

Evaluation of the diurnal cycle of summertime convection over the European Alps in cloud-resolving models

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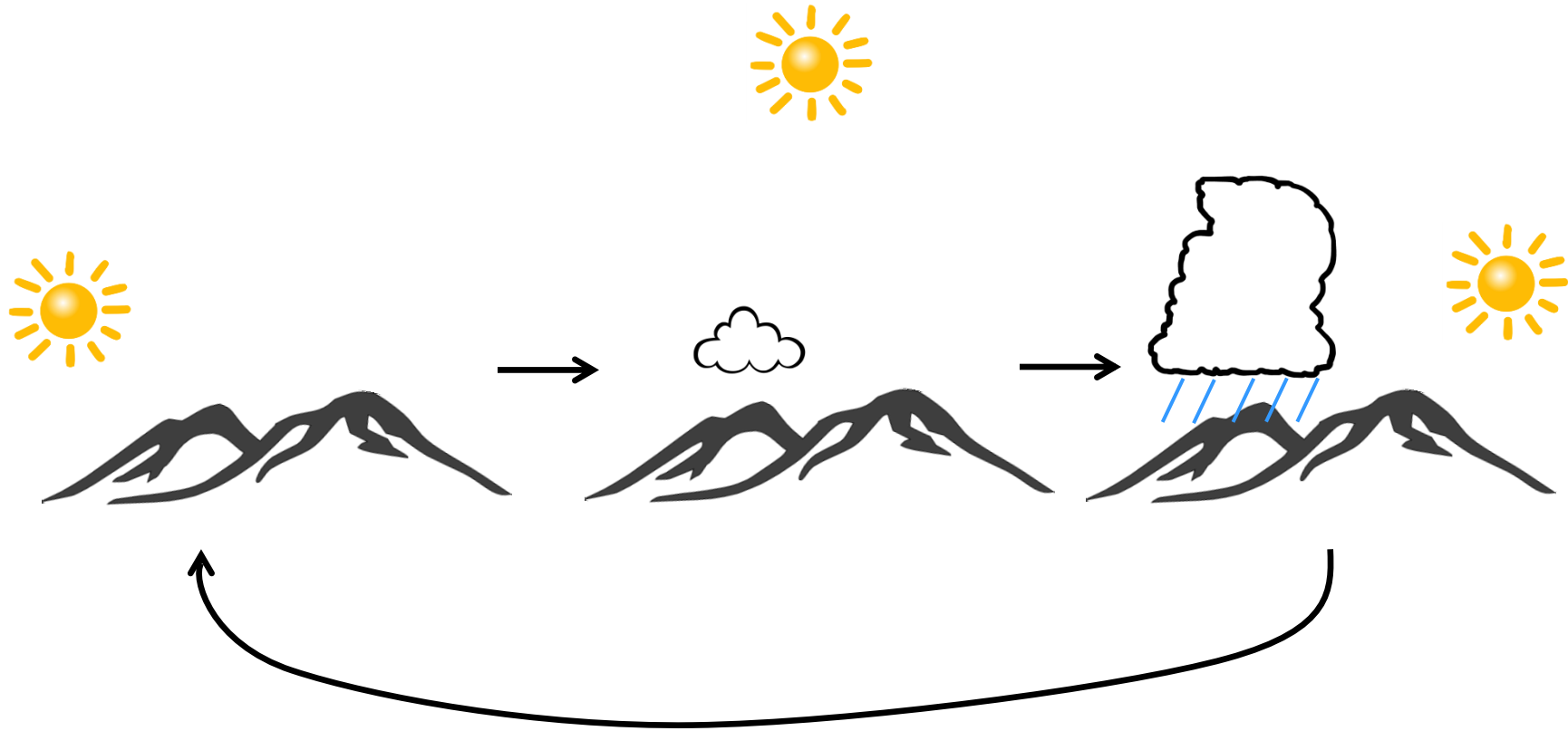
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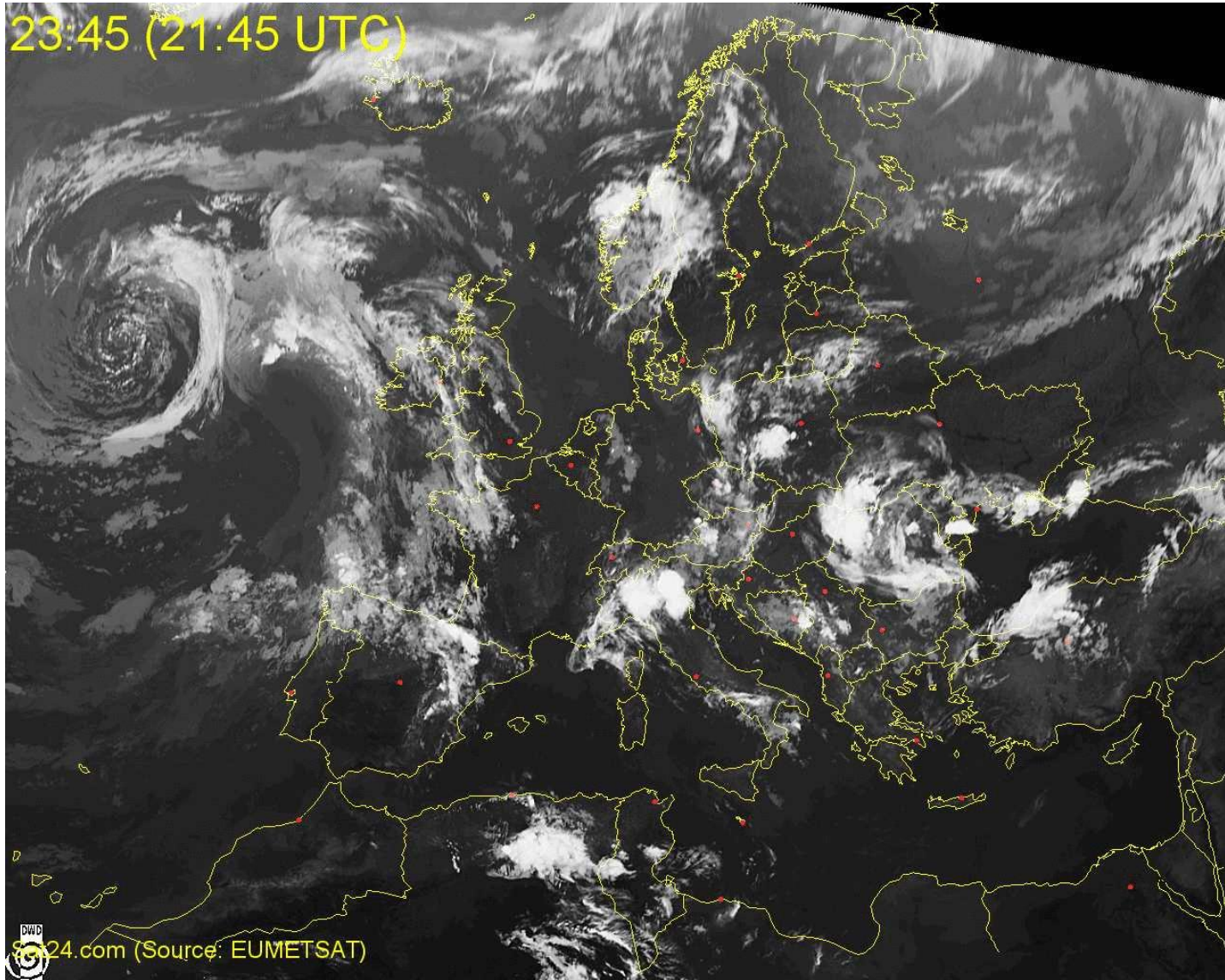
19 March 2014

Introduction

Diurnal cycle of moist convection



SEVIRI 10.8 μ m, June 30 to July 2, 2009

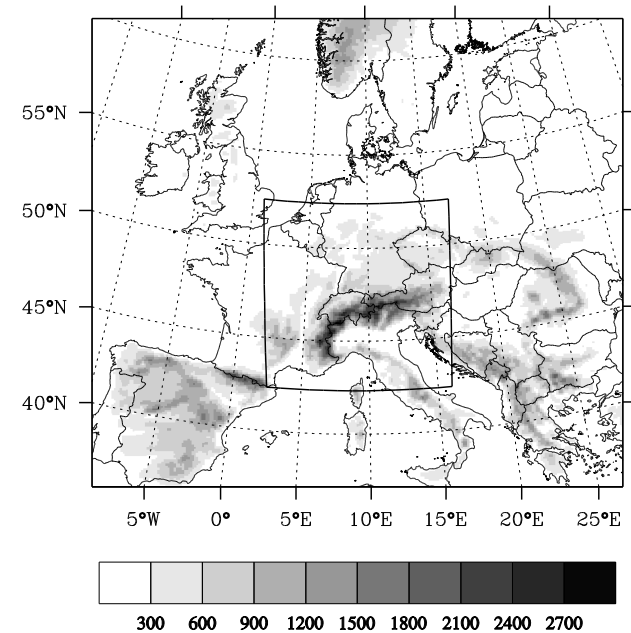


Imagery from <http://imkhp2.physik.uni-karlsruhe.de/~muehr/satpicsf/DWD/>

COSMO setup and Observations

Model setup and time period

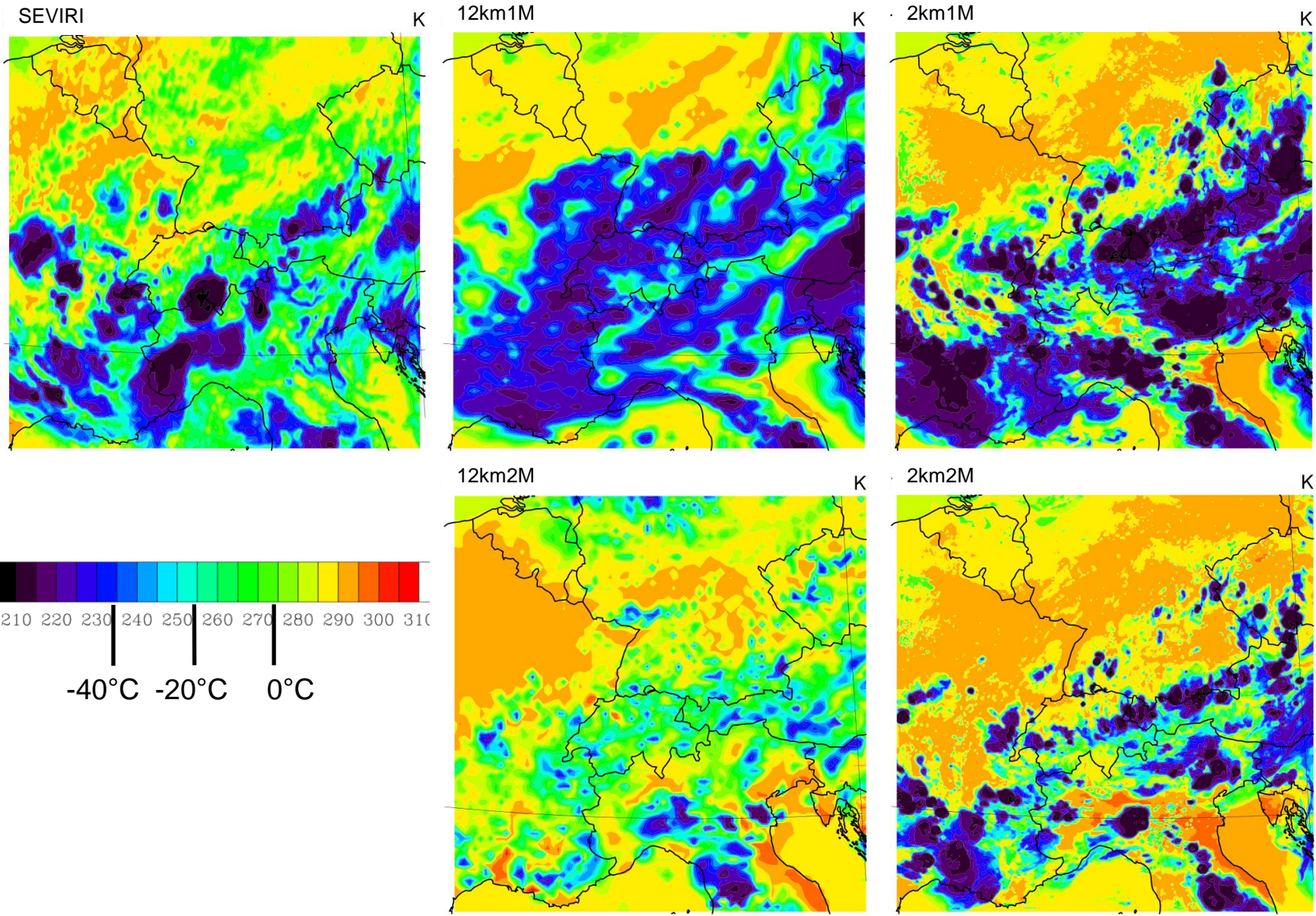
- COSMO Version 4.25
- Cloud resolving resolution
- 500 x 500 x 60 grid points
- RTTOV7 for synthetic satellite images
- 3 to 13 June 2007



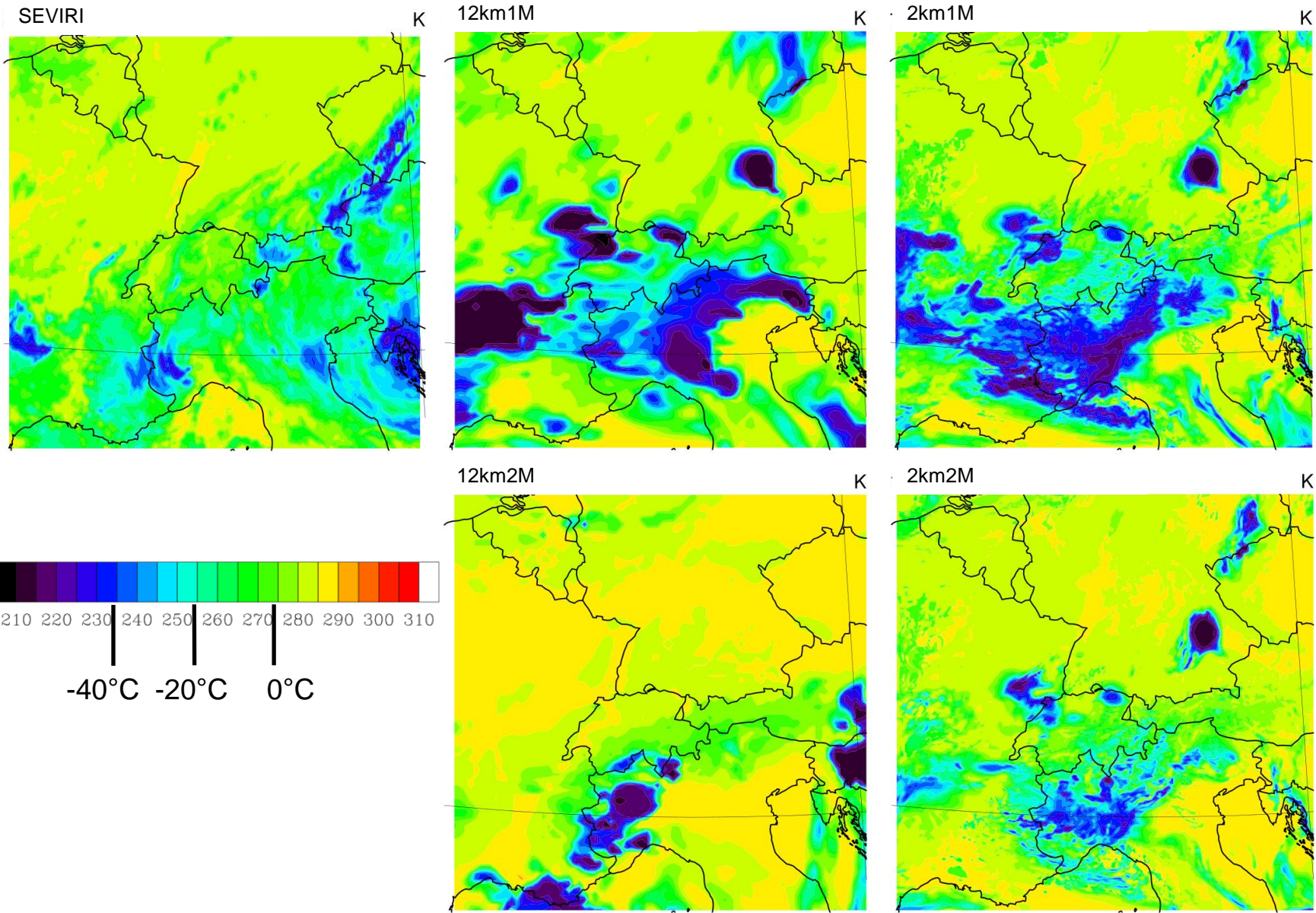
	12km1M	12km2M	2km1M	2km2M
12 km resolution with ERA interim as BC	X	X		
2 km resolution with 12km1M as BC			X	X
one-moment micorphysics scheme	X		X	
two-moment microphysics scheme		X		X

Clouds and Radiation

BT 10.8 μm , 16 UTC, 5 June 2007

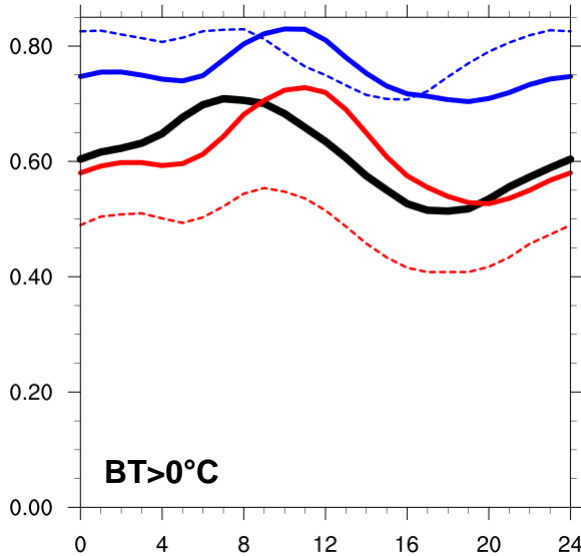
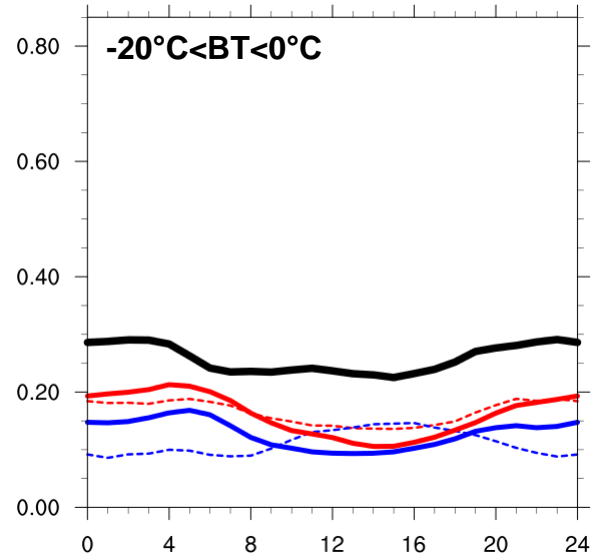
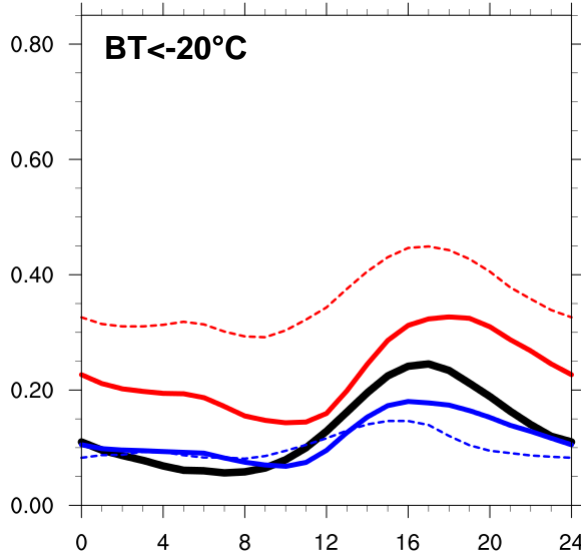


BT 10.8 μm , 04 UTC, 6 June 2007



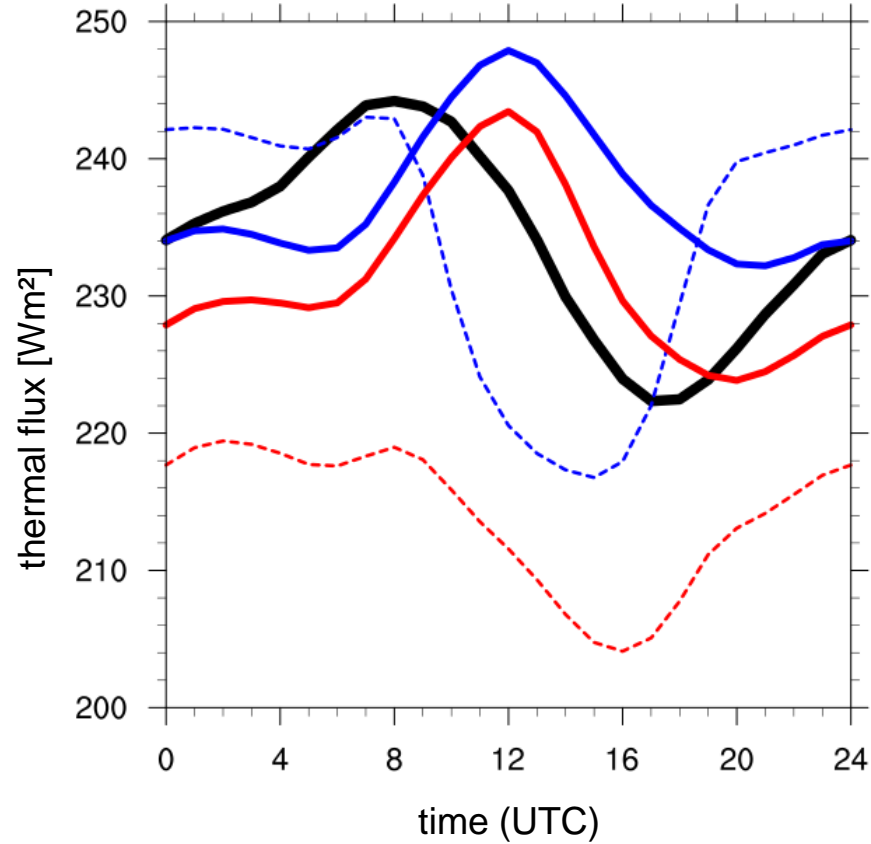
Diurnal cycle of BT 10.8 μm cover

3 to 13 June 2007



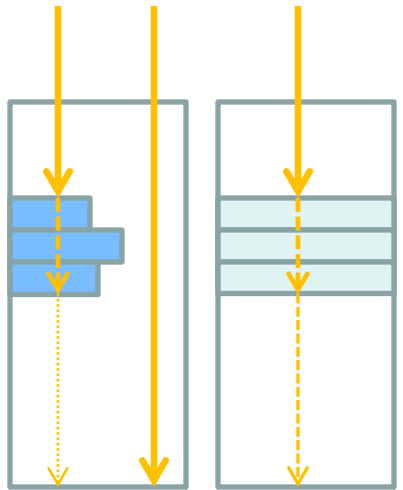
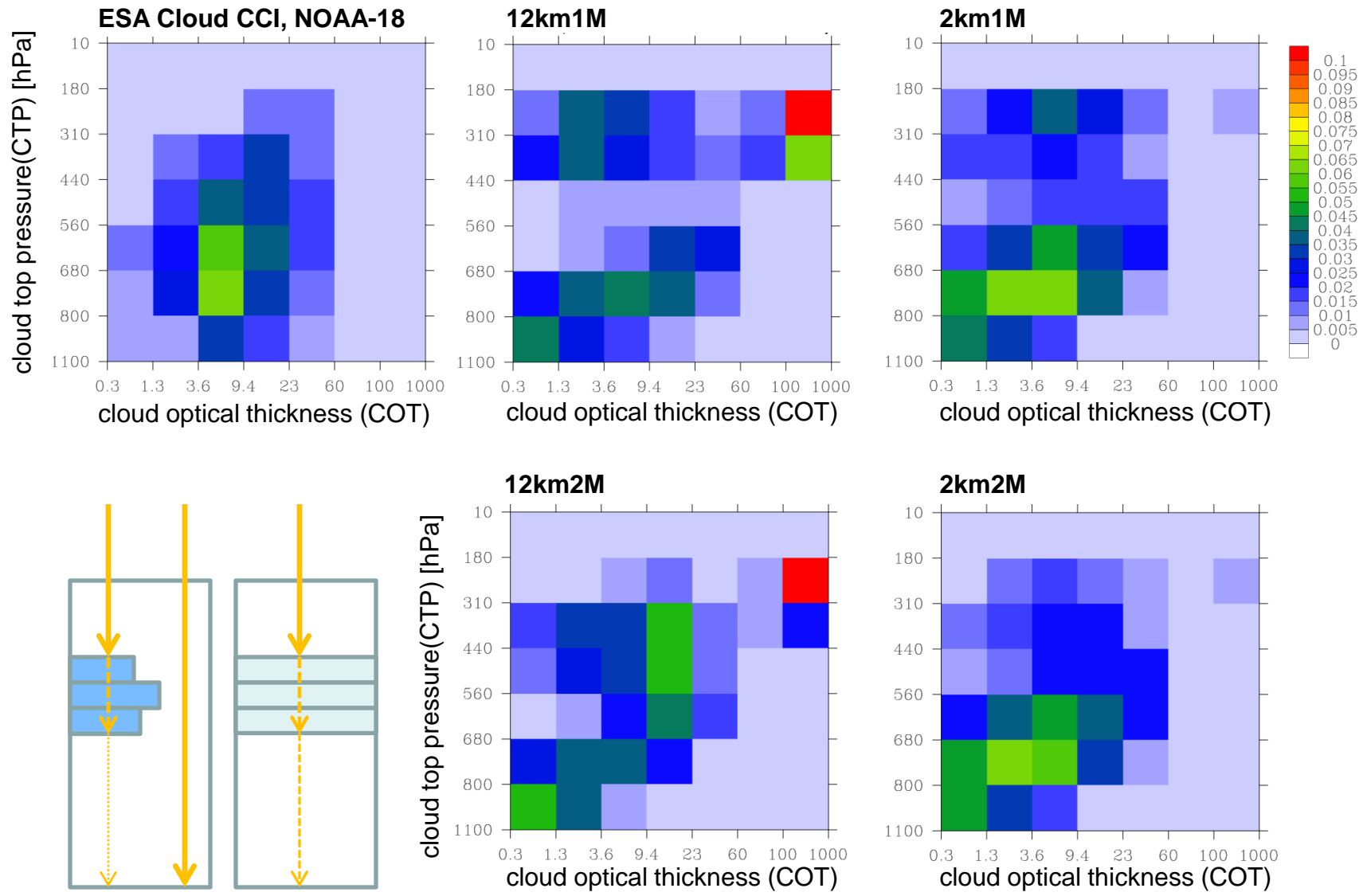
Thermal Flux, diurnal cycle

3 to 13 June 2007

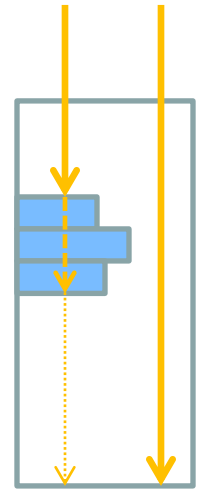
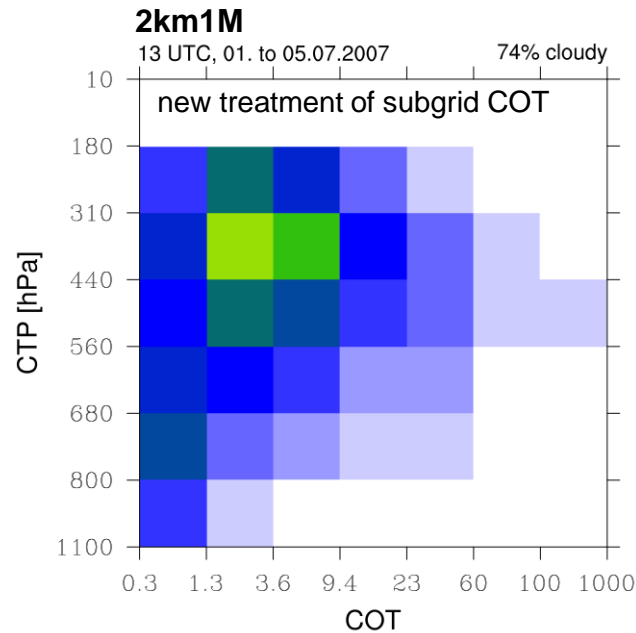
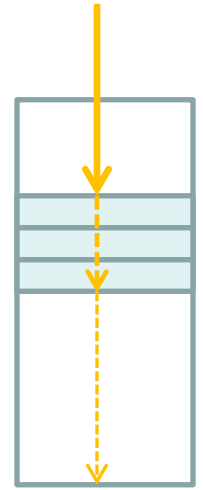
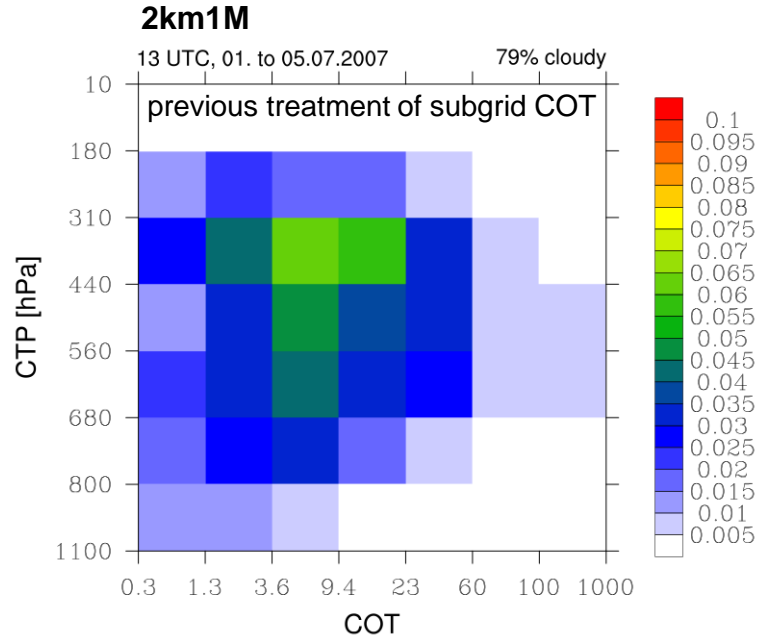
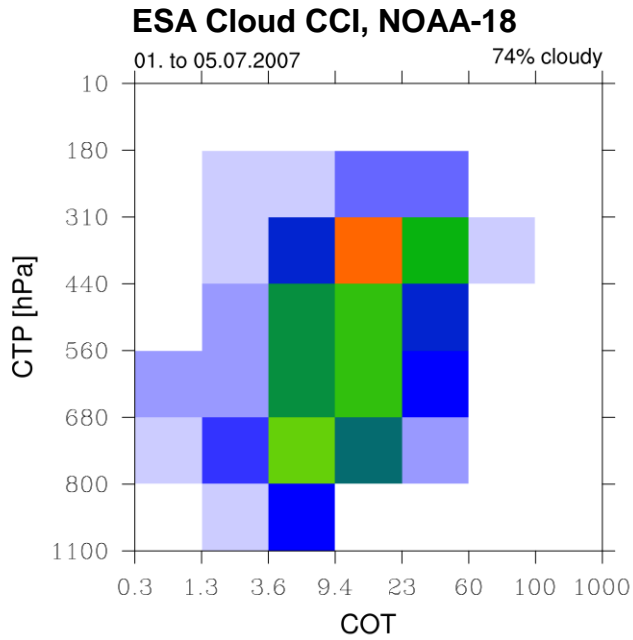


CTP/COT histograms, 13 UTC

3 to 13 June 2007

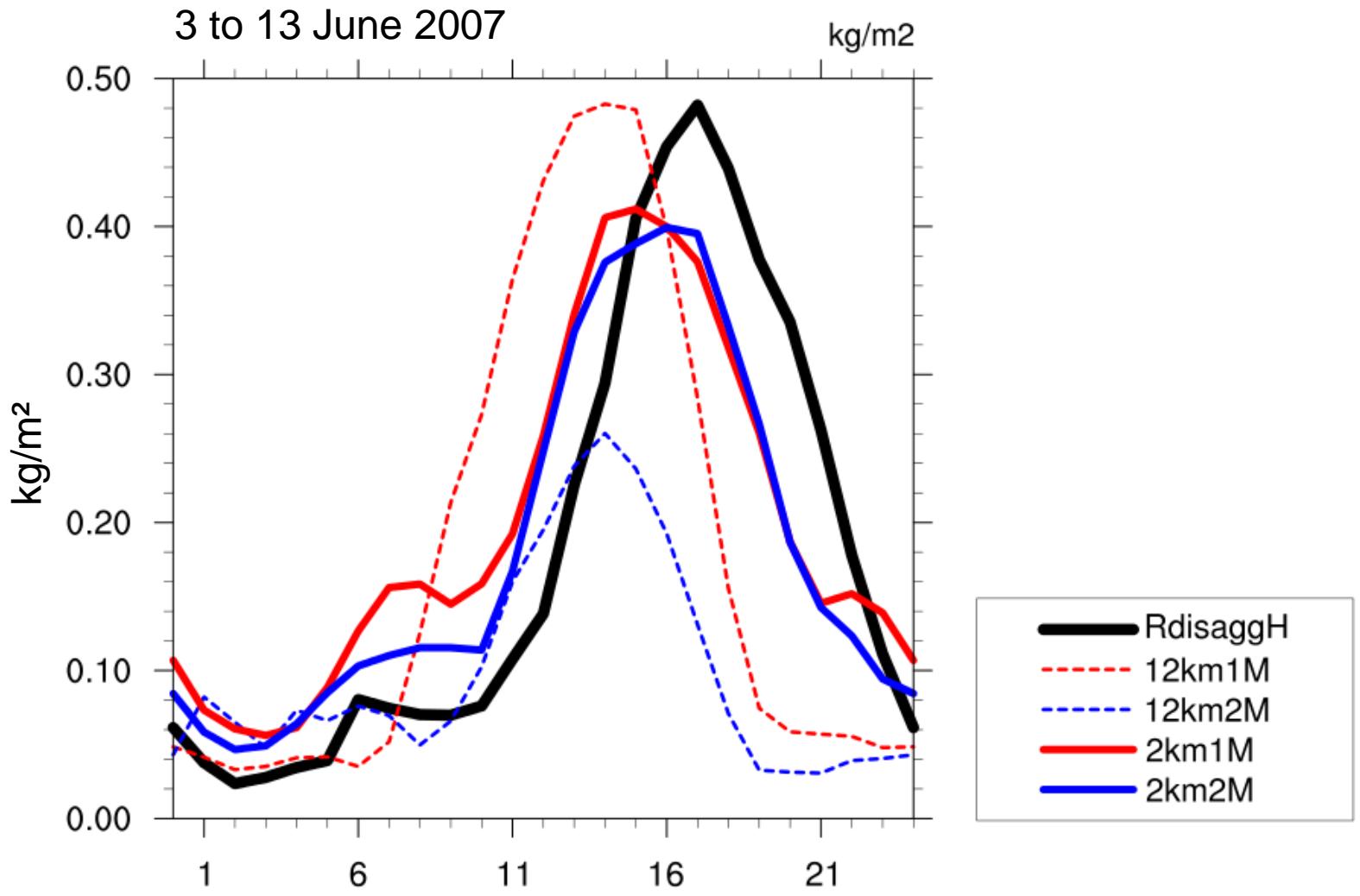


new treatment of subgrid COT: 1-5 July 2007



Precipitation

Diurnal cycle of Precipitation over Switzerland



Conclusions

Conclusions

- Too much high cloud cover in COSMO with one-moment microphysics scheme
 - Substantial improvement with ice sedimentation
- Remaining bias and time shift in diurnal cycle of thermal flux
- Changes in clouds are not evident from the diurnal cycle of precipitation → satellite observations provide an additional view for model validation
- Can be a challenge to build your own cloud simulator

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