
Intercomparison Study of GCM
simulations over the North-East Pacific
Ocean; Case Description

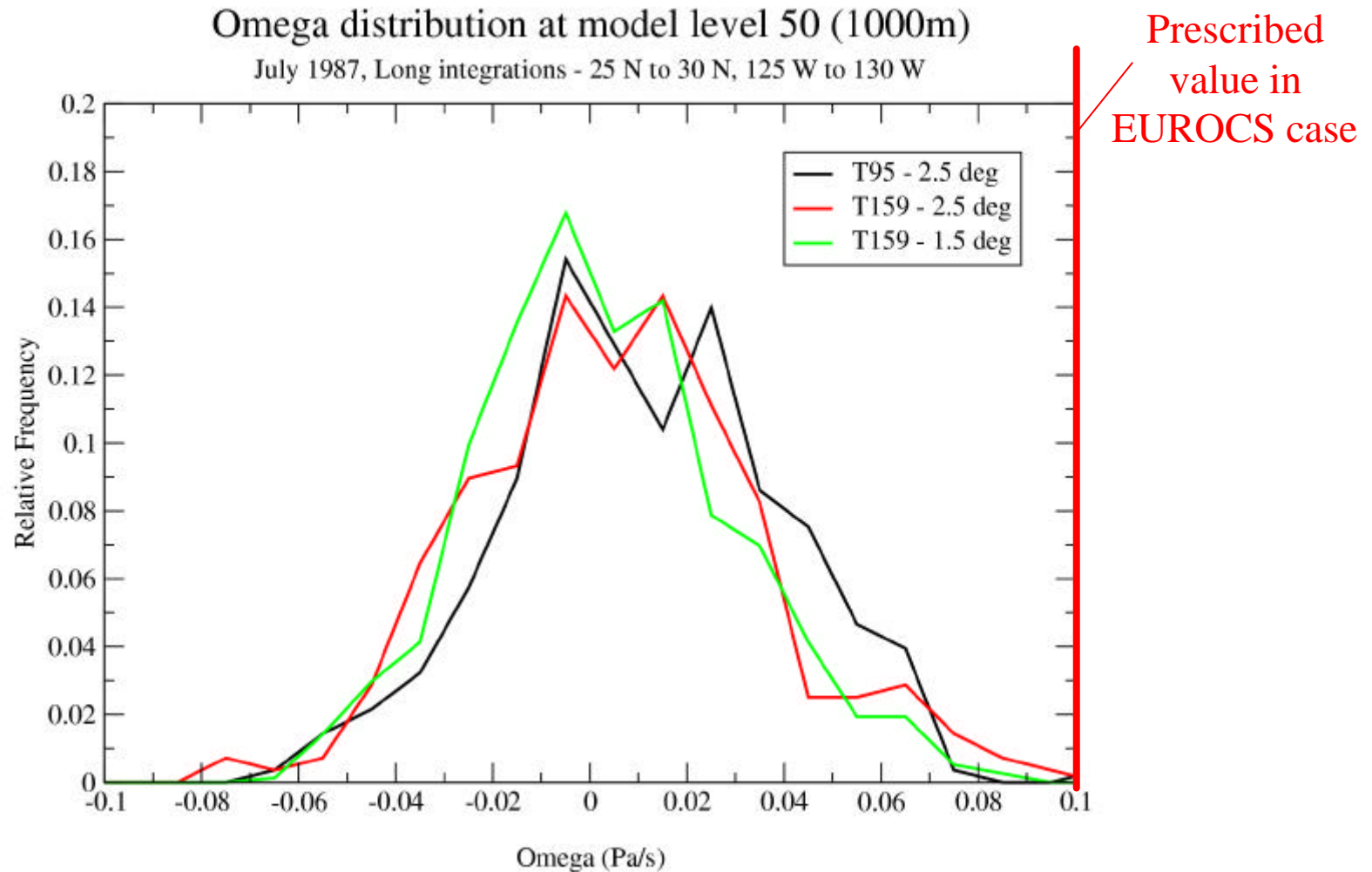
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Motivation

- We want to include **full GCMs** in the GCSS/EUROCS framework.
- **Why?**
 - SCM/CRM simulations have **limitations**:
 - there are only **few cases**
 - we know little about their **representativeness**

Vertical velocity in stratocumulus region in ECMWF model



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- **Why?**
 - SCM/CRM simulations have **limitations**:
 - there are only **few cases**
 - we know little about their **representativeness**
 - the important **feedback of the physics to the dynamics** is absent
- Therefore **good parametrizations can give bad results** and vice versa.
- **Errors in different parts of the model** contribute to the total error.
- Hence, we propose to compare GCM simulation along a **prescribed cross section representing the Sc to Cu to Cb transition.**

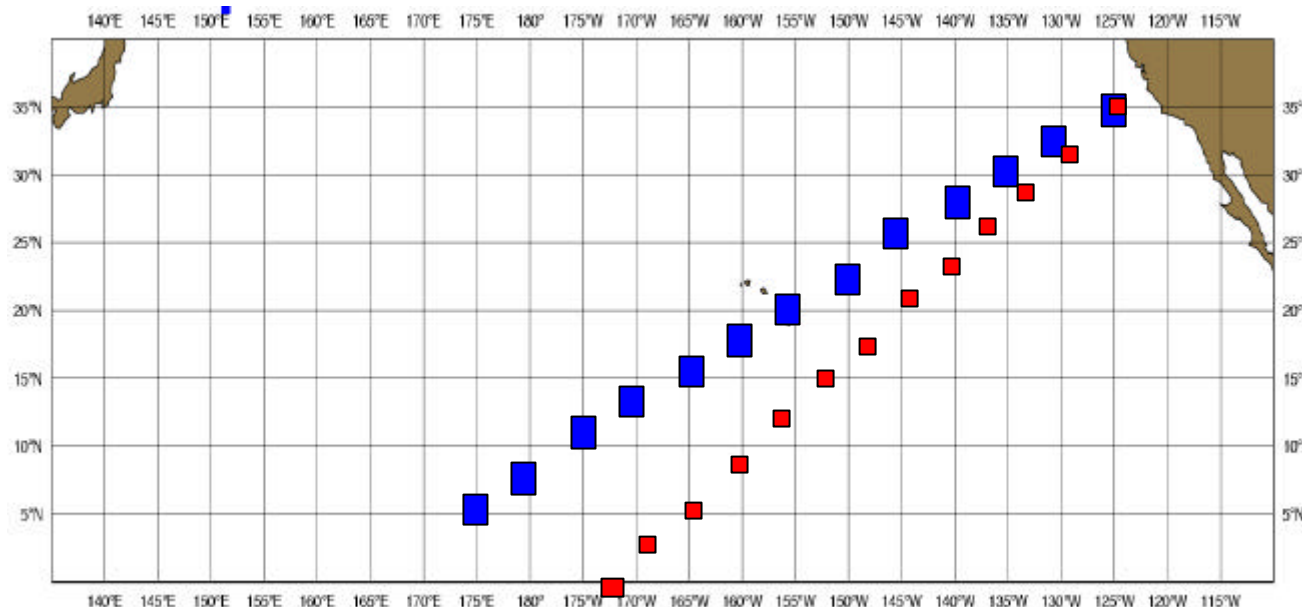
What do we want modelers to provide ?

- **Monthly means for June, July, August 1998**
- **Monthly means for the daily hours 0, 3, 6, 9, 12, 15, 18, 21 UTC.**
 - So for each of these hours 3 separate monthly means (June, July, August) are requested. This way we will gain some insight in the monthly mean averaged diurnal cycle. So for each variable this implies that there are 24 data sets.
 - If you cannot provide 3 hourly monthly means, please do provide 6 hourly data, I.e. 0,6,12,18 UTC.
 - you are free to choose how to create that data, but you are encouraged to do a climate run
 - Everybody can submit more than one result if they wish to do so (e.g., 1-day and 5-day forecasts, forecasts and climate runs, different model versions ...) but again it would be nice if we would have as a baseline from everyone at least one climate run.

What do we want modelers to provide ?

In view of the problems we have encountered with the diagonal crossing of Hawaii, we kindly request an additional diagonal:

1. The original diagonal (diagonal 1). This data should be provided at 13 locations starting at 35 N, 125 W and moving southwestwards at 5 deg longitude and 2.5 deg latitude steps until 5N, 175 E (see Figure with blue squares below)
2. A second diagonal (diagonal 2). This data should be provided at 13 locations starting at 35 N, 125 W and moving southwestwards at 4 deg longitude and 3 deg latitude steps until 1S, 172 W (see Figure with red squares below)



What do we want modelers to provide (1)?

- Vertical profiles as a function of pressure:
 - File format: ASCII files, 1 file per parameter, Line format: 13(1x,E14.6)
 - File layout: Lines: Levels from top to bottom; Columns 1 to 13: Points from 35 N, 125 W onwards
 - Parameters:
 - Pressure (hPa) - `cross_press_month_hour_diagonal.ascii`
 - Potential temperature (K) - `cross_theta_month_hour_diagonal.ascii`
 - Specific humidity (kg/kg) - `cross_q_month_hour_diagonal.ascii`
 - Relative humidity (%) - `cross_rh_month_hour_diagonal.ascii`
 - Zonal wind (m/s) - `cross_u_month_hour_diagonal.ascii`
 - Meridional wind (m/s) - `cross_v_month_hour_diagonal.ascii`
 - Vertical velocity (Pa/s) - `cross_w_month_hour_diagonal.ascii`
 - Cloud cover (%) - `cross_cc_month_hour_diagonal.ascii`
 - Specific cloud liquid water content (kg/kg) - `cross_clwc_month_hour_diagonal.ascii`
 - Specific cloud ice water content (kg/kg) - `cross_ciwc_month_hour_diagonal.ascii`

Where month = {june,july,august}, hour={00,03,06,09,12,15,18,21} and diagonal={1,2}

(So `cross_cc_july_09_1.ascii` contains the July monthly mean cloud cover of 9UTC for the first (original) diagonal.)
- If possible provide the data at your full vertical resolution, i.e., on model levels.

What do we want modelers to provide (2)?

- “Single level” parameters :

 - File format: ASCII file, For all parameters: Filename= `single_level_data`
`_month_hour_diagonal.ascii` where `month = {june,july,august}` and
`hour = {00,03,06,09,12,15,18,21}`, `diagonal = {1,2}` Line format: 13(1x,E14.6)
 - File layout: Lines: 1 parameter per line in the order below, Columns: Column 1 to 13: Points from 35 N, to Southwest onwards
 - Parameters:
 - Sea surface temperature (SST)
 - Outgoing longwave radiation (W/m^2)
 - Surface downward longwave radiation (W/m^2)
 - Net shortwave radiation at the top of the atmosphere (W/m^2)
 - Surface downward shortwave radiation (W/m^2)
 - Surface latent heat flux (W/m^2)
 - Surface sensible heat flux (W/m^2)
 - Total cloud cover (%)
 - Total column water vapour (kg/m^2)
 - Liquid water path (kg/m^2)
 - Ice water path (kg/m^2)
 - Convective precipitation (mm/d)
 - Stratiform precipitation (mm/d)
 - Cloud radiative forcing (shortwave)(W/m^2)
 - Cloud radiative forcing (longwave) (W/m^2)

What do we want modelers to provide (3)?

Optional:

Participants are also kindly asked to send in 2D-datasets for the single level fields for the same monthly means of 0,3,6,9,12,15,18,21hr UTC of a rectangular that includes the 2 diagonals.

Please do send it in GRIB (preferably) or otherwise in netcdf

Why so few parameters ?

- The parameters we want you to provide constitute only a small set.
- The study is aimed to initiate the some thinking about how to include the GCM as a whole into the EUROCS/GCSS framework.
- We are not aiming for completeness at this stage, but want to review the state of affairs.

Where to send the data?

- All files per case should be packed into a zip-archive indicating your name, institute and the model version (feel free to use your internal magic code names for those) and integration type. Also included should be a “readme”-file giving more details on the type of integration etc.
 - Example:
 - I run 31 1-day forecast using the operational ECMWF model and average them up. My file could then be called: `cjakob_ecmwf_operational_1dfc.zip`
- The files should be attached to an email and send to Geert Lenderink (lenderink@knmi.nl) and to Pier Siebesma: siebesma@knmi.nl

What will we do with the data sent in?

- We will intercompare the models.
- Where available we will compare model results to data and to analyses from NWP centres.
- We will try and investigate some simple science questions (that is all that we can do with this data).
 - Examples:
 - Do models with similar cloud properties (cover, condensate content) give similar radiation?
 - Does vertical velocity affect cloud properties the same way in all models?
 - Is the influence of mean inversion strength at the top of the convective BL on cloud properties similar in the different models?