimised). Hopefully soon. Antje will inquire with Richard and inform us.

Based on this we have a better insight what we can commit to, and what the implications are of the 137 level version.

Antje has asked for a list of stations for which output can be generated. For which partners would this be of help ?? Are there still significant concerns about the extraction of the datasets? Would groups be interested in pressure levels? These are questions we can address further during the meeting.

Antje explained that the update is planned for September. Feedback from CAMS-84 would then be required by July. The validation work should start in April at the latest.

Antje mentioned a meeting at ECMWF in April to make a final decision on which runs to evaluate. Antje will inform us about this. It would be good if the validation could focus on surface concentrations, important for the users.

Status of the test runs? They have now progressed to May 2017 (starting January 2017)

Yves has looked at the first test dataset, and showed first results for the stratosphere (see slides).

### **Status of the WP1 report and the WP4 report, both SON 2018**

#### **WP1:**

Note that the preparations are on schedule, and not yet all inputs have to be available today.

- Annette: All input arrived, apart from one, but some are incomplete, so there may be a late contribution.
- Michael: Aerosol contribution almost ready. Michael will perform a short review.
- Yves: Has already posted the stratospheric contribution
- Michel: All inputs in place.

To conclude: there are no delays so far.



**WP4:**

John Douros: We are currently waiting for the contributions from John/Christos (AA) and Natalia (MPI). No delays foreseen.

Yasmine commented on the status of IAGOS: There is a reduced number of (European) IAGOS measurements this quarter (SON2018). Due to a forced switch in company responsible for the maintenance several instruments are not operational. Hopefully this is solved in the summer 2019.

IAGOS at Frankfurt often shows different results than other European airports, e.g. Paris? This is discussed, but not yet understood. Remains a point of attention.

Antje asked if in-flight cruise data can be included in the validation. Together with Yasmine it will be checked if the (old) scripts of Luke can be ported to 137 levels.

## Status of the WP5 reanalysis validation reports

With the delivery of the validation reports in December this WP is on schedule.

## Status of the WP6 scoring document

Michael: The scoring document and various approaches will be reviewed by Michael and Henk. This because the methods discussed are not fully coherent and can be homogenized. A meeting is planned end of February.

## Status of the reanalysis validation paper

Annette reviewed the reanalysis validation paper. See her slides for more details.

## Presentations by all partners

On RedMine the slides presented at the meeting are available (merged to 1 pdf). There were presentations by the persons listed below. Focus on WP1/WP4:

- New developments in analysis approach, measurements used, other new aspects
- Major (unexpected) results for the SON 2018 reports,
- New developments
- Other results, e.g. case studies

There were presentations from:

*Eleni (AUTH)*: Global-regional comparisons, WP6, case study.

*Annette Wagner (MPG)*: Describing the status of the reanalysis paper. There is still a debate if the new control should be included. Antje suggests to add diurnal cycle of NO<sub>2</sub>, PM data.

*Kaj (AU)*: Arctic, showing very good results.

*Anne (IUP)*: NO<sub>2</sub>, HCHO, satellite and MAX-DOAS; NRT, WP4. Overestimate of fires in Australia. New comparisons of analysis and day-1 forecast for CAMSRA.

*Yasmine (CNRS-LA)*: IAGOS. Is there an issue in 2018 in CAMSRA?

*John & Christos (AA)*: ESRL, EMEP, Airbase; NRT, WP5, Mediterranean. Two presentations (ideas for papers).

*Yves (BIRA)*: Stratosphere; NRT evaluation. First results for 137L in the stratosphere.

*Bavo (BIRA)*: NDACC (plus about 25 TCCON sites, profiting from the S5P VAL campaign, which now has stopped).

*Thorsten (UBC)*: TCCON, CO<sub>2</sub>, CH<sub>4</sub> and CO; NRT.

*Michel Ramonet (LSCE)*: ICOS CO<sub>2</sub>, methane. New plots, site-dependence.

*Michael (MET-NO)*: Aerosols; reanalysis, NRT, e-suite, WP5. Hints of SO<sub>4</sub> bias in SH, changes in composition from one upgrade to the next, PM<sub>2.5</sub> comparisons. Extension of the Earlinet comparisons.

*Sara (BSC)*: Dust; NRT, Mediterranean. New case studies. Dust << total AOD.

*Harald (DWD)*: Forward operator computations at DWD and ECMWF give different results. Harald is in contact with ECMWF.

For the detailed results we refer to the slides.

## AOB

Annette: It would be useful to send reminders on the schedule/deadlines by email.

We wish Jacques all the best and a quick recovery!

## Other changes with respect to CAMS-84 phase 1:

### Starting point is continuity:

- Same key activities: 3-monthly evaluation of
  - the global service,
  - regional service,
  - e-suite,
  - reanalysis
- Same team as in first phase: 14 partners
- Strong links to observations community / involvement in networks
  - Same budget

### Extension of activities (Phase 1 -> Phase 2):

- Aerosol chemical speciation.
- Sulphur dioxide measurements from space.
- For stratospheric ozone a new satellite dataset will be added: SAGE-III-ISS
- The evaluation of global (tropospheric) ozone data based on IASI/Metop-B satellite data.
- Use field campaigns such as ATom: Atmospheric Tomography Mission for evaluation of O<sub>3</sub>, CO, NO, NO<sub>2</sub>, OH, HO<sub>2</sub>, HCHO; StratoClim: Stratospheric and upper tropospheric processes for better climate predictions and other field campaigns as the data become available.
- The contract between CAMS and NDACC (CAMS-27) will greatly increase the number of observations available through NDACC.
- As soon as details of the other "in-situ" CAMS contracts become available (ICOS, ACTRIS, GAW, EMEP, and IAGOS) the consortium will evaluate the observational datasets involved. New/improved measurements will be used soon after they become available.
- IAGOS extension of observations: CO<sub>2</sub>, CH<sub>4</sub>, NO/NO<sub>2</sub>, H<sub>2</sub>O, UT/LS
- Extra satellite observations: OMI, S5P (alternative retrievals, products not assimilated)
- The development of an operational validation server (hosting to be negotiated) where use is made of the heritage of the demonstration servers (functionality, software) developed as part of CAMS phase 1.
- Hosting of the operational server (BIRA).
- Furthermore, this software must also be installed on ECMWF hardware for internal non-operational use (e.g. testing by ECMWF of new developments in the Global Production System in the lead-up to the experimental production suites).
- Delivery of observations to ECMWF
- Extra global model configurations will become available and will be evaluated: IFS-MOZART, IFS-MOCAGE, IFS-TM5-BASCOE, IFS-GLOMAP
- Additional focus on Europe as a whole.
- Focus on USA and Asia.
- Regional reanalyses.
- Two extra regional models.
- Assist ECMWF with the evaluation of new CAMS-global system configurations (not e-suite)

**Reduction of activities/effort (Phase 1 -> Phase 2):**

- The reanalysis evaluation will take less effort: one report less, increments of one year (but extra quick looks)
- There will be less e-suite (upgrades) in coming years
- Work packages have been joined, which improves the management burden somewhat
- Routine activities will take somewhat less time ...
- Development work for automated verification server done in phase 1 (but not complete).
- The automated production of verification plots should reduce the workload for the partners.
- Hopefully the CAMS data store will make it easier to extract relevant model information: e.g. time series ?

**CAMS-84 email list**

Henk will send an email to update the email lists.

## Presentations from the partners

On RedMine the slides presented at the meeting are available (merged to 1 pdf).

There were presentations from:

*Michel Ramonet (LSCE):* ICOS CO<sub>2</sub>, methane

ICOS-ERIC network (Europe + Reunion), phase 2 also CO (and Rn) ;  
spike removal (local sources);

Outside Europe: RAMCES-ICOS (LSCE); OBSPACK (US, NOAA) now  
providing 3mo updates; Aircore vertical profiles

Summer drought 2018 study, with comparison to CAMS models

*Thorsten (UBC), Bavo (BIRA):* CO<sub>2</sub>, CH<sub>4</sub> and CO; NRT.

TCCON (European institutions): 2 stations (Bialystok, Ascencion)

*Bavo (BIRA):* NDACC

CAMS-27 contract (new are T profile and HNO<sub>3</sub>), now 39 instruments  
contribution to scoring document

*Yves (BIRA):* Stratosphere; NRT evaluation.

Satellite data used, headline scores

Phase-2: Better filtering OMPS-LP, SAGE-III ISS (3mo delay)

*Michael (MET-NO) represented by Augustin:* Aerosols; reanalysis, NRT, e-suite, WP5.

Scoring document - METNO working on draft scoring paper

Evaluation of vertical profiles with EARLINET lidars (paper planned)

*Sara (BSC):* Dust; NRT, Mediterranean.

Phase II: Aeronet fine/coarse fractions - for NRT reports; vertical profiles based on  
ceilometers; MISR satellite dust filtered; CALIOP-LIVAS profiles, possibly also China

*Werner, Harald (DWD):* Ceilometers, backscatter vs models

Forward operators (issues) may be resolved with E-PROFILE

*Kaj (AU):* Arctic; reanalysis, e-suite; case study.

More focus on transport; new data

*Eleni (AUTH):* Global-regional comparisons, WP6, case study.

Storage has been an issue; to discuss within CAMS-84 how this can be  
implemented in the future. Richard: in future CDS will have both datasets.

Maybe download no longer necessary

*Annette (MPG):*

New: NO<sub>2</sub>, SO<sub>2</sub>

Reanalysis paper: 3rd version (internal) end of October; submit end Nov

Also MACC reanalysis included in GAW station evaluation

*Anne (IUP):* NO<sub>2</sub>, HCHO, satellite and MAX-DOAS; NRT, WP5.

Contribution to Antje's reanalysis paper and Annette's reanalysis paper.

Phase 2: extensions to GOME2-B, OMI, S5P (in development);

Results from the paper: Rush hour peak models not confirmed by MAX-DOAS (Bremen)

Antje: diurnal cycle test for reanalysis (assimilation)

*Valérie (CNRS-LA):* IAGOS.

Plans for phase 2, O3, CO, H2O, CO2, CH4;

data provision and process-oriented publications

(Ex: Sauvage 2017 source-receptor; Petetin 2018, representativity, PBL profiles;

Clark in prep)

*Natalia (MPG):* Extension: IASI ozone, IASI SO2 (ESPRI, Lieven Clarisse)

ATOM campaign, StratoClim (AWI); extension of wildfire case studies

July there were fires over Europe, but not so clear in satellite. Alaska fire study

(note Antje: maybe this was period where MODIS GFAS data were not arriving in time

Guy: Would be very interesting to perform analysis with ATOM vs CAMS:

who could pick this up?

*John & Christos (AA):* ESRL, EMEP, Airbase; NRT, WP5, Mediterranean.

Main extension: surface ozone, CO vs airbase

Mortality vs Temperature and ozone in France, correlations with MACC and CAMS RA

For the details we refer to the slides which are provided on RedMine.

## AOB, discussion

Natalia: Please provide schedule for deliverables of CAMS-84 for first 3 months.

Henk: this has been added as action.