



Koninklijk Nederlands  
Meteorologisch Instituut  
*Ministerie van Verkeer en Waterstaat*

# The Netherlands Site Report

Martin de Graaf  
Arnoud Apituley



## Developments 2010 - 2011

### Personnel change

- Arnoud Apituley ([apituley@knmi.nl](mailto:apituley@knmi.nl)) joined KNMI staff. Focus on water vapour from Raman lidar. TT6 site representative. TT3?
- Martin de Graaf – TT6 site representative
- Reinout Boers changed position [research in Earth Observations, remote sensing]. Involved in MWRnet. TT3?
- Siebren de Haan – GPS manager



## Developments 2010 - 2011

Steps towards fully operational GRUAN site - Cabauw:

- Incorporation of Raman lidar team at KNMI, headed by A. Apituley. Additional WV measurements by Raman lidar.

## Cabauw EARLINET Lidar Station

### Timeline of measurements:

2006 – 2008	Caeli development at Bilthoven
Mar. – Apr. 2008	installation into sea container
May 2008	IMPACT campaign at Cabauw
Oct. 2008 – Apr. 2009	instrument upgrades at Bilthoven
May 2009	EARLI'09 intercomparison at Leipzig.
June 2009	EARLINET mon + thur regular
measurements	
June – July 2010	CINDI campaign at Cabauw.
Sept. 2009	repair of AIRCO.
Nov. 2009	Backscatter lidar decommissioned
Nov – Dec 2010	AIRCO technical problems

### Special measurements

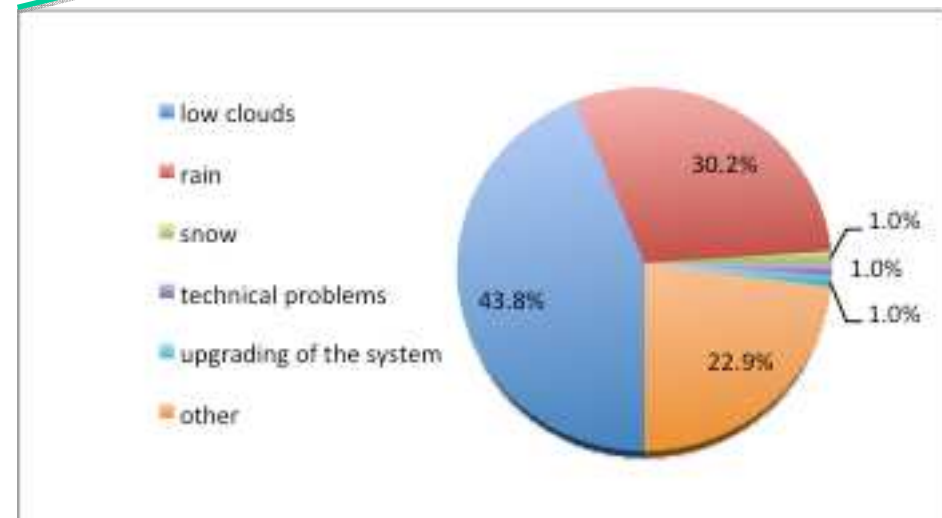
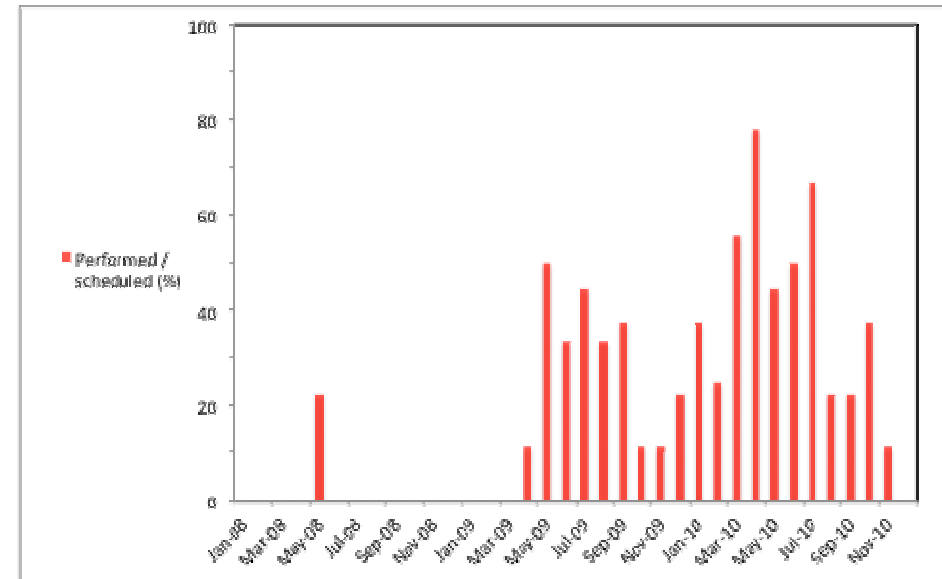
CALIPSO/CALIOP 2006 to 2010	138.5 hrs
Campaigns:	
- EUCAARI / IMPACT (May 2008)	143.5 hrs
- LUAMI intercomparison (17/10/08)	5hrs
- A2D (ADM) intercomparison (17/12/08)	5.5 hrs
- EARLI 09 (May 2009)	70 hrs
- GEOMON/NDACC CINDI (June – July 2009)	110 hrs
Eyafjallajökull (April – May 2010)	134.5 hrs

### EARLINET database

-425 profiles (May 2008 – May 2010)	
-Categories	
- Cirrus	169
- Volcanic ash	280
- CALIPSO	127

### Change of Organisation

Jan. 2011 – RIVM phases out climate research/remote sensing. KNMI adopts Caeli and applies for institutional EARLINET membership.





## Developments 2010 - 2011

Steps towards fully operational GRUAN site - Cabauw:

- Operational data flow of standard Radio Sondes (12 and 00 UTC launches) to Lead Centre



## Developments 2010 - 2011

Steps towards fully operational GRUAN site - Cabauw:

- Continued effort for MW radiometer network (R. Boers)
- Paper on fractional cloudiness using ground-based remote sensing techniques (Boers et. al., 2010)



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## Optimized fractional cloudiness determination from five ground-based remote sensing techniques

R. Boers,<sup>1</sup> M. J. de Haij,<sup>1</sup> W. M. F. Wauben,<sup>1</sup> H. Klein Baltink,<sup>1</sup> L. H. van Ulfst,<sup>1</sup> M. Savenije,<sup>1</sup> and C. N. Long<sup>2</sup>

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[1] A 1 year record of fractional cloudiness at 10 min intervals was generated for the Cabauw Experimental Site for Atmospheric Research (CESAR) (51°58'N, 4°55'E) using an integrated assessment of five different observational methods. The five methods are based on active as well as passive systems and use either a hemispheric or column remote sensing technique. The 1 year instrumental cloudiness data were compared against a 30 year climatology of Observer data in the vicinity of CESAR (1971–2000). In the intermediate 2–6 octa range, most instruments, but especially the column methods, report lower frequency of occurrence of cloudiness than the absolute minimum values from the 30 year Observer climatology. At night, the Observer records fewer clouds in the 1–2 octa range than during the day, while the instrumental techniques registered more clouds. During daytime the Observer also records much more 7 octa cloudiness than the instruments. A reference algorithm was designed to derive a continuous and optimized record of fractional cloudiness. Output from individual instruments were weighted according to the cloud base height reported at the observation time; the larger the height, the lower the weight. The algorithm was able to provide fractional cloudiness observations every 10 min for 99.92% of the total period of 12 months (15 May 2008 to 14 May 2009).

**Citation:** Boers, R., M. J. de Haij, W. M. F. Wauben, H. K. Baltink, L. H. van Ulfst, M. Savenije, and C. N. Long. Optimized fractional cloudiness determination from five ground-based remote sensing techniques, *J. Geophys. Res.* 115, D24116, doi:10.1029/2010JD014661.



a) NubiScope



b) Total Sky Imager

c) Pyrgometer



d) Cloud Radar



e) Cloud Lidar





## Developments 2010 - 2011

Steps towards fully operational GRUAN site - Cabauw:

- Archiving all CESAR (=Cabauw) data in central data base. This will facilitate future inclusion of more instruments in the data flow to LC.

GPS:

- Conversion to NetCDF format is underway
- CABAUW is super-site for EUMETNET - E GVAP
- Climatological reprocessing can still be done





## Next steps towards fully operational GRUAN site - Cabauw:

- Including scientific ozone sondes
- Including GPS data
- Raman lidar WV data

