

MINUTES OF CLOUD-NET SECOND PROGRESS MEETING

21-22 Oct 2002, Buys-Ballot meeting Room, KNMI, Netherlands.

Present: Jacques Pelon, Martial Haeffelin, Arnaud Delavel, Anne Mathieu, Dominique Bouniol (IPSL), Philipp Currier, Jean-Pierre Claeysman (Degreane), Jean-Marcel Piriou (MeteoFrance); David Donovan, Henk Baltink, Nick Shutgens, Wouter Knap, Gerd-Jan van Zadelhof (KNMI); John Goddard (RCRU); Damian Wilson (Met Office); Herman Russchenberg, Oleg Krasnov, Silvester Heijnen (TUD); Pekka Ravila (Vaisala); Arnoud Apituley (RIVM); Robin Hogan, Malcolm Brooks, Anthony Illingworth (co-ordinator.), Nicolas Gaussiat (Administrator) (UR).

1. GENERAL REMARKS and PROGRESS ON DELIVERABLES.

1.1 AJI reviewed the actions since the last meeting.

Old Action 2.1 - JWFG had supplied document on accuracy of LWP from radiometers which is to be placed on the web. New Action 0.1 - Place on the web.

Old Action 2.2. - MH has supplied BSRN standard radiometer procedure document.

New action 0.2 - put link on web to this document.

Old Action 3.3. DD and HR produce netCDF data. New Action 0.3 - do by Nov 02.

Old Action 3.4 Confirm rainfall is being measured and archived at all sites.

New action 0.4 - SIRTa inform when instrument is returned from USA.

Old Action 4.7 MB supply model comparison details to DW.

New action 0.5 A paper is being written and will be sent to DW.

Old Action 6.1 Loan of ceilometer from KNMI to SIRTa. This has now been arranged. The ceilometer should arrive at SIRTa in the next two weeks.

All other actions were dealt with under other specific agenda items.

The twelve month extension has been granted by Brussels. The signed revised contracts were distributed.

1.2 The first annual report (10 pages) had been accepted by Ricardo Casale. The next report should be more substantial and conform to the guidelines.

1.3 Completed Deliverables.

The Brochure (0), Kick-off workshop report(1) , Review of existing data sets (2a) have been completed and are on the web. Deliverable (2b) analysis of existing data sets is being edited by AJI.

Action 1.1. AJI to complete deliverable 2b and place on the web.

1.4 Initial Algorithm Recommendation (Deliverable 3)

A draft document prepared by AJI and RJH was discussed extensively.

Action 1.2 A revised version to be circulated and agreed and placed on the web.

The following aspects in this initial algorithm recommendation need further investigation for the next stage of the document.

Action 1.3 MH/JP to produce a document on the micropulse lidar specification and performance.

- Action 1.4 DD/JP to produce document on the use of multiple field of view and its usefulness or otherwise with respect to multiple scattering.
- Action 1.5 DD/HKB Discuss LWP accuracy from the radiometer with CLIWANET colleagues including performance above 500 g m^{-2} .
- Action 1.6 RJH/MB/NG - HIGH PRIORITY - Definition of the cloud mask algorithm from radar/lidar observations.
- Action 1.7 JWFG What sort of rain gauge is needed to provide a 'rainfall mask' to identify periods when radome attenuation may be important.
- Action 1.8 JP. Produce document outlining the IPSL Lidar/IR retrieval technique.

1.5 User Requirement Document. (Deliverable 4) .

This document was introduced by J-M P and DW. It has already had several iterations via email.

- Action 1.9 D.W. to produce amended version for posting on the web.
- Action 1.10 J-M P and DW (with iteration via AT, RJH and NG) Define common file format (and translation program) for model data. HIGH PRIORITY.
- Action 1.11 J-M P, DW and AT - Document the relevant physical details of the cloud schemes in the models being used.
- Action 1.12 RJH Define a level 2a product, which is the best values of Z and Beta in which for example a) gaseous attenuation has been corrected b) insects have been removed and c) rain flagged. HIGH PRIORITY.
- Action 1.13 HR. Document method for cleaning up 3GHz data (as per RJH document). Document production of cloud mask at 3GHZ (see action 1.6)
- Action 1.14 DW Define regimes for categorising different weather types. For example 50mbar ascent (3 types?) and boundary layer criterion (4th type) .

1.6 Web site archiving and formats.

This was discussed extensively. See actions under the previous two items.

Data output from all models and observations sites had been received.

- Action 1.15. All. Presentations to be sent to NG for posting on the web.

2. Overview of Instrumentation, data gathering and calibration issues.

Status of recording stations.

2.1 SIRTAs: The 94GHZ radar is operating satisfactorily for four days a week from first thing in the morning until late afternoon. It is hoped that 24h data gathering can start shortly. The LNA lidar is also operating during most of these times when it is not raining. The ceilometer should start 24h operation when it arrives in two weeks or so.

2.2 CHILBOLTON: The ceilometer is operating satisfactorily. The 94GHZ radar tube and modulator are being repaired in Canada. They should have been shipped back to the UK last week, but the manufacturers discovered a fault with the modulator which they are currently investigating.

[Note added later - fault will be repaired - return to UK in January 03]

2.3 CABAuw. The ceilometer and radar are operating 24h a day. The radar has lost about 50% of power. The amplifier is shortly to be returned to the UK (for a 2/3 weeks) where the manufacturers will investigate this loss of power and hopefully correct it. The

TARA 3GHz cloud radar is currently being repaired - this should be completed before the end of November.

Action 2.1 MH to link CloudNET to data archive and SIRTA web site.

Action 2.2 MH Provide document on accuracy of SIRTA radiometer LWP.

Action 2.3 JWFG to circulate details of Chilbolton status message board.

Action 2.4 All. Respond to HKB's request for any requirement to keep CT12 and IR radiometers in the array of stations around Cabauw.

Action 2.5 HR/OK Report on status of TARA and its repair program over next two months.

3. Update on Model Developments.

Presentations on:

ECMWF (AT given by AJI),

MO - which has the new dynamics operating since mid-August (DW),

MeteoFrance (J-M P),

Racmo (Eric van Meijgaard) - uses ECMWF physics.

Presentation by RJH on deriving pdfs from observations and by DW on their use in models.

Action 3.1 DW - Explore possibility of archiving UM 'global' model data.

Action 3.2 AJI to respond to DWD (Gerhardt Adrian) to say we welcome their model data in Cloudnet comparisons.

Action 3.3 AT, DW, J-M P to produce short document detailing the relevant cloud physics parameterisation schemes in the models. Details on numerical schemes is less important, more crucial are the details of the physics which are relevant to the observations.

4. Work Package 1 - Analysis of Existing Data Sets.

The following presentations were given (copies of all to be sent to NG):

4.1 D Bouniol reviewed IPSL progress including

a) Normalised ice particle size distribution with respect to concentration and size.

b) Fits to CEPEX data had been carried out. Action had been taken to acquire the VIPS data from A Heymsfield which extends to lower sizes than earlier data sets.

c) Campaign data had been classified to correlate V_t observed with , for example, IWC, Re, Dm etc - two regimes in a plot of V_t versus IWC/No were identified - was this due to a difference in shape. Polarisation lidar data will be examined to exploit this further.

d) Lidar/radar retrieval algorithms which allowed the concentration to vary along the ray path were described. Methods which identified layers of supercooled water embedded within ice clouds were also described.

ACTION 4.1 DB (et al) to determine the number of free variables in the universal psd.

4.2 J Pelon described lidar and tripe wavelength IR cloud retrievals also for BL properties.

4.3 Anne Mathieu described 'congruent' means of comparing boundary layer models with satellite data.

4.4 Arnaud Delavel discussed normalisation calibration and noise in lidar signals.

ACTION 4.2 AD to compare the molecular calibration technique with the use of the integrated backscatter in thick stratocumulus.

ACTION 4.3 UR - E O'C - Effect of aerosols on integrated backscatter calibration.

ACTION 4.4 SIRTa to compare their simultaneous lidar returns at zenith, 2degs and 5degs off vertical to quantify effects of specular reflection from ice crystals.

4.5 DD showed a preliminary comparison of ceilometer and simultaneous RIVM lidar observations. There is evidence that the ceilometer has a lower sensitivity during the day.

ACTION 4.5 DD to pursue these comparison studies.

4.6 Malcolm Brooks presented IWC comparisons of Chilbolton data with UM model.

4.7 AI presented E O'C's work on retrieving drizzle properties in Sc.

4.8 NG showed dual wavelength radar retrievals of LWC. For future CloudNET comparisons Doppler velocity may be useful. It should be possible to derive LWP directly from the radiometer rather than integrating up the profiling radiometer.

4.9 DD reported that there were insufficient Cabauw data to carry out previous action 4.5 on statistics of Sc.

4.10 DD described further radar lidar retrievals of ice clouds fitting to a bimodal size distribution of two gamma function (cf CETP universal single function see Action 4.1) Plots of Reff, tau and Rt versus T and IWC were presented.

4.11 HKB showed that at 1295MHz it was only occasionally possible to identify the clear air (i.e. true air velocity) component superposed on the cloud return. It was decided that it was not sensible to pursue this line of enquiry.

4.12 Oleg Krasnov described means of separating cloud returns from drizzle radar returns in Sc using the ratio of Z and the lidar derived extinction coefficient.

5. Future plans Status of various work packages and deliverables.

5.1 DW lead further discussion on the user requirement document. (see action 1.9 -DW).

5.2 AJI/RJH lead further discussion on the initial algorithm recommendation.

The following comparisons should be carried out before the next meeting - for details see the version of this document on the web. In the following actions the algorithms should be carried out using data from the three sites and compared with the four model outputs.

Water clouds.

Action 5.1 TUD - Lidar/radar use Frisch and 'BEST' approach to derive LWP and LWC for Sc and liquid water clouds.

Action 5.2 UR: O'Connor - radar/lidar synergy to derive drizzle size, concentration and fluxes.

Action 5.3 UR:NG. - LWC from dual wavelength radar - when available from Chilbolton.

Ice clouds:

Action 5.4 KNMI::DD - Radar/lidar synergy to characterise ice clouds.

Include Matrosov method for comparison.

Action 5.5 CETP: CT - Radar lidar synergy to characterise ice clouds.

Action 5.6 IPSL:JP - Lidar/IR algorithm to characterise ice clouds.

Mask and classification:

Action 5.7 UR - M.Brooks: Cloud mask, classification (phase), cloud fraction and IWC.

Action 5.8 All the above - produce documented code for these algorithms.

5.3 Publications.

The following reasonably imminent future publications were identified from the presentations given in item 4.

- a) CT et al on Lidar/Radar ice retrievals with variable No.
- b) JP on lidar/IR ice retrievals.
- c) MB et al on IWC (from Z) model evaluation
- d) O'Connor et al - Drizzle from lidar and radar.
- e) NG et al - dual wavelength retrievals of LWC.
- f) DD - lidar/radar retrievals plus Doppler.
- g) O Krasnov et al - water cloud retrievals.

6. Date and place of next meeting.

24-25 April starting 9am in UK. Either Chilbolton, Reading or RAL.

Reminder: High Priority Actions:

- 1.6 RJH/MB/NG Definition of cloud mask.
- 1.10 J-M P and DW et al. Definition of common file format for model data.
- 1.12 RJH Define level 2a product.

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