# EUCLIPSE

## EU Cloud Intercomparison, Process Study and Evaluation Project


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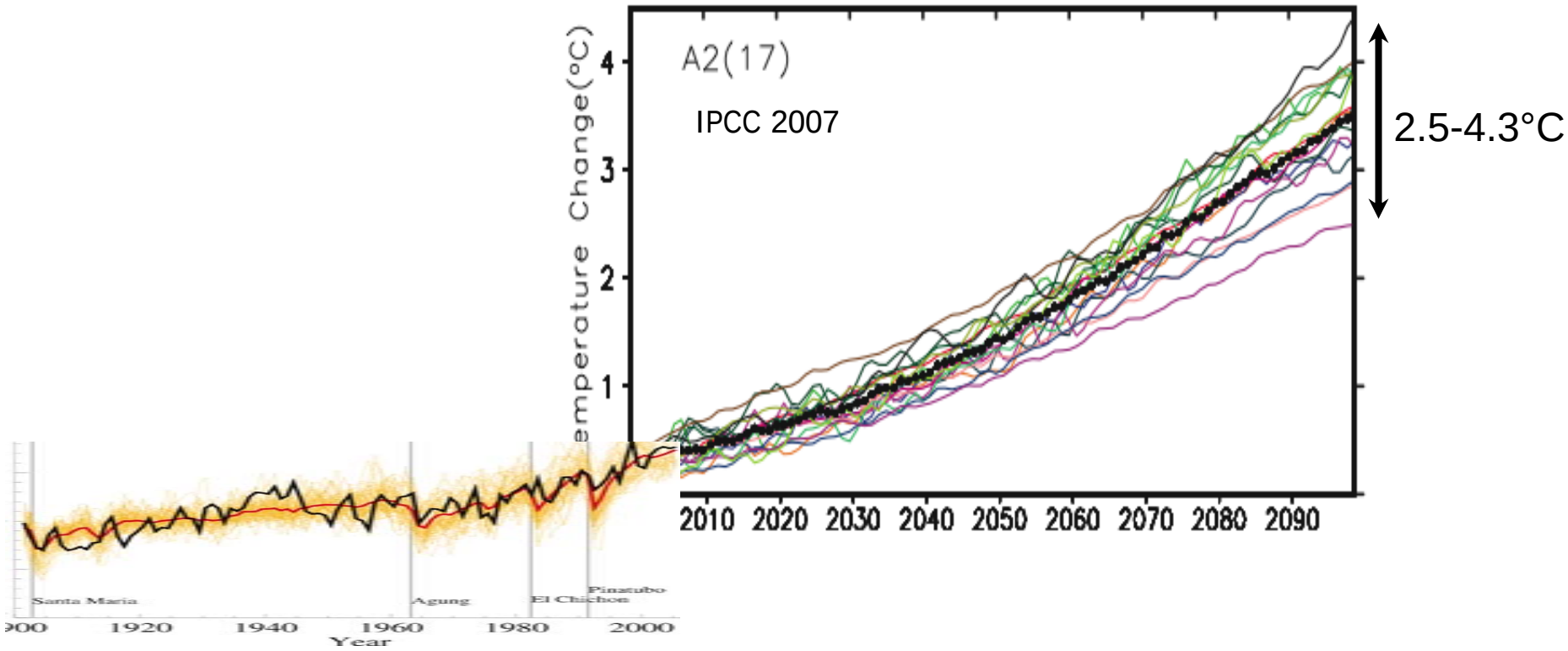
# Logon to wifi: works for some

- Network eduroam
- User name kouch101@soliscom.uu.nl
- Password: Gisteren2010
- Accept the certificate

# Uncertainties in Future Climate model Predictions



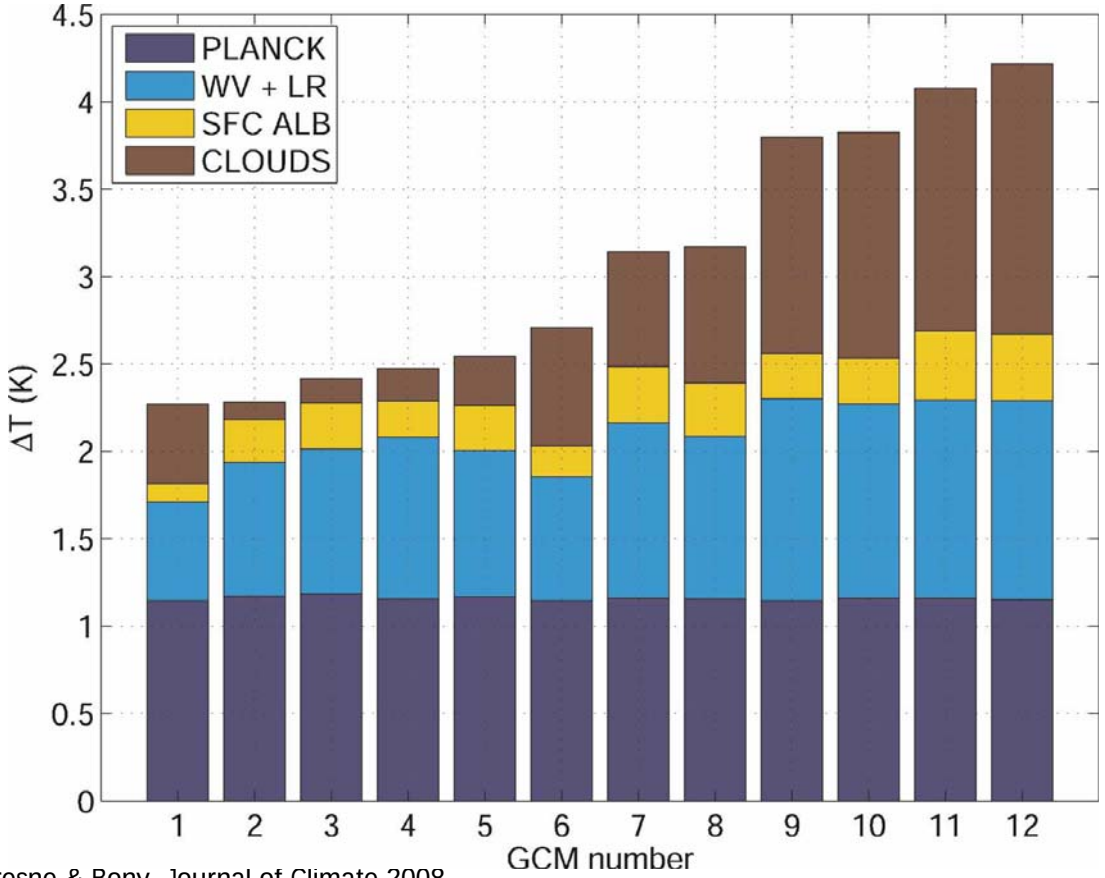

1900

Past

Present

Future

# $2XCO_2$ Scenario for 12 Climate Models




Dufresne & Bony, Journal of Climate 2008

Cloud feedback

Surface albedo feedback

Water vapor feedback

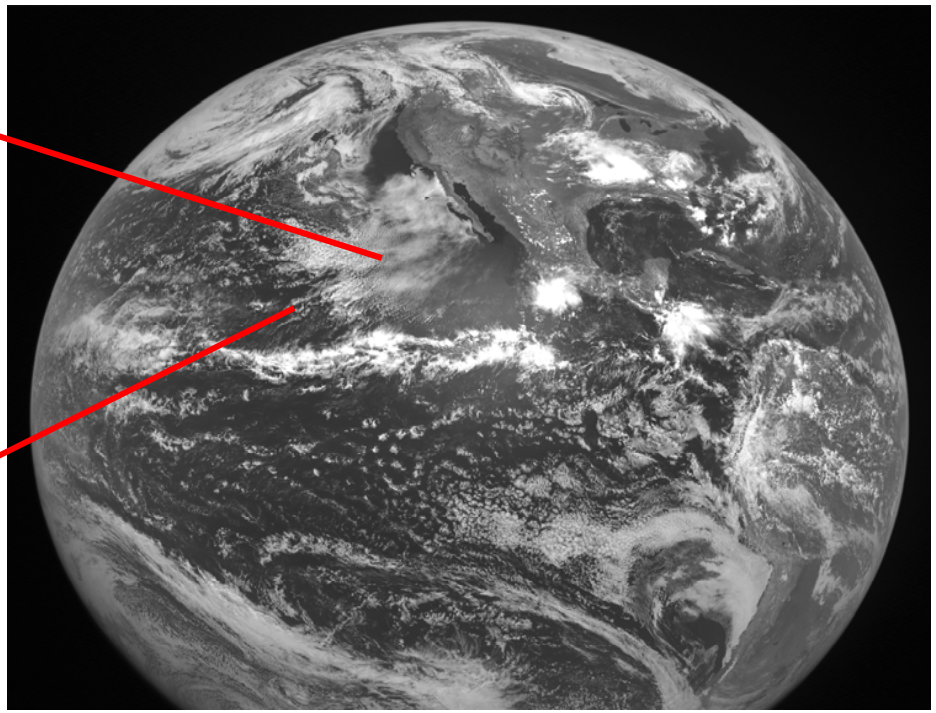
Radiative effects only

*Cloud effects "remain the largest source of uncertainty" in model based estimates of climate sensitivity* IPCC 2007

# Primarily due to marine low clouds

Stratocumulus

Shallow cumulus



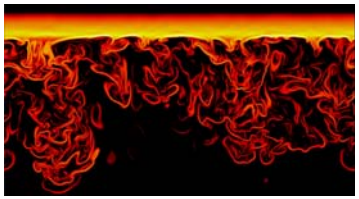
"Marine boundary layer clouds are at the heart of tropical cloud feedback uncertainties in climate models"

(Bony Dufresne GRL)

# EUCLIPSE OBJECTIVES

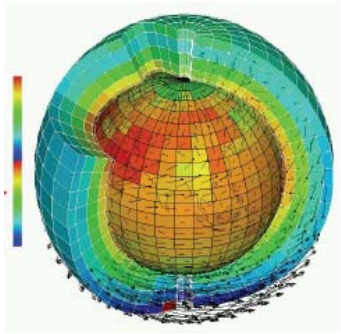

1. Evaluate cloud-related processes in ESM's through integration of the latest data sets, LES techniques and new process-oriented diagnostic techniques
2. Develop physical understanding of how these cloud-related processes respond and feedback to climate change.
3. Developing metrics to measure the relative credibility of the cloud feedbacks produced by the different ESM's thereby demonstrating a reduction of the uncertainty in model-based estimates of climate change.
4. Improve the Parameterizations of cloud-related processes in the current ESM's

# Combine all tools and Research Communities

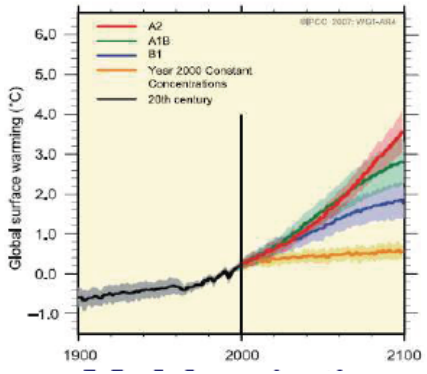


Direct Numerical Simulation

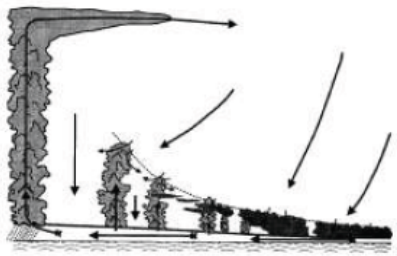
Large Eddy Simulation



Climate Models




Model Projections



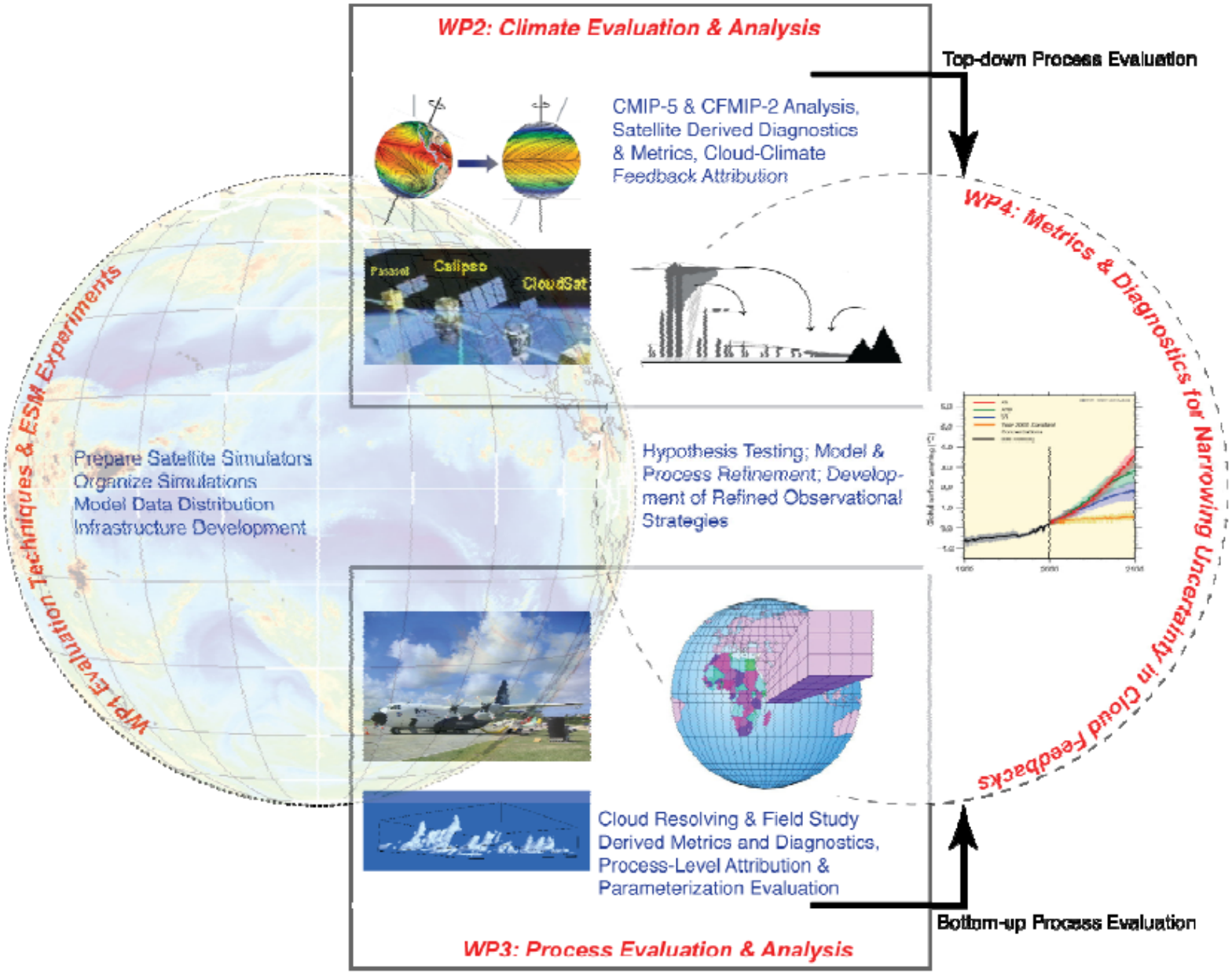
Field Campaigns

Instrumented Sites

Global Observational Data sets

Analysis & Understanding cloud feedbacks

# Break up of the Work



# Involved Institutes

**List of Participants:**

| Number | Short name | Participant organisation name | Country |
|---|---|---|---|
| 1 (Coord.) | KNMI | Royal Netherlands Meteorological Institute | NL |
| 2 | MPG | Max Planck Institute for Meteorology | DE |
| 3 | METO | Met Office | UK |
| 4 | IPSL | Centre National de la Recherche Scientifique - Institute Pierre Simon Laplace | FR |
| 5 | AA | Academy of Athens | GR |
| 6 | ECMWF | European Centre of Medium Range Weather Forecasts | UK |
| 7 | TUD | Delft University of Technology | NL |
| 8 | MF-CNRM | Météo-France - Centre National de Recherches Météorologiques | FR |
| 9 | SU | University of Stockholm | SE |
| 10 | ETHZ | Eidgenössische Technische Hochschule Zürich | CH |
| 11 | UW | University of Warsaw | PL |
| 12 | JPL | Jet Propulsion Laboratory | USA |
| 13 | DKRZ | German High Performance Computing Centre for Climate- and Earth System Research | DE |

# Participating Models

| Responsible Institute | ESM | LES |
|---|---|---|
| MPG/ETH | (M1) ECHAM-5 | UCLA-LES |
| ECMWF/KNMI | (M2) EC-EARTH | |
| CNRS-IPSL | (M3) IPSL-ESM | |
| METO | (M4) HadGEM2-ES | UKMO-LES |
| MF-CNRM | (M5) Arpege | |
| TUD | | DALES |
| WU | | EULAG |

# WP1: Evaluation techniques and climate model experiments

Led by: George Tselioudis (Athens)

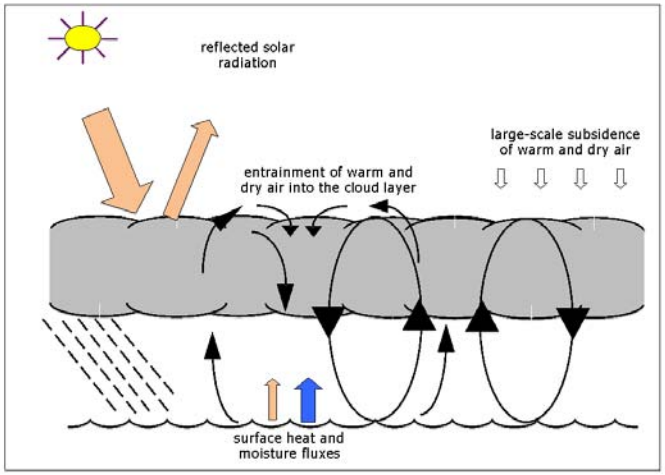
1. Development in implementation of COSP (simulators) in the participating ESM's
2. CALIPSO and PARASOL GCM-oriented observational products
3. Execution of the agreed CMIP5 runs
4. Dissemination of the agreed model output in the WDCC database2

# WP3: Process Evaluation Analysis

Led by: Stephan de Roode (TU Delft)

1. Evaluation of BL-clouds processes with LES and observations
2. Response of BL-clouds for future climate conditions
3. Analysis of ESM results (free and in NWP mode) and comparisons to observations at selected locations

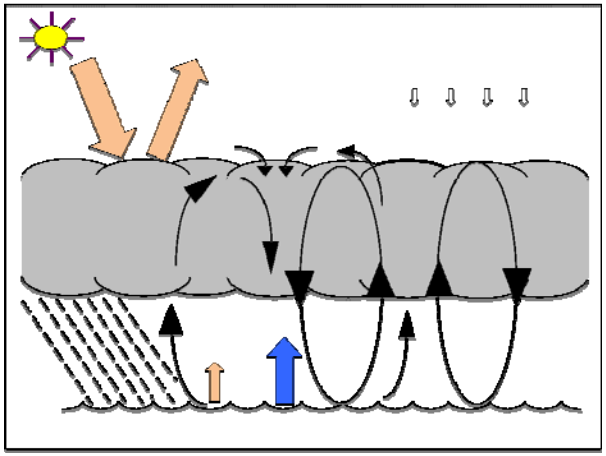
# CGILS



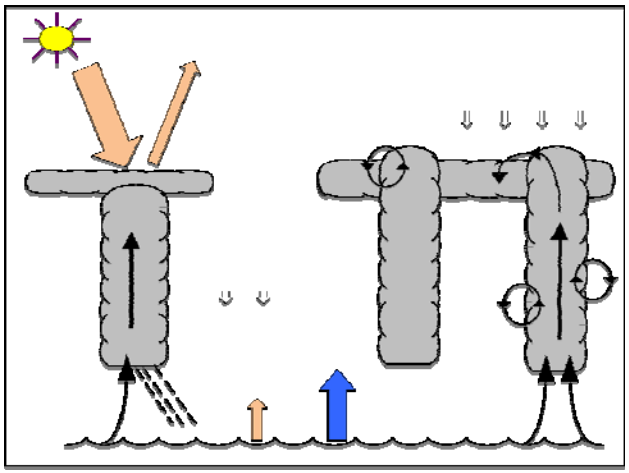

Sea water temperature: T

Present

?



negative Feedback?



Positive Feedback?

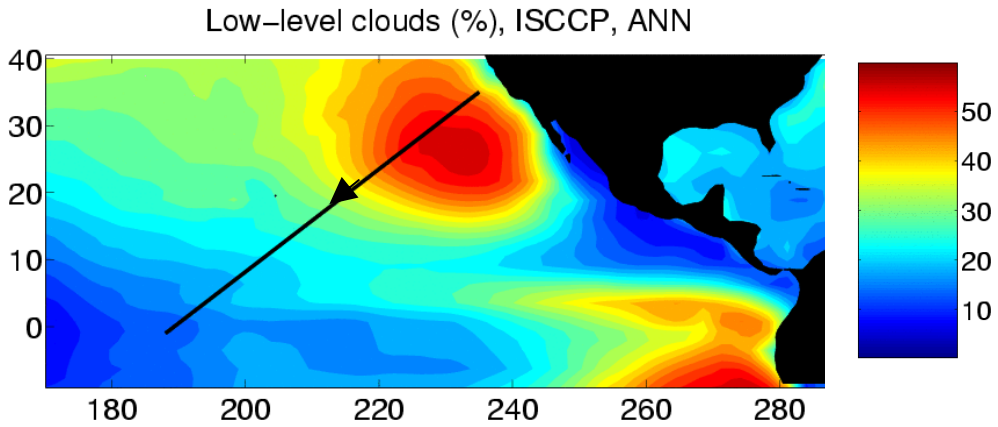
Sea water temperature: T+ΔT

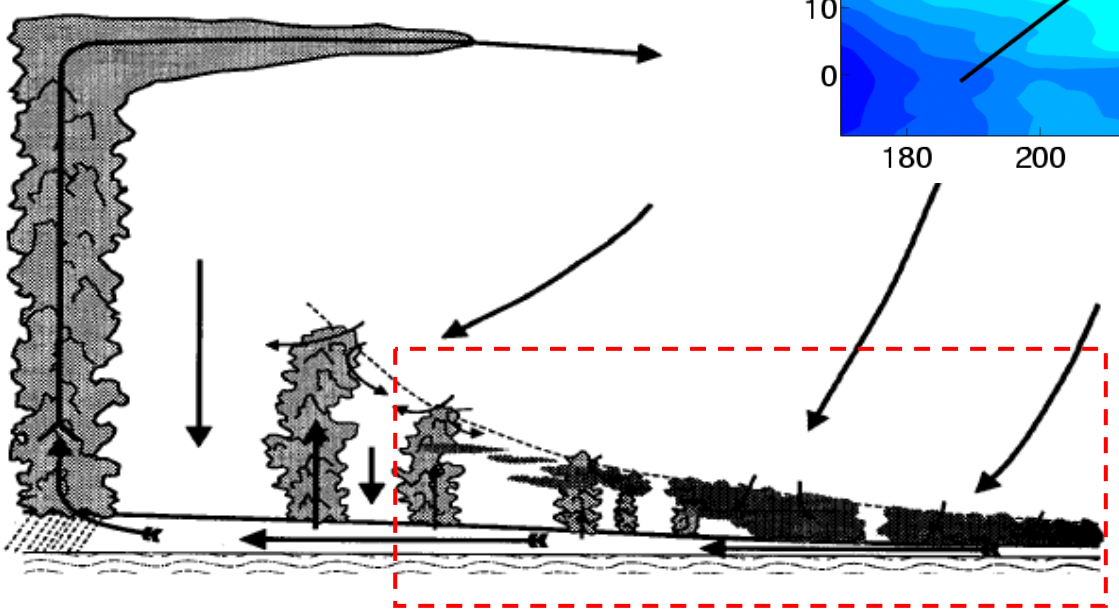
Future

# Transition Stratocumulus to Cumulus

Irina Sandu (composite transtions)

Stephan de Roode (ASTE transition)

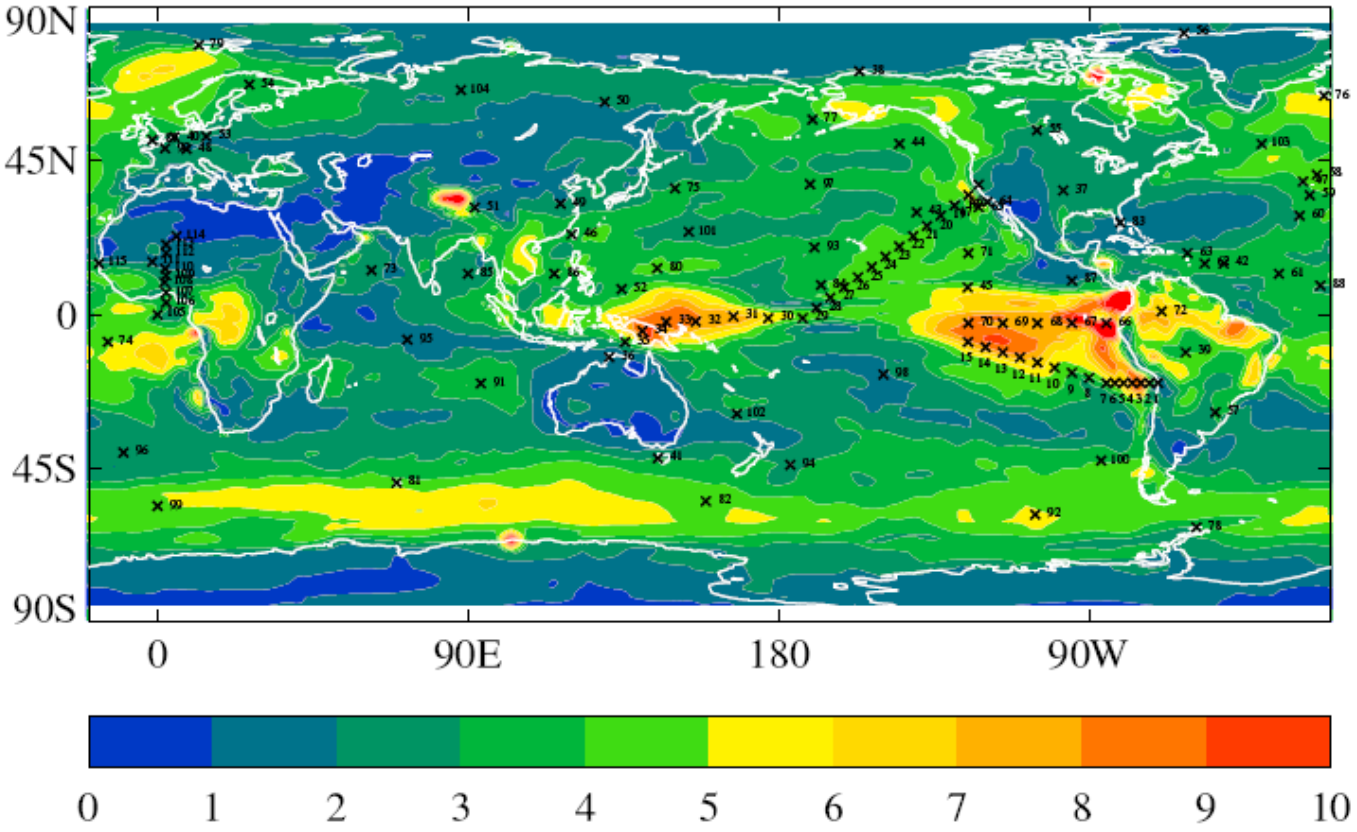


Warm sea water Cold sea water

← time

# Analysis at selected gridpoints



# WP2: Climate Model Evaluation and Analysis

Led by: Sandrine Bony (IPSL)

1. Evaluate Clouds , precipitation and radiation by climate and NWP models, point out systematic and compensating errors and develop metrics.
2. How do simulations of cloud processes influence the current climate
3. Quantify and interpret intermodel spread of climate simulations in future climate

Including : cloud-aerosol evaluations (Lohmann, Quaas)

polar clouds (Svenson), (tropical) precipitation, ENSO, temperature extremes in Europe, deep convection.

# WP4: Metrics and diagnostics for narrowing uncertainties in cloud climate feedback

Led by: Bjorn Stevens (MPI Hamburg)

1. Develop and testing hypotheses to explain inter-model spread in cloud feedback and climate sensitivity in climate models.

Extra: NWP related activities to identify cloud representation biases:

Initial tendency techniques (ECMWF)

Transpose-AMIP type of experiments.

model experiments nudged to reanalysis data.

# Why are we here now?

- To get to know each other.
- To present the excellent science we want to put forward.
- To assess and discuss the progress in WP1 and WP3.
- To further design group efforts.
- To assure synthesis between the working packages

# Final Practicalities

- Next Annual General Assembly :
  - June 6-10 2011, Met Office Exeter UK

• However, keep interacting and (video)-meet with each other in the mean time!!

• Financial and adminstrative issues: Jeroen Sassen ( sassen@knmi.nl ).

• For all practical and organisational issues: Karin van der Schaft ( schaftvd@knmi.nl ).

•Newsletter.

•Reports on deliverables and milestones.

•Website (www.euclipse.eu): Karin vd Schaft & Frank Selten ( selten@knmi.nl)

•Dinner tonight!