ASTEX case: SCM preliminary results

S. Dal Gesso, R. Neggers, P. Siebesma

KNMI, Royal Netherlands Meteorological Institute

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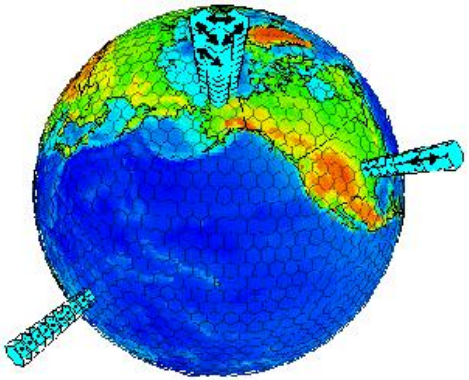
- conclusions.

Brief description of the experiment



SCM version of regional climate model RACMO

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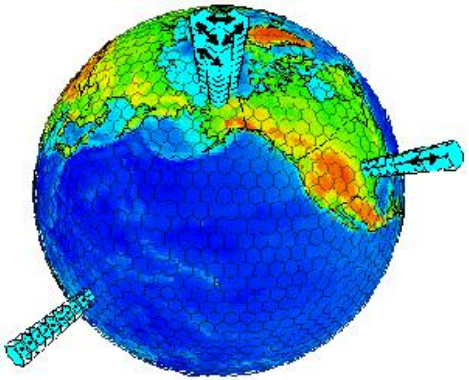

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- $\Delta t = 300$ s;

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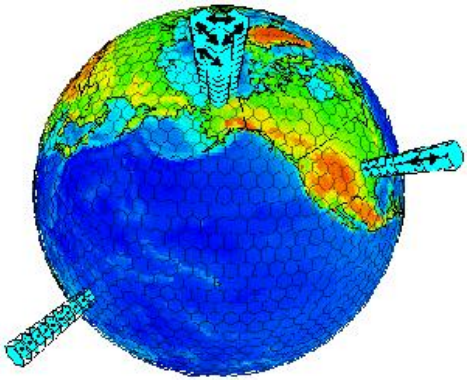

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- $\Delta t = 300$ s;
- standard vertical grid levels (L91);

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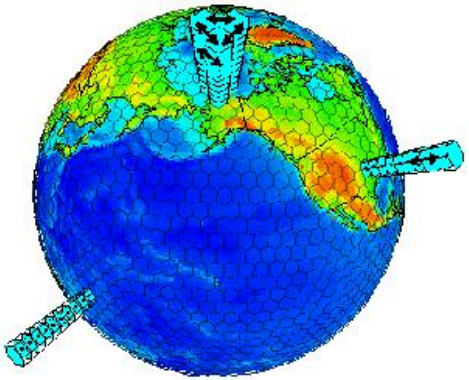

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- $\Delta t = 300$ s;
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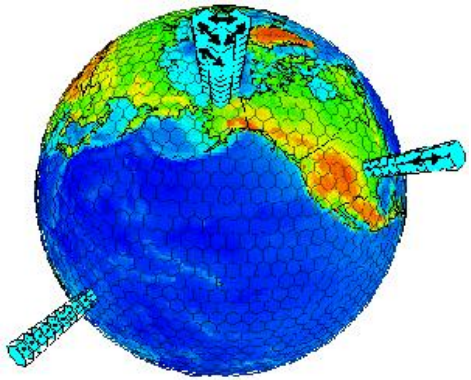
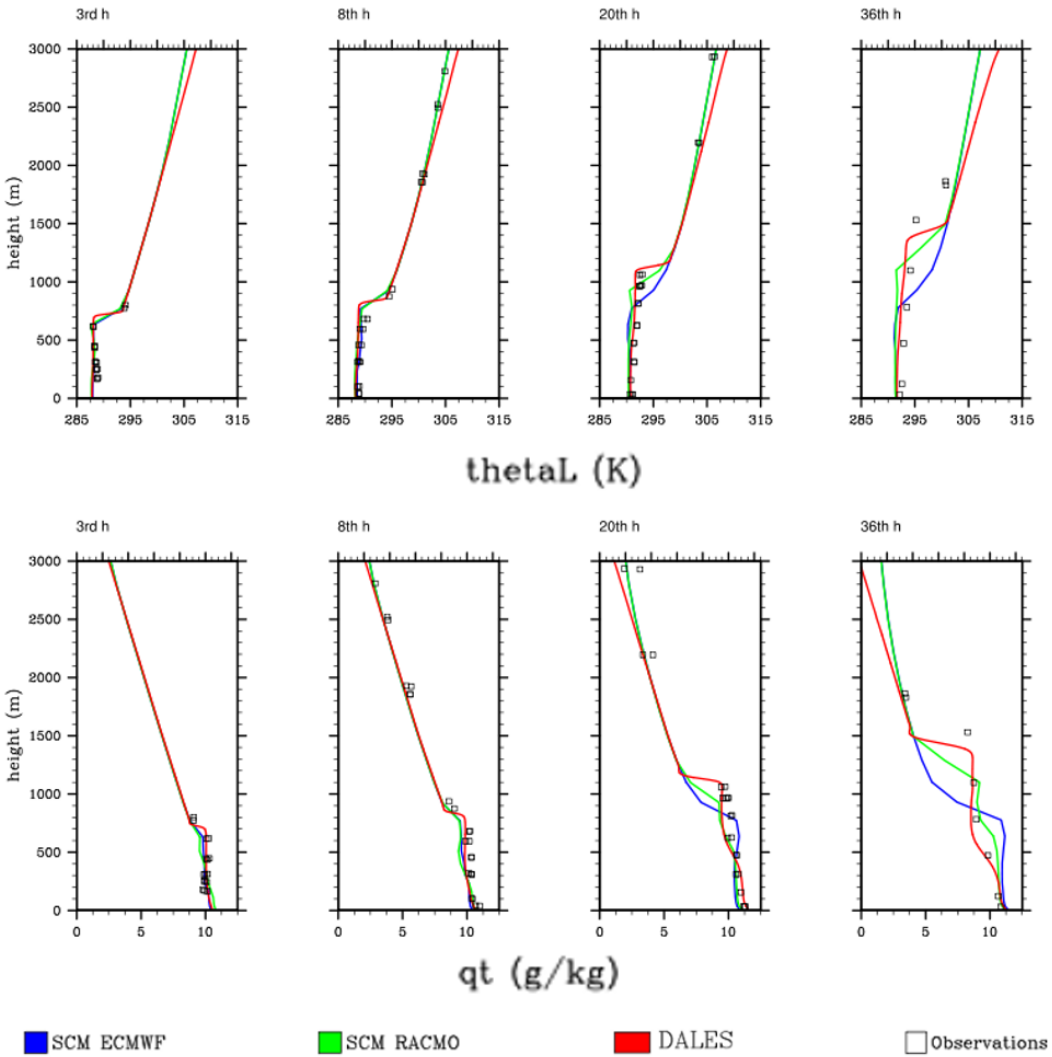


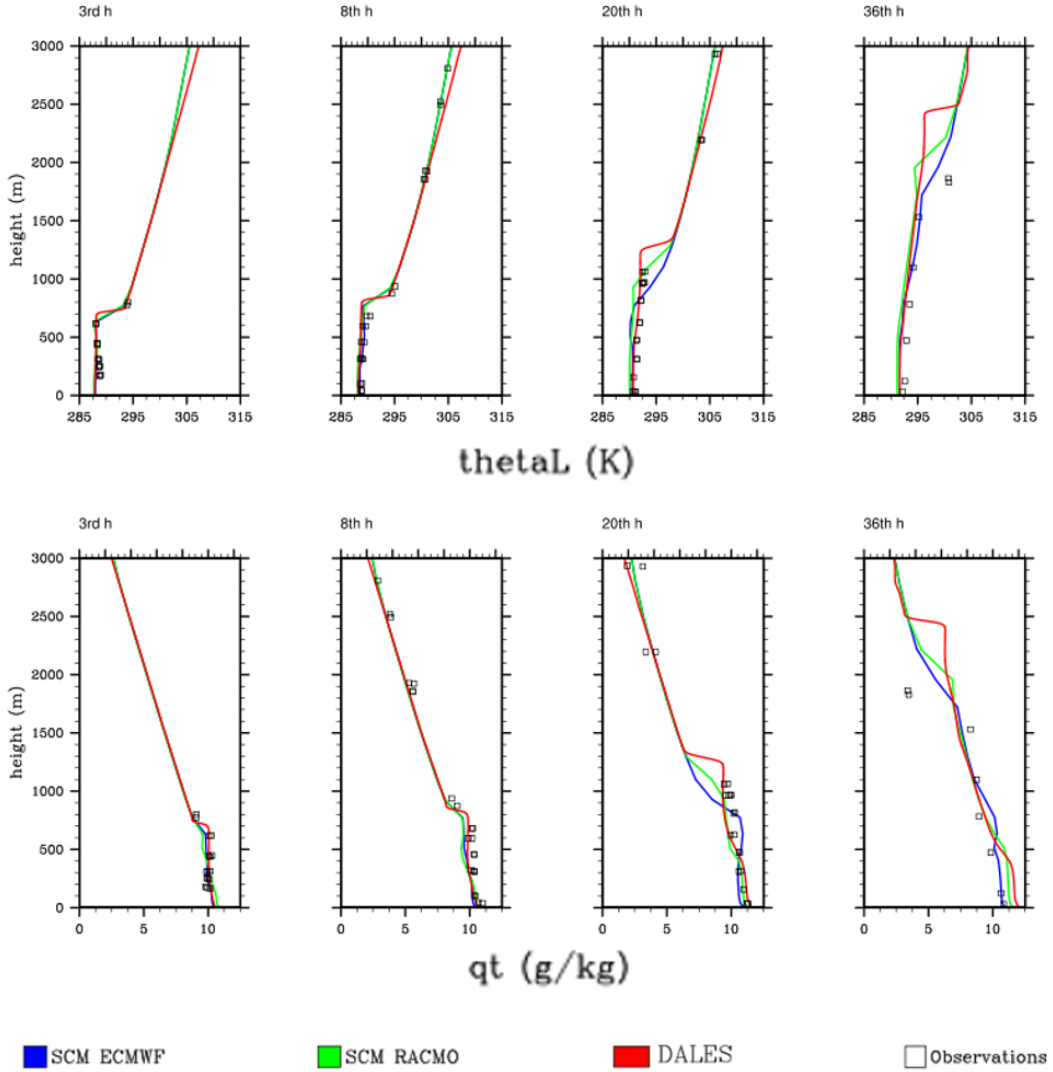
SCM version of regional climate model RACMO

- $\Delta t = 300$ s;
- standard vertical grid levels (L91);
- two LS forcings;
- comparison of the results with observations, LES and ECMWF 31r1 results.

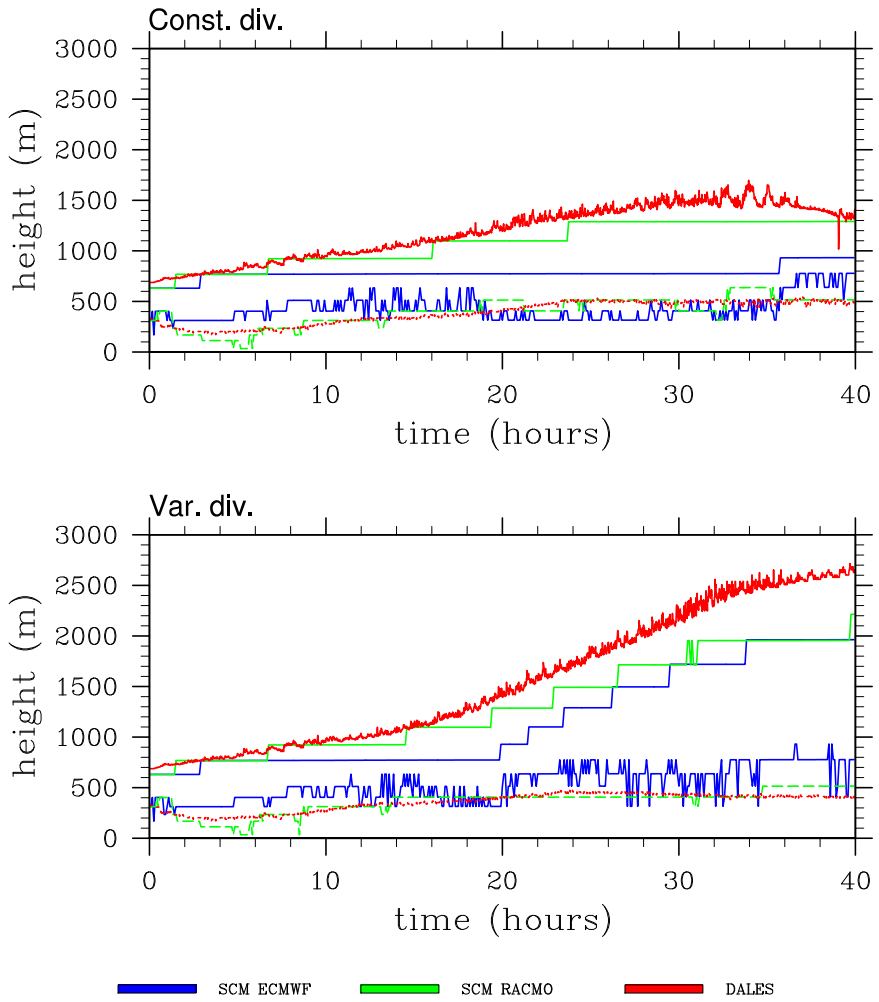
Constant divergence rate case



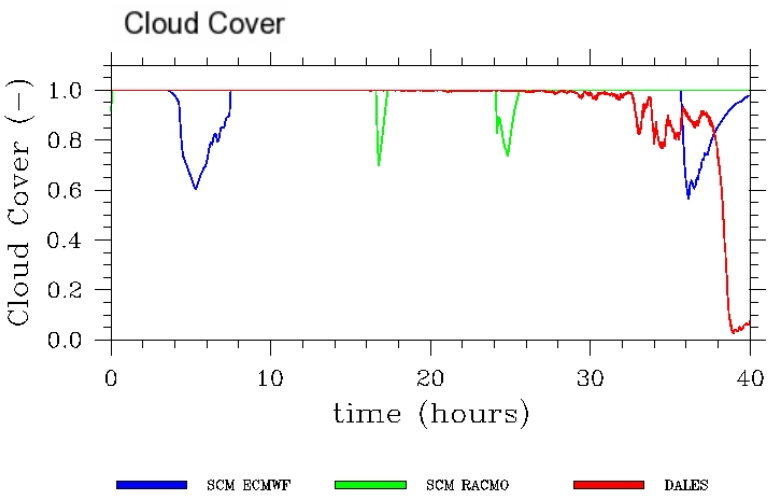
Time-varying divergence rate case

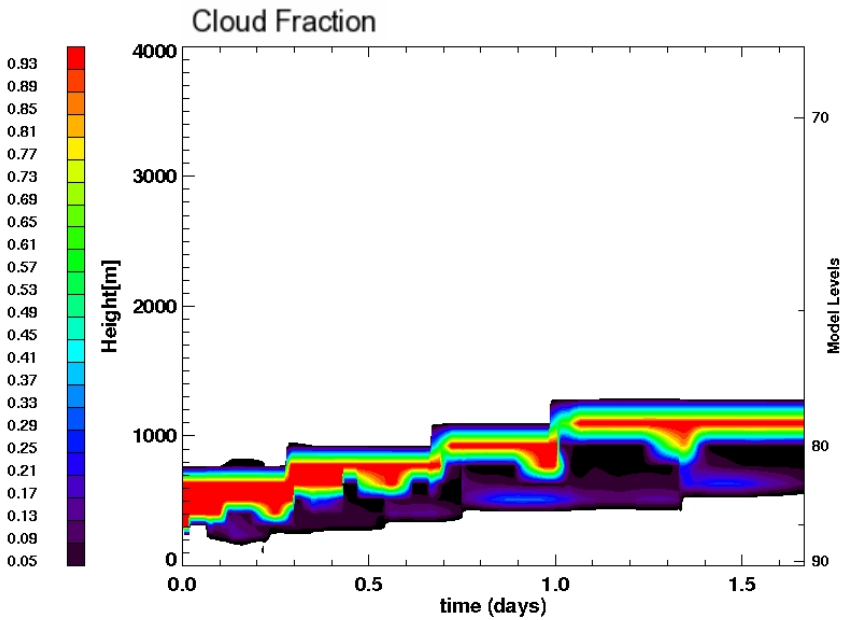


Cloud layer top and bottom

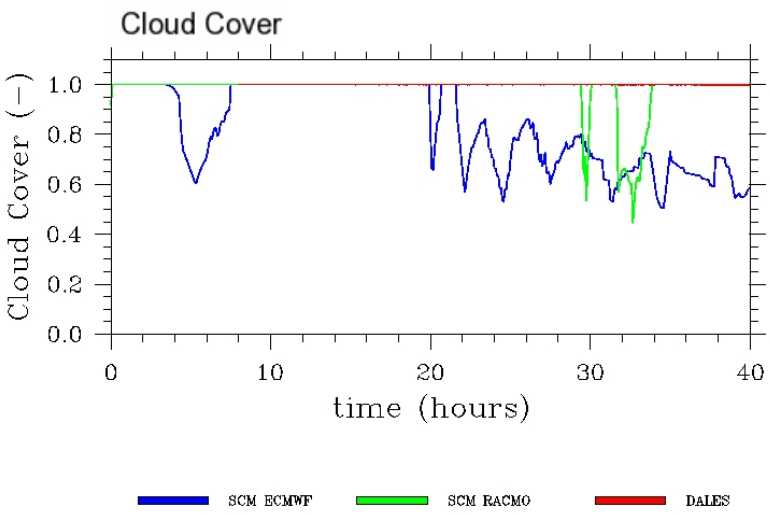


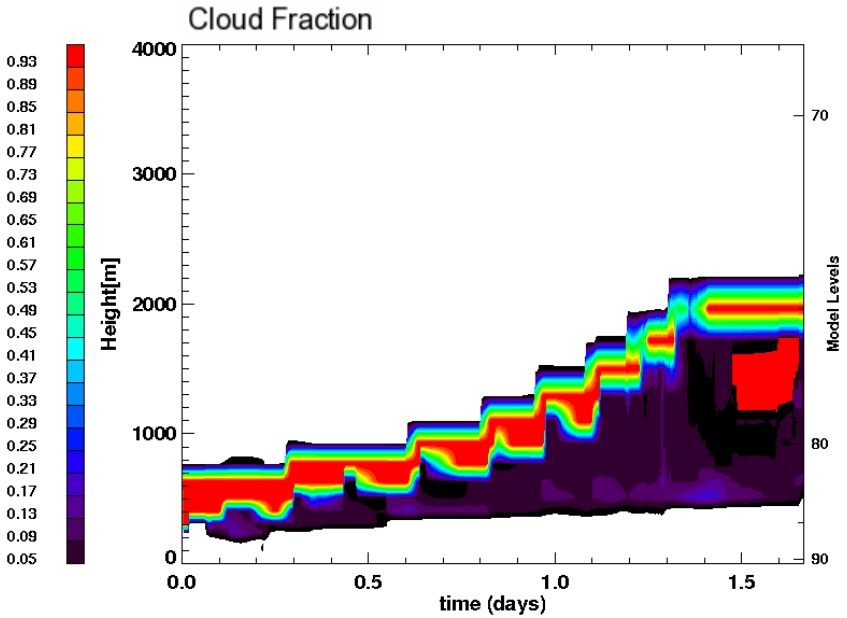
What about clouds? Constant divergence rate case





What about clouds? Time-varying divergence rate case





Dual Mass Flux scheme

$$\text{EDMF: } \overline{w'\phi'} = -K\frac{\partial\bar{\phi}}{\partial z} + M(\phi_u - \bar{\phi})$$

Siebesma et al. 2000

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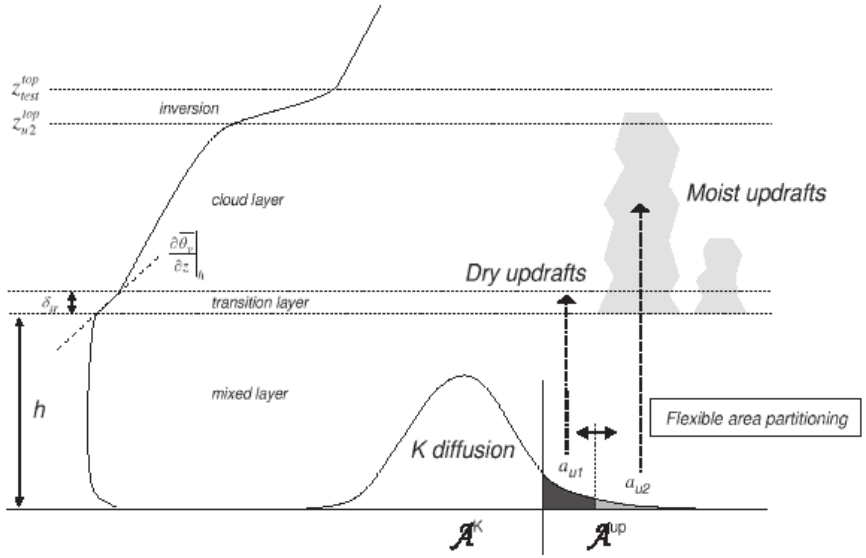

DualM: $\overline{w'\phi'} = -K\frac{\partial\bar{\phi}}{\partial z} + \sum_{i=1}^{2} M_i(\phi_{ui} - \bar{\phi})$

Neggers et al. 2009

Presentation of the closure

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At the top of the cloud layer:

$$\frac{M_e}{M_c} = \frac{A}{Ri} \quad \text{where} \quad Ri = \frac{g\Delta\theta_i}{\bar{\theta}} \frac{\delta z_c}{CAPE}$$

Wyant et al. 1996

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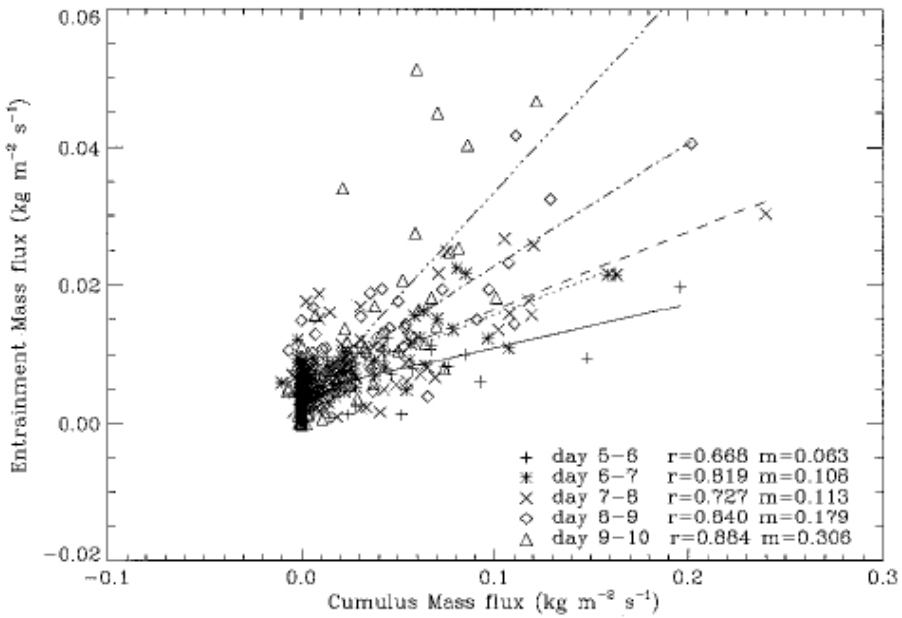
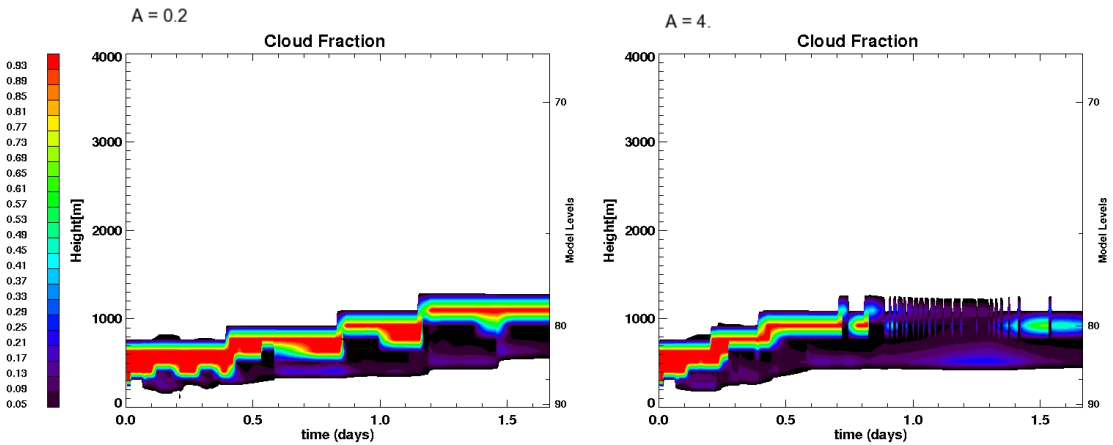


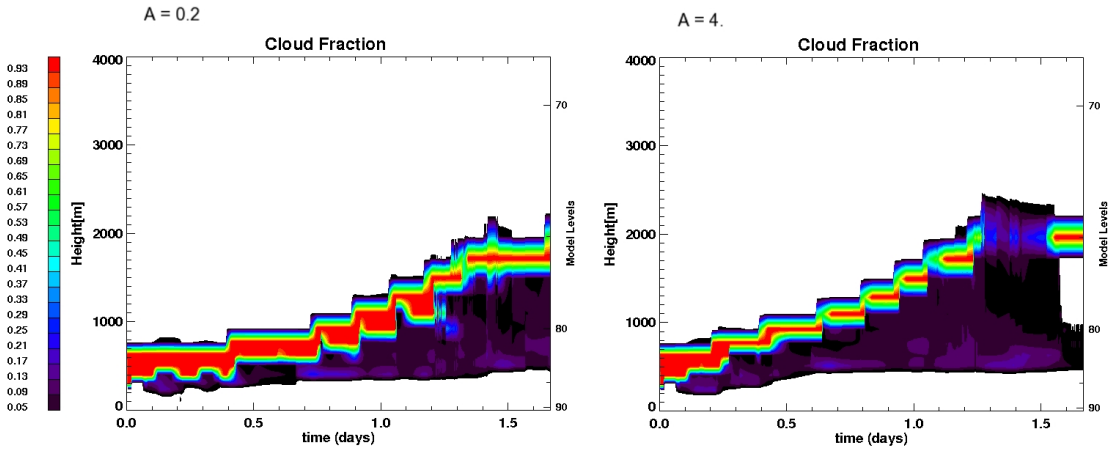
What about A?

The influence of the choice of A

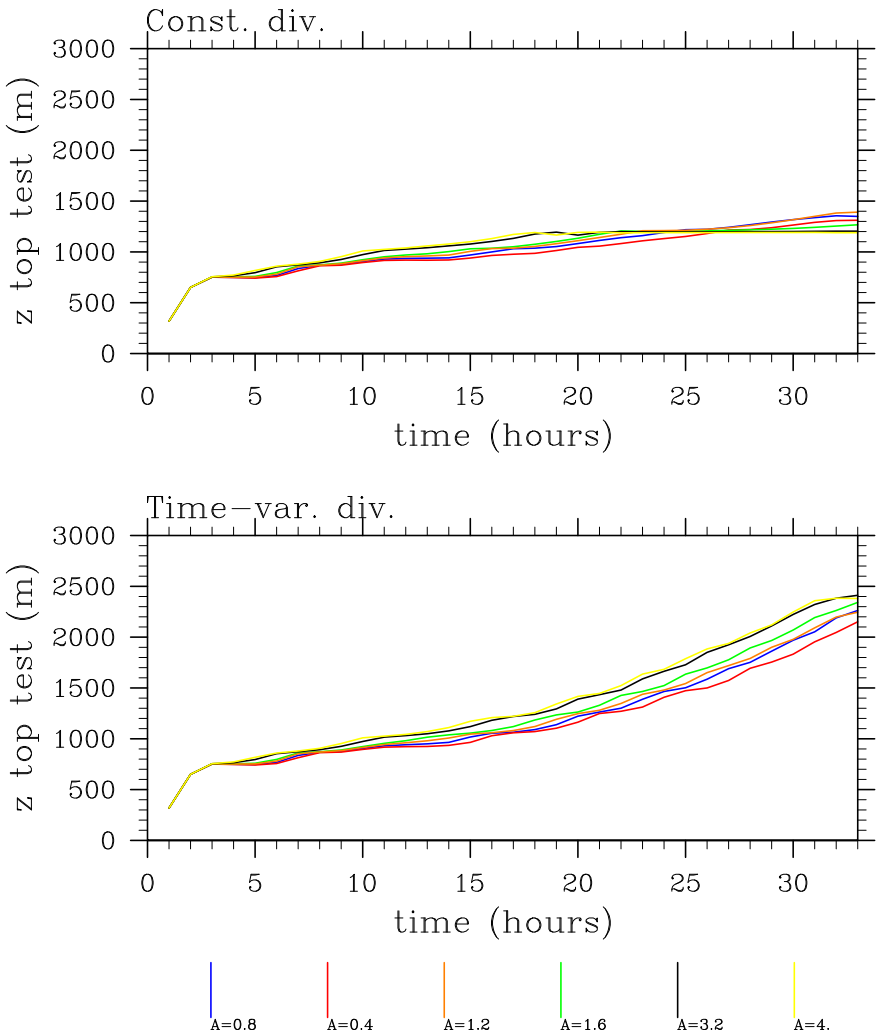
Const. div. case



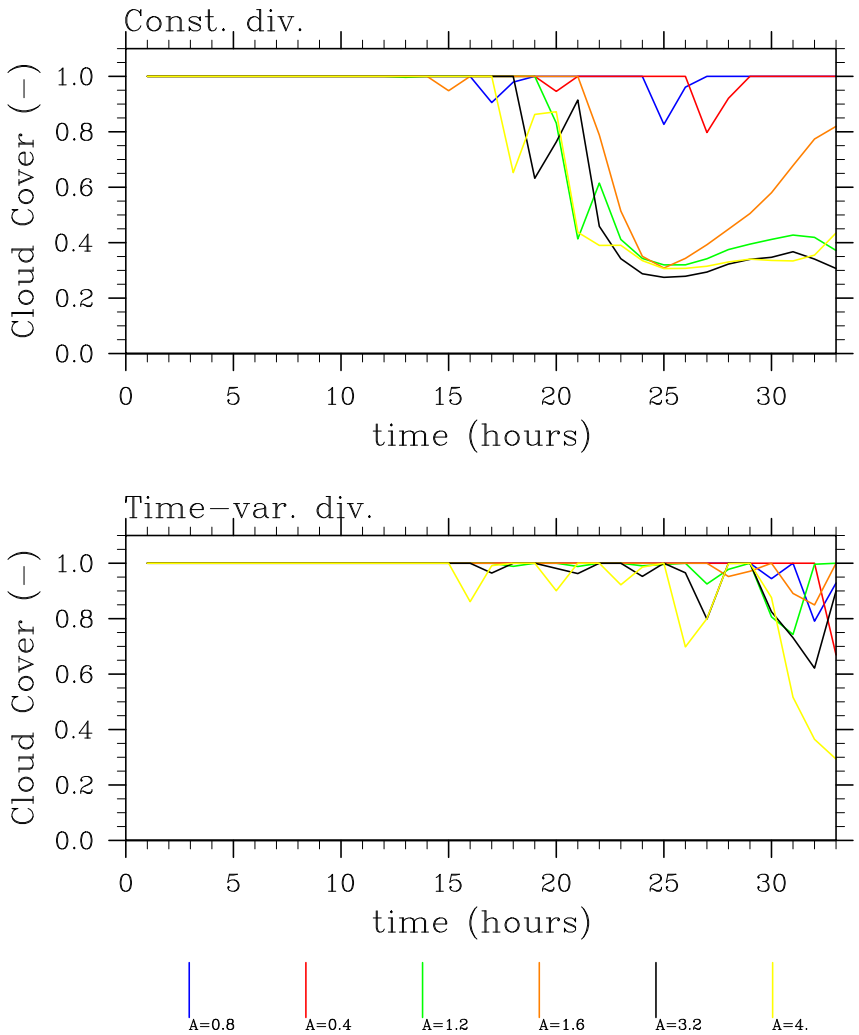
Time-var. div. case



The influence on BL height



The influence on cloud cover



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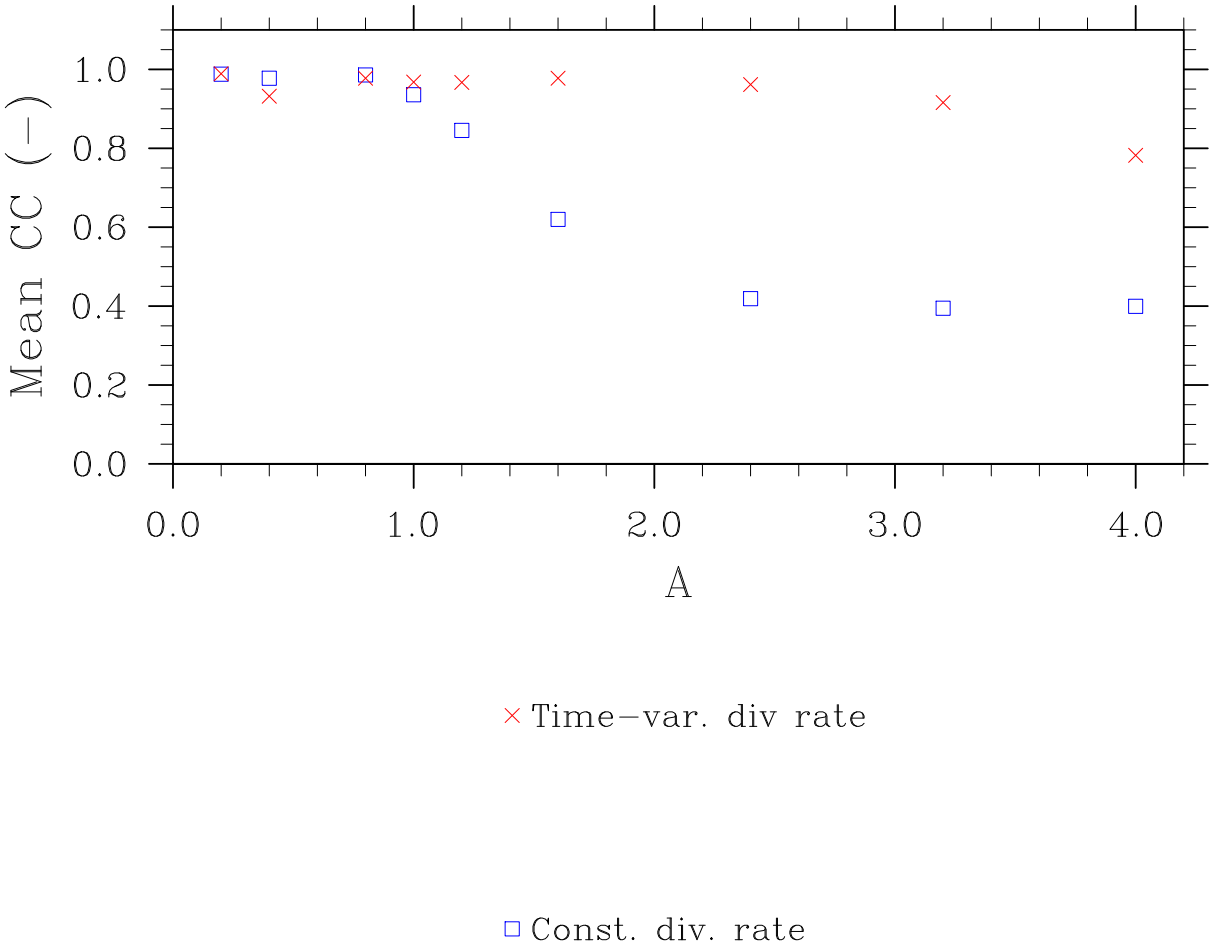

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- compared to ECMWF 31r1 the cloud layer top is heigher (and in better agreement with LES) but is still lower than in LES results;
- big impact of the closure parameter A at the top of the cloud layer $\longrightarrow$ more research needed.

Thank you for the attention!