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***H.M. Deneke, A.J. Feijt, R.A.
Roebeling, N.A.J. Schutgens and
E.L.A. Wolters***

**CM- SAF Board meeting
24- 26 April 2006, Offenbach, Germany**

**Status CM- SAF Clouds Programme:
Cloud Physical Properties**

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Content



Research & Development

Visiting Scientist Activities

Work plan until February 2007

Conclusions



*Research
&
Development*





••• Improvements CPP (SEVIRI and AVHRR)

New Look Up tables

Higher number of Gaussian μ points and Fourier terms

Koelemeijer approach: relate reflectances over dark surfaces to reflectances over bright surfaces

Hexagonal ice crystals types C0 and C3 crystals added (*Hess et al. 1998, Knap et al. 2005*)

"White Sky" surface reflectances from MODIS added

Inter- calibration of AVHRR and SEVIRI reflectances

••• **Full disk processing for SEVIRI**

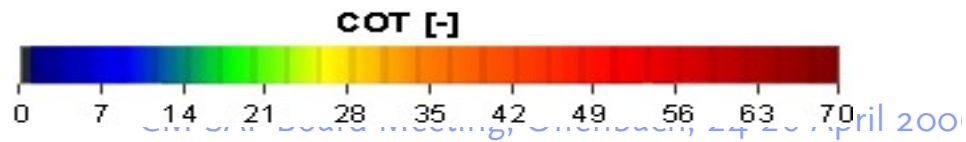
Reduction of computational demands



Meteosat- 8



Konin



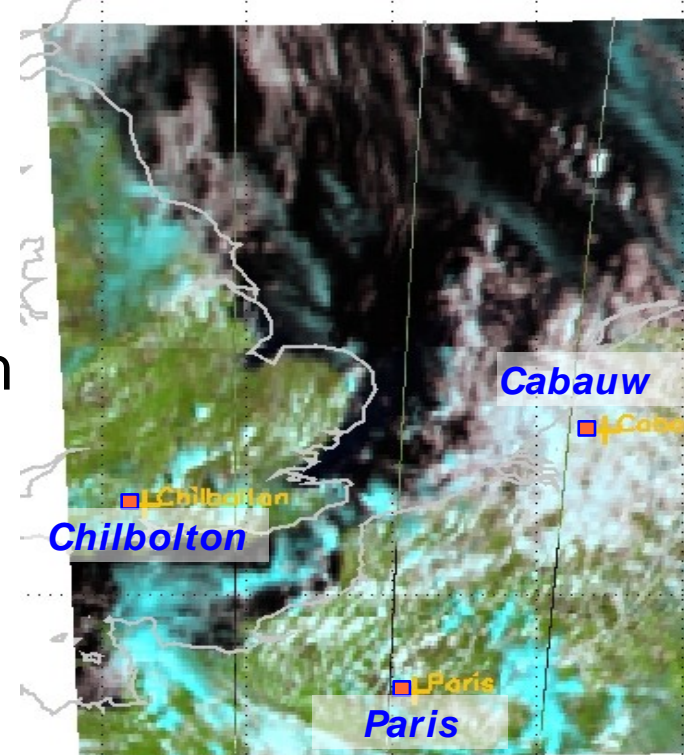
••• Ground-based validation data

Validation of cloud properties using measurements from the 3 CloudNET sites (collected since 2001) that consist among others of:

Target classification for cloud ph

Microwave radiometer for CLWP

Pyranometer irradiance for COT

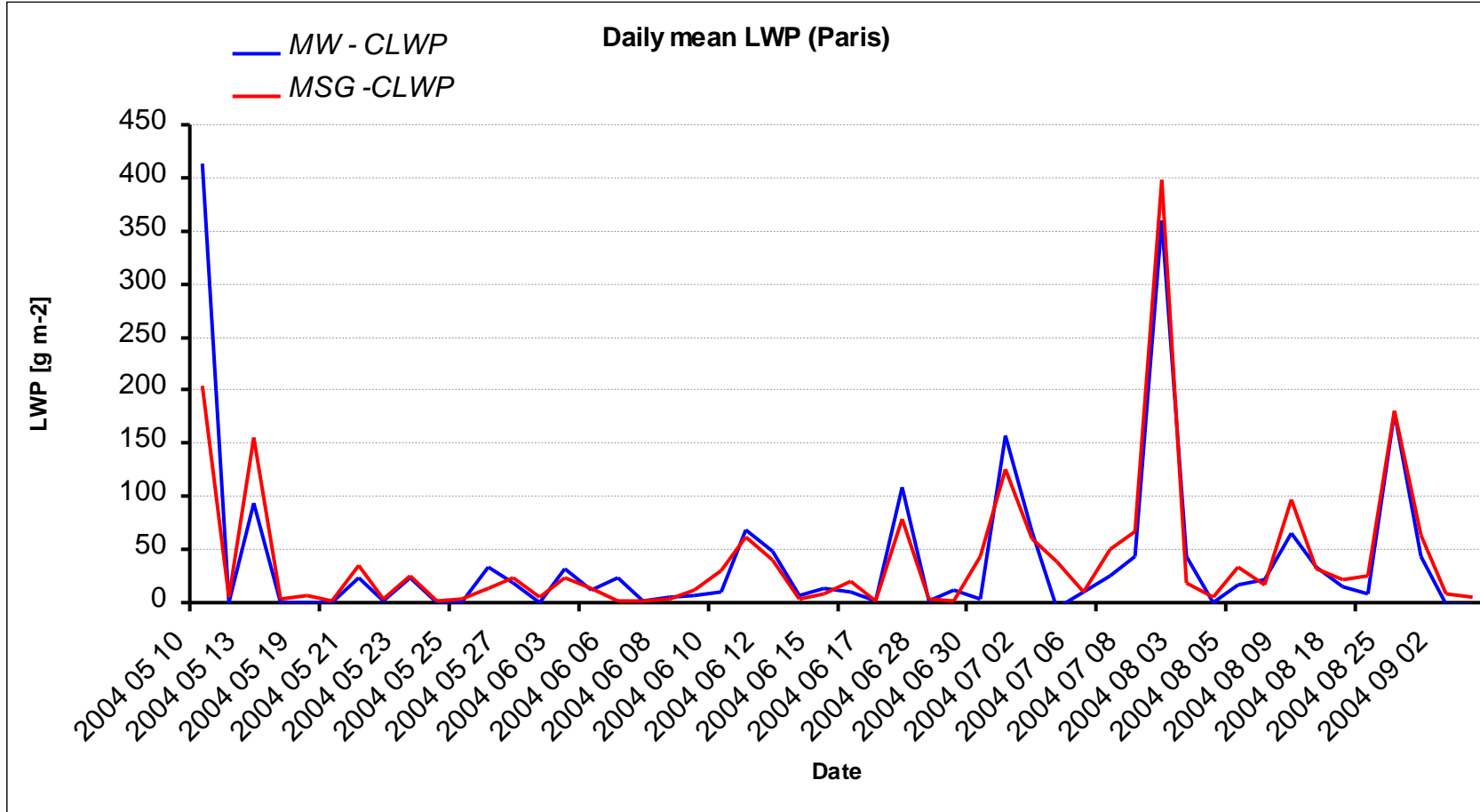


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(<http://www.met.rdg.ac.uk/radar/cloudnet/>)



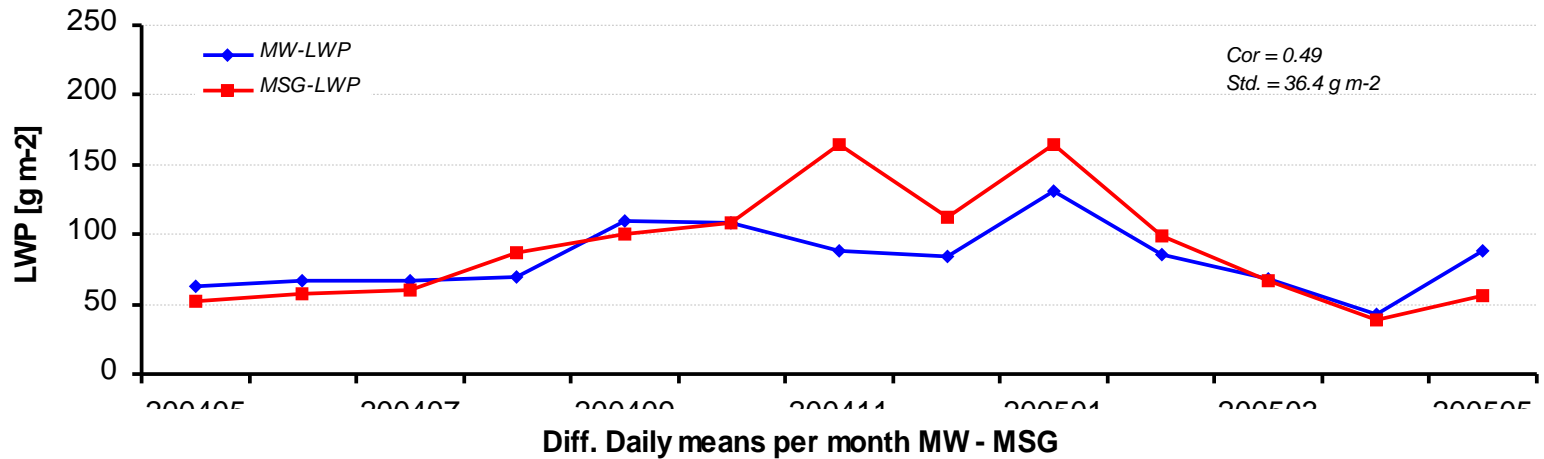
CLWP Validation: daily results



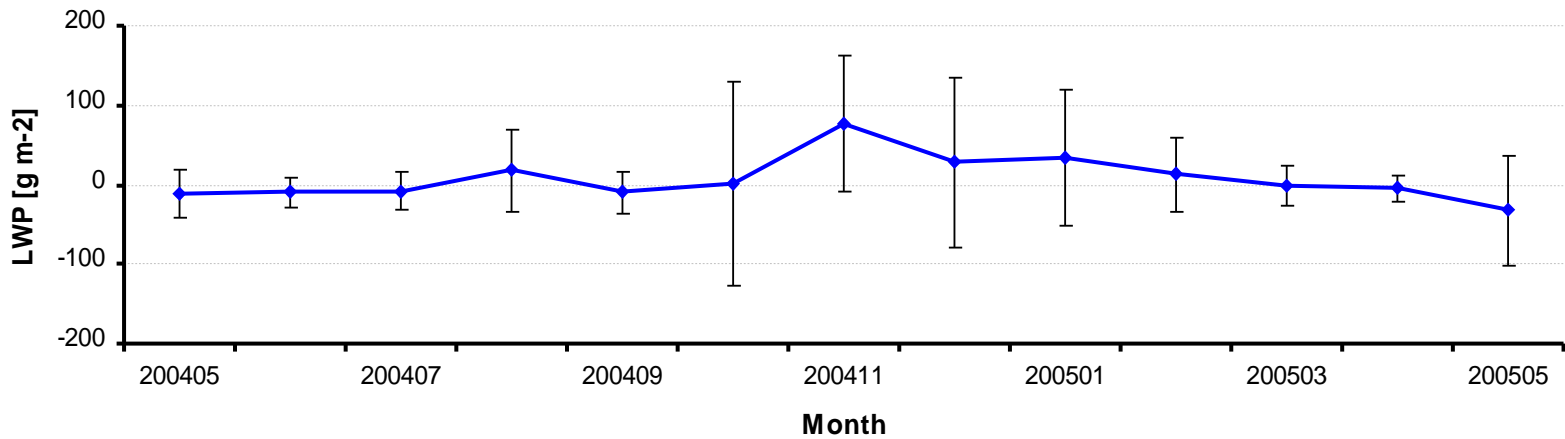
CLWP Validation: monthly results



Monthly mean LWP (Chilbolton)



Diff. Daily means per month MW - MSG



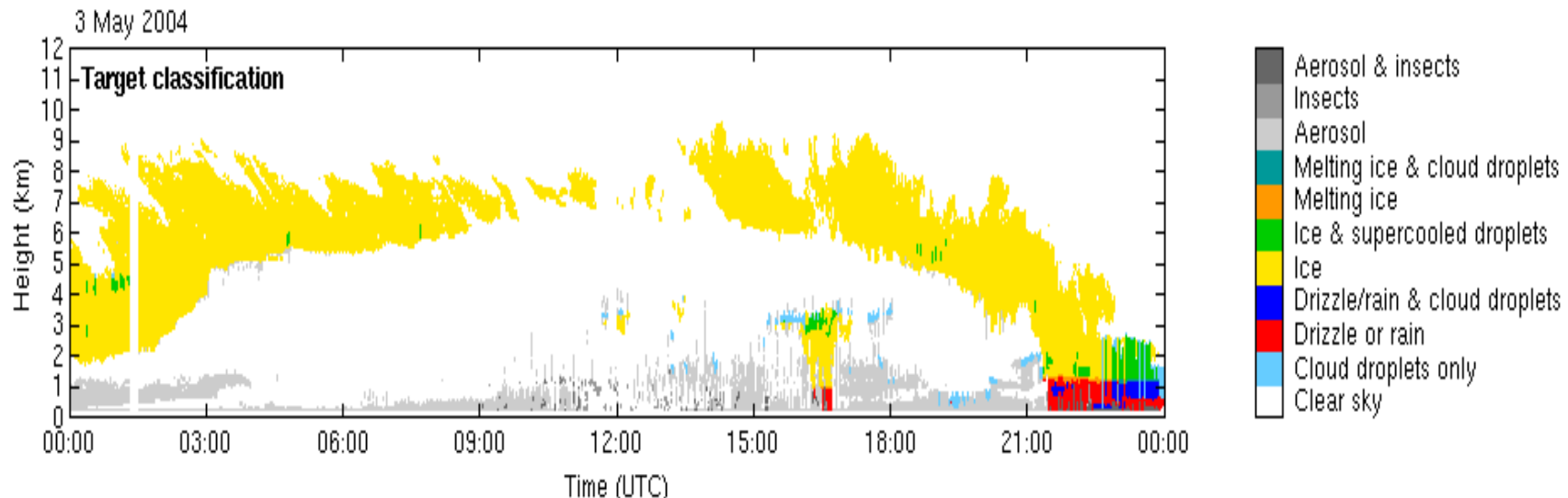


Cloud phase validation



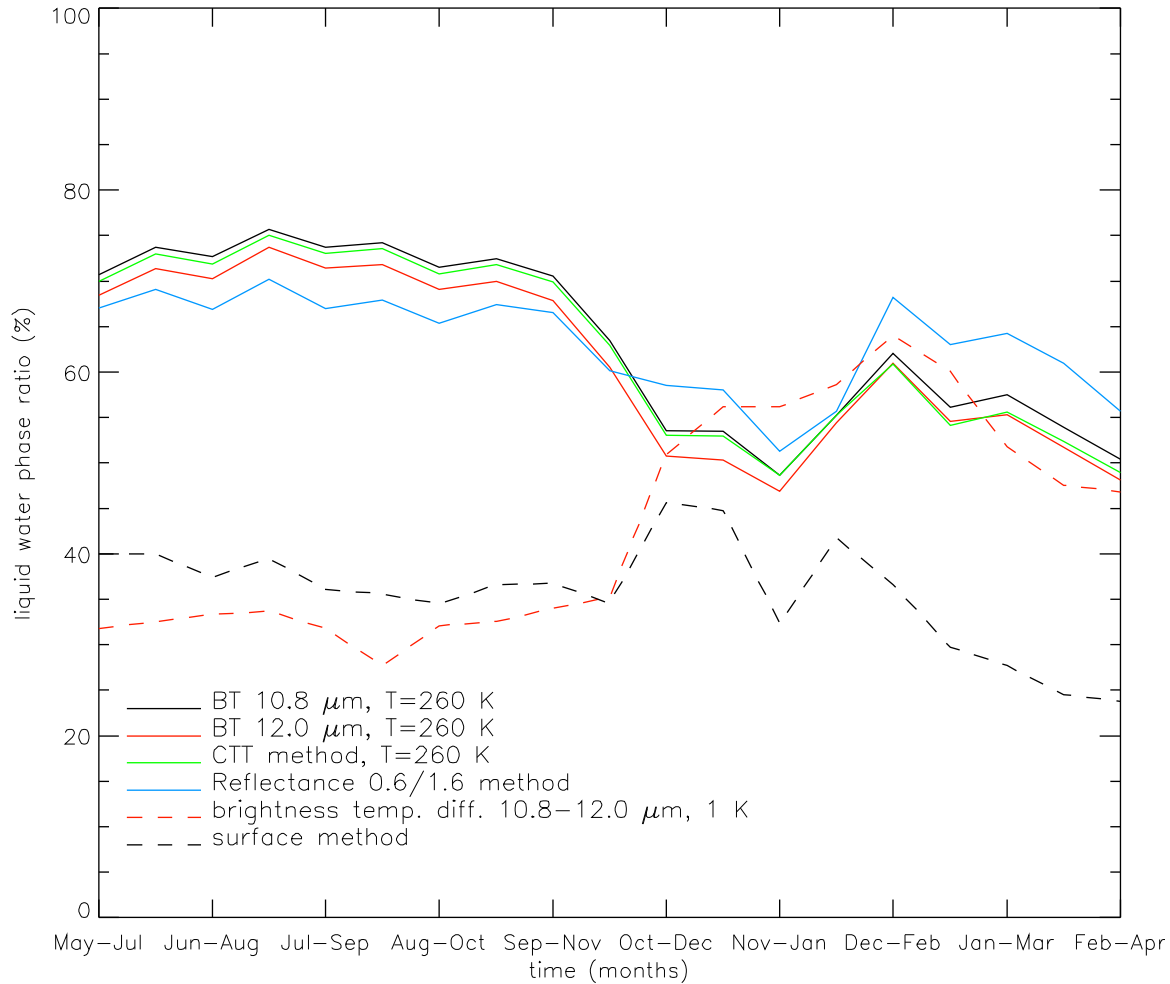
Comparison of SEVIRI and lidar/ radar (Cabauw) liquid water phase ratio for May 2004- April 2005

Seasonal and yearly averages based on daily ratio

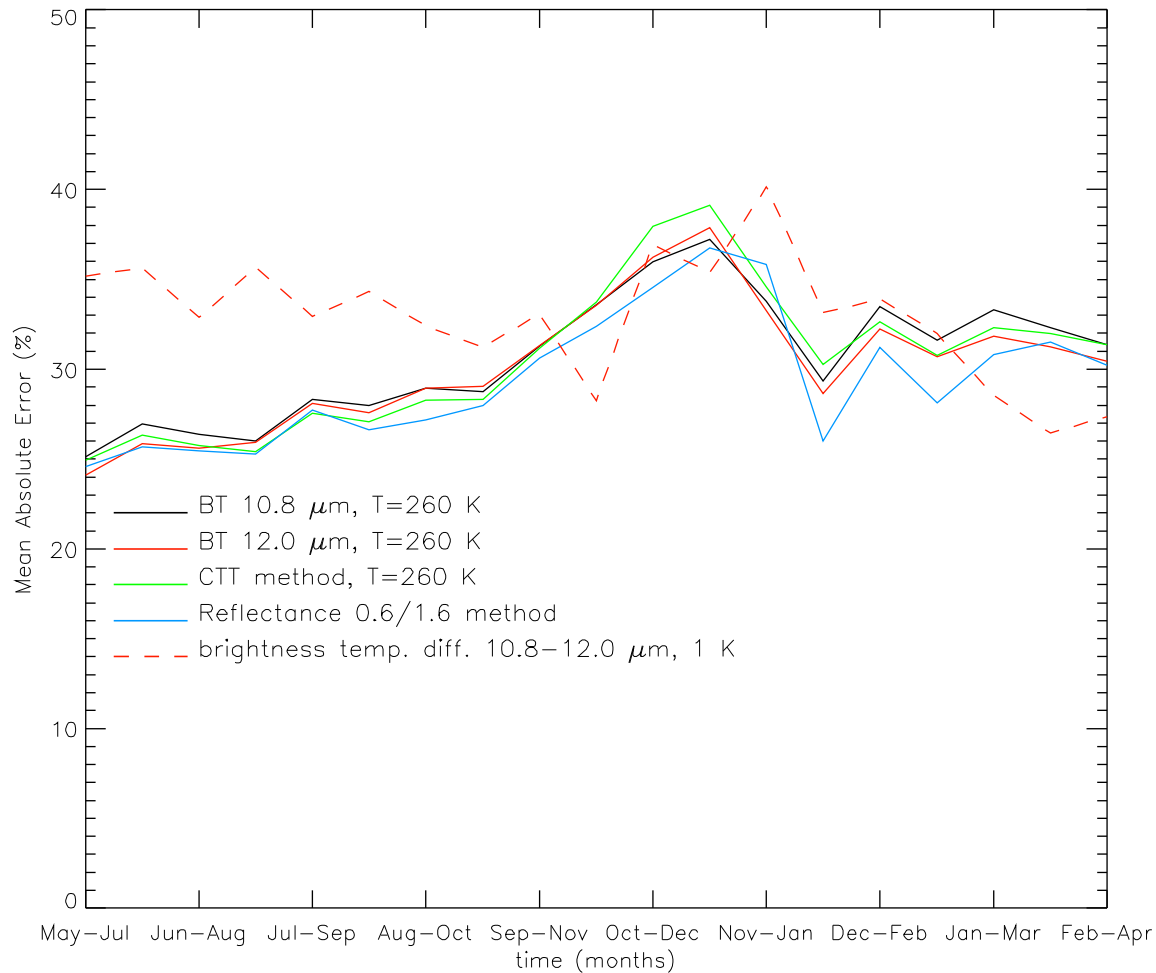




Validation results CPH



Validation – Mean Absolute Error





Results – full year



Method	Bias (%)	MAE (%)	Corr (-)
$R_{0.6/1.6}$	28.7	26.8	0.57
$BT_{10.8}$	31.6	27.6	0.54
CTT	30.7	27.5	0.55
$BT_{12.0}$	29.3	27.0	0.56
$BTD_{10.8-12.0}$	2.8	32.2	0.06

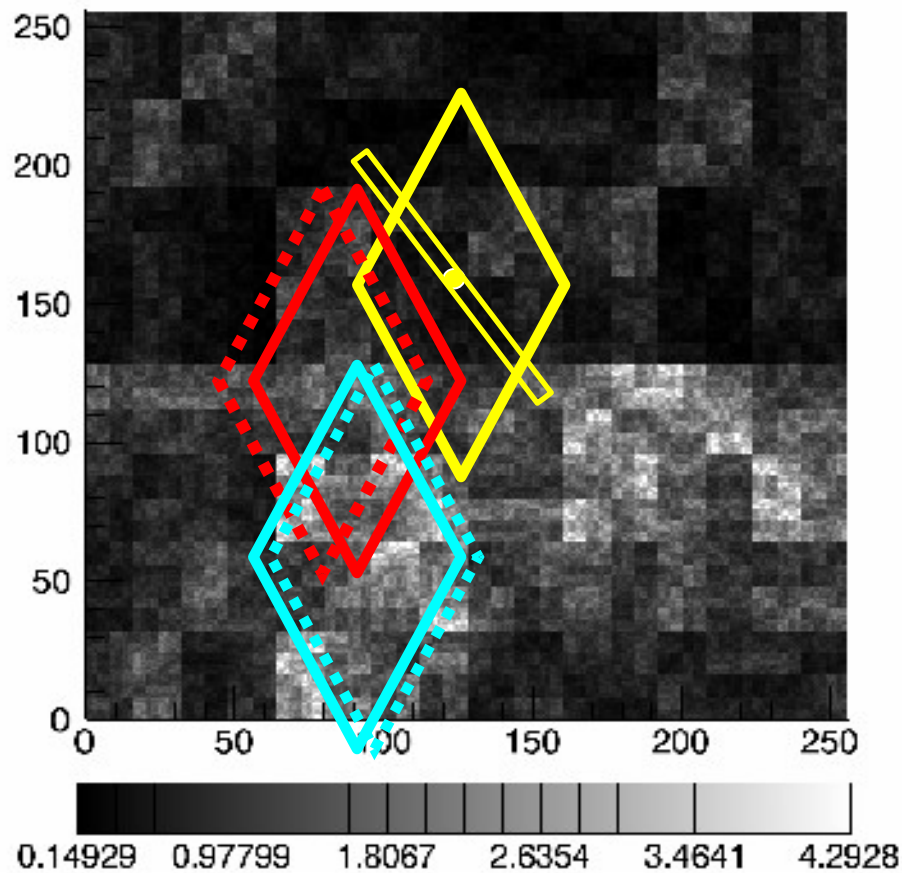


••• Inhomogeneity & observations

Quantification of error budget resulting from different types of observations (ground-based versus satellite)

Development of interpolation method to minimize these errors

••• Inhomogeneity & observations



**Offset ground site
and SEVIRI pixel
center**

**Wind
speed/ direction**

**Parallax effect due
to large viewing
angle**

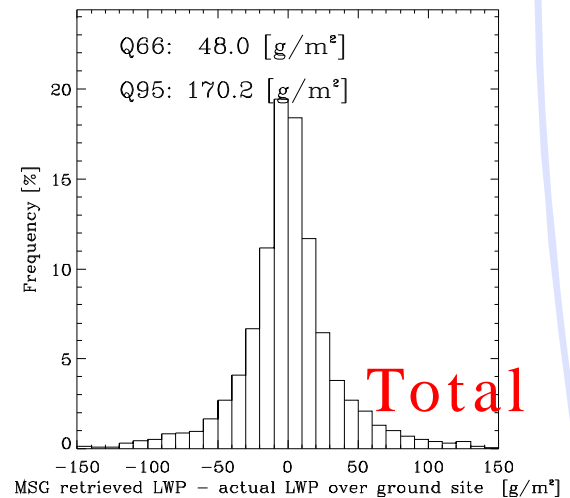
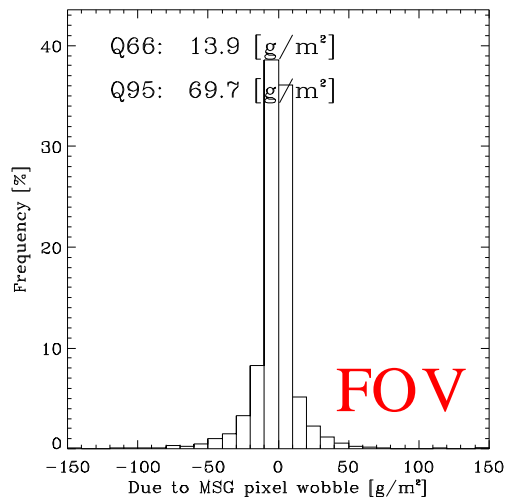
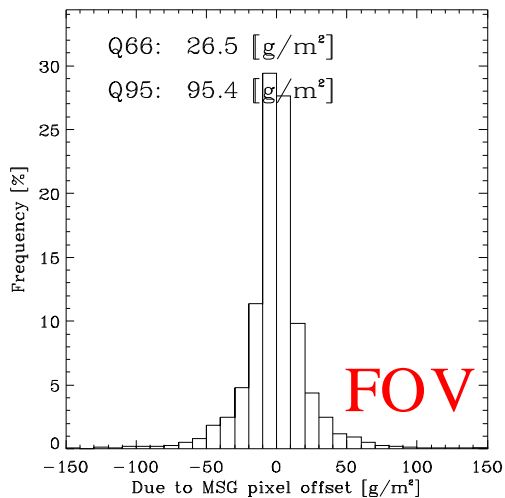
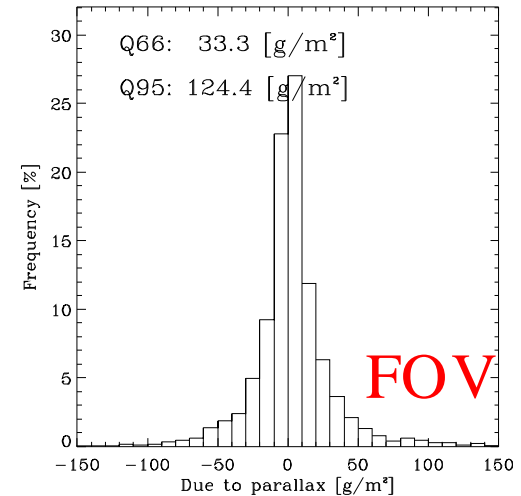
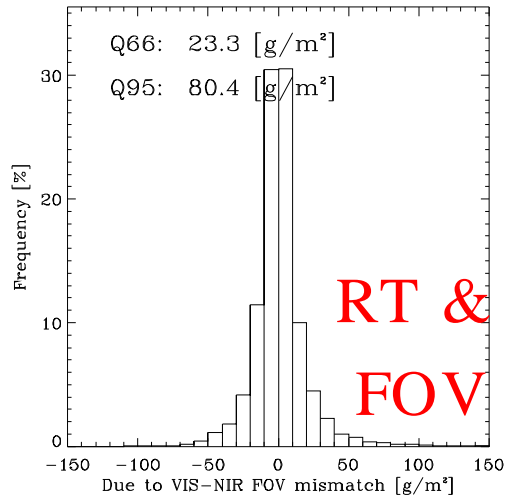
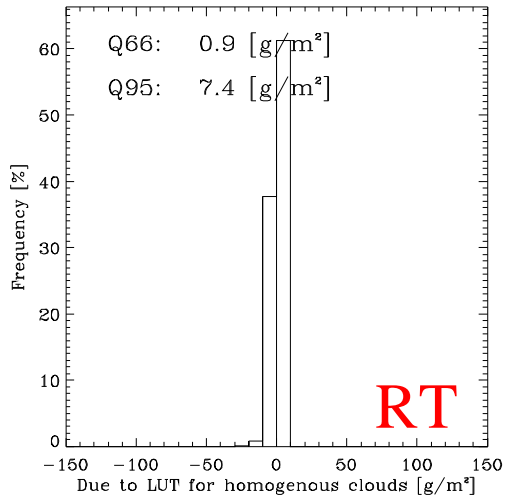
VIS/ NIR

inconsistency

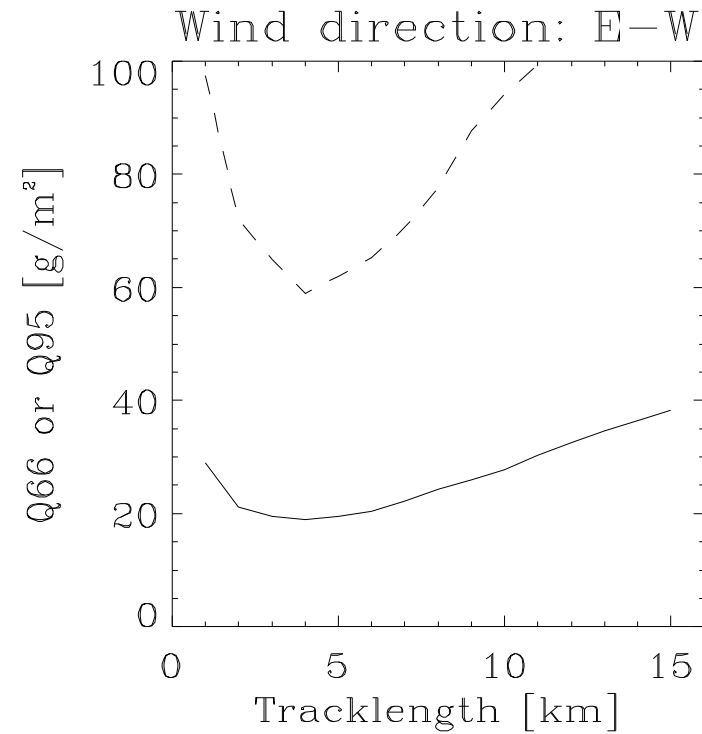
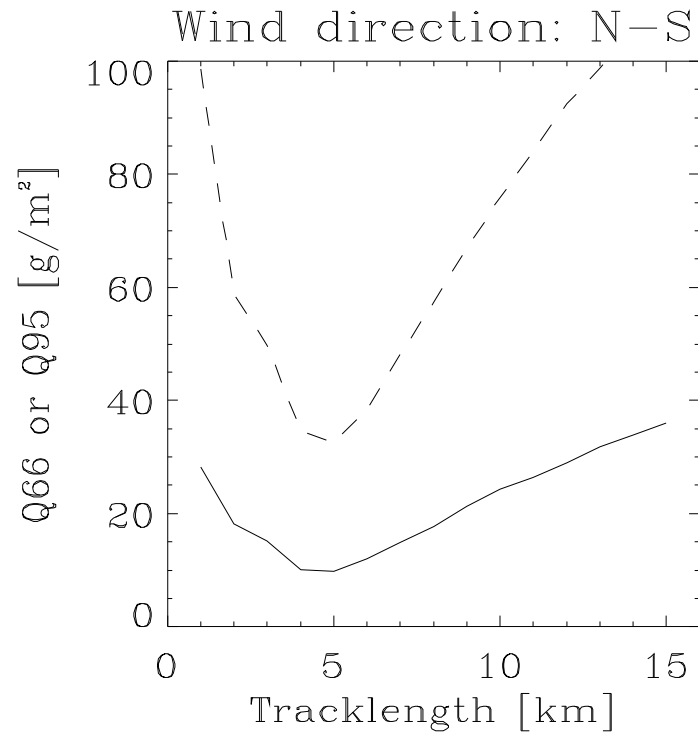
Wobbling of

enbach, 24-26 April 2006

••• Error budget for LWP validation



Optimising tracklength



***V i s i t i n g S c i e n t i s t
A c t i v i t i e s***

Visiting Scientist

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Improved retrieval of ice cloud properties



Objective

To improve the algorithms for the retrieval of Cloud Optical Thickness and Ice Water Path for ice clouds.

Status

Comparison vertical size distributions of Ping Yang crystals

Impact vertical size distribution on phase function

Reporting: completion expected in May

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Visiting Scientist

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Feasibility study aerosols retrievals^{KNMI}



Objective

To perform a feasibility and user requirement study to develop a MSG algorithm for the retrieval of aerosol optical depth over dark surfaces

Status

- *Review of existing methods, user requirements*
- *Application of HYGEOs method*
- *Comparison of preliminary results to MODIS and AERONET measurements*

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*W*o*r*k *p*l*a*n *2006-2007*



Planning 2006 - 2007

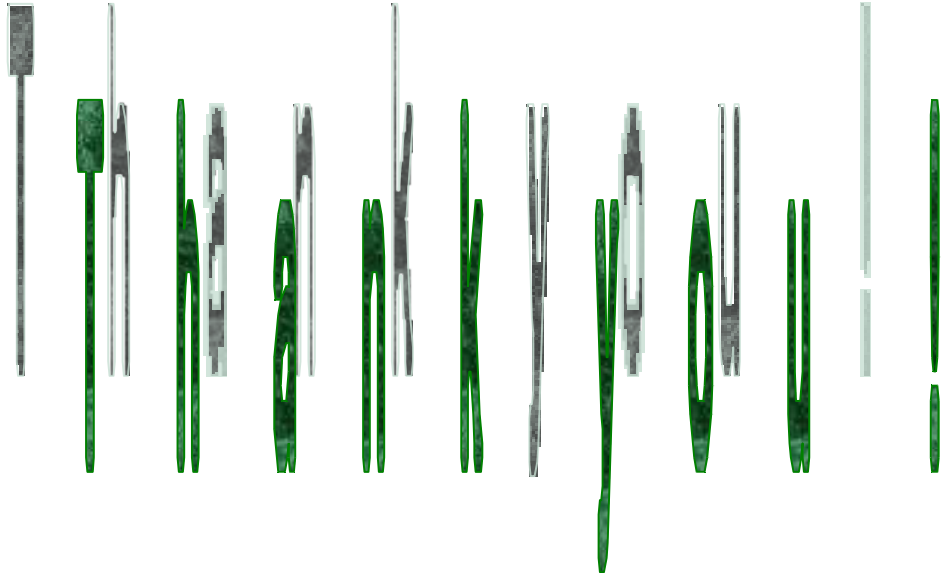
Implement line to band conversion

Analyses on development of combined CPH method using additional channels, like e.g. 3.9 and 8.7 μm

Continuation of validation error analysis

Extended validation of CPP for SEVIRI and AVHRR



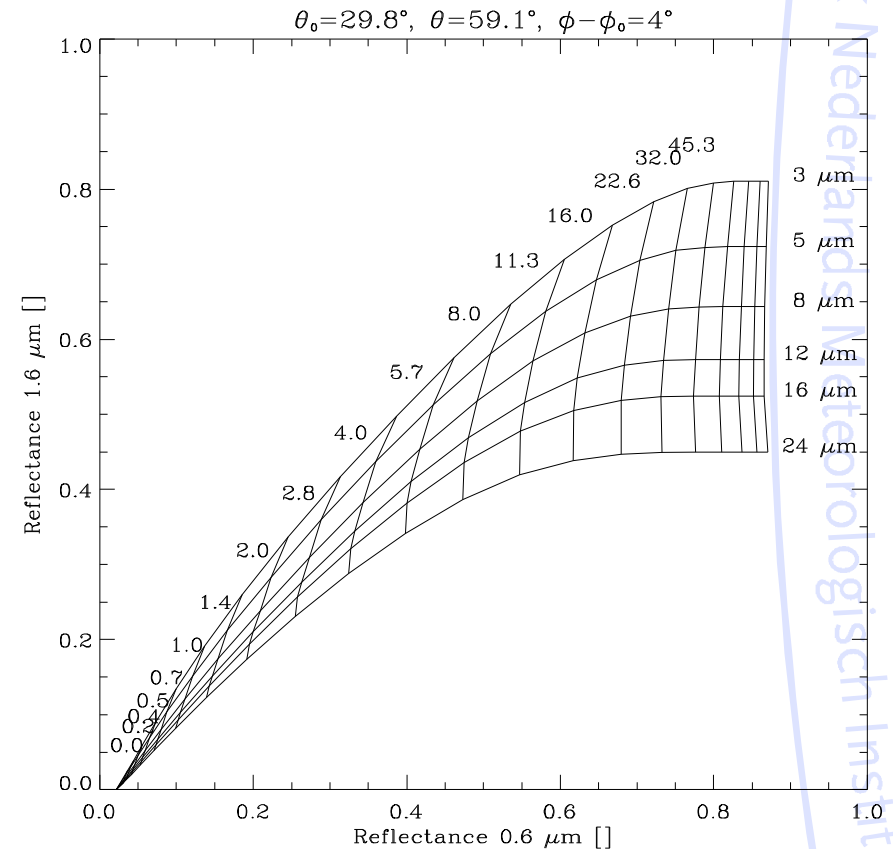




Quick & dirty radiative transfer



Independent Pixel Approximation
Radiative smoothing: 300 m
Included: plane parallel bias
Ignored: shadowing
SEVIRI LUTs
 $R_{\text{eff}} = 10 \mu\text{m}$
Chandrashekar's formula for contribution of surface reflection



Koninkrijk Nederlands Meteorologisch Instituut

