Thunderstorms on the Brazilian Horizon ISS020-E-47807, October 6, 2009

No.

# **Cloud side remote sensing** Droplet size profiles from specMACS

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### **Aerosol and Convection**



### Cloud side remote sensing

M





### From 1D Nakajima-King



#### LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN Cloud side remote sensing

### From 1D Nakajima-King



for many realistic **3D cloud side cases** 

















# 3D lookup data base

# Statistical retrieval based on forward simulations:

• Regional Atmospheric Modelling System (RAMS, Jiang an Li 2009, Feingold et al. 1996)

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- warm cumulus (RICO)
- Forward imagery from 3D RT model: 12 scenes x 4 viewing directions = 48 cases varying with varying SZA
- → lookup table: 1.5·10<sup>9</sup> radiance pairs binned by scattering angle



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# Synthetic test cases

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LMU



## Synthetic test cases

### Cloud model microphysics

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MU

**Retrieved efffective radius** 

MIN





### VIIRS data, 27 Sept. 2014

AC17 VIIRS Overpass - fRGB (17:38:00-17:43:00)



AC17 VIIRS Overpass - 11.45 µm





#### specMACS RGB and shadow mask





#### specMACS RGB and vegetation mask





#### specMACS RGB and phase detection





## **ACRIDICON case AC17**

MIN

#### specMACS RGB and effective radius retrieval





### **ACRIDICON case AC17**

M

#### specMACS RGB and effective radius retrieval



CAS-DPOL in-situ profile





#### specMACS RGB, effective radius retrieval, and altitude







First specMACS derived droplet size profile!





specMACS RGB, effective radius retrieval uncertainty due to retrievable technique and calibration uncertainty





### Summarizing

cloud side remote sensing with specMACS

LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

- → statistical microphysics retrieval combined with
- → O2A derived distance/ cloud surface orientation







### Summarizing

cloud side remote sensing with specMACS

LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

- statistical microphysics retrieval combined with
- → O2A derived distance/ cloud surface orientation

### NEXT:

- systematic comparison to in-situ cloud for ACRIDICON
- Stronger integration of cloud shape information into retrieval



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