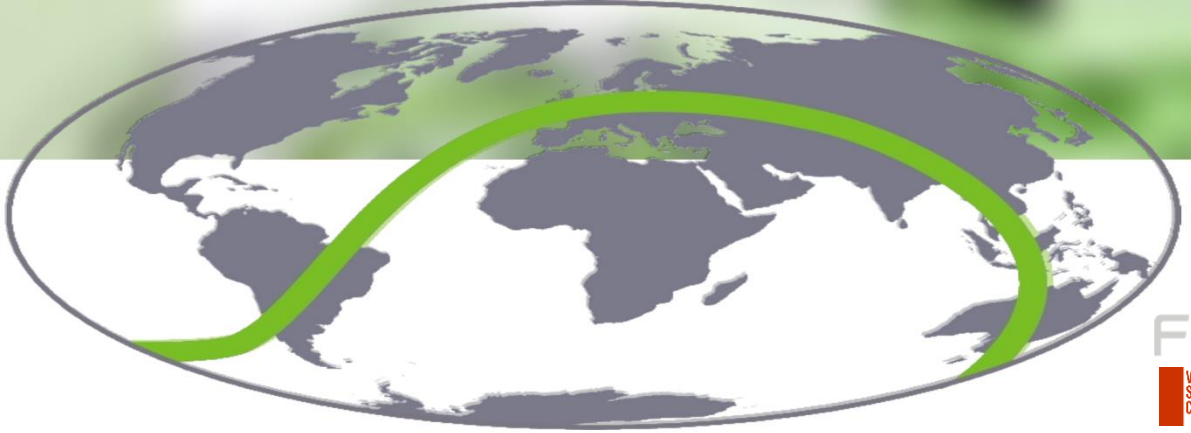


wege entstehen, indem wir sie gehen
paths emerge in that we walk them

Wegener Center

UNI GRAZ

Regional and Local Climate Modeling Research Group

ReLoClim

A konvekció és a turbulencia parametrizáció összefüggései a COSMO-CLM regionális klímamodellben

András Csáki

45. Meteorológiai Tudományos Napok, 2019.11.14.

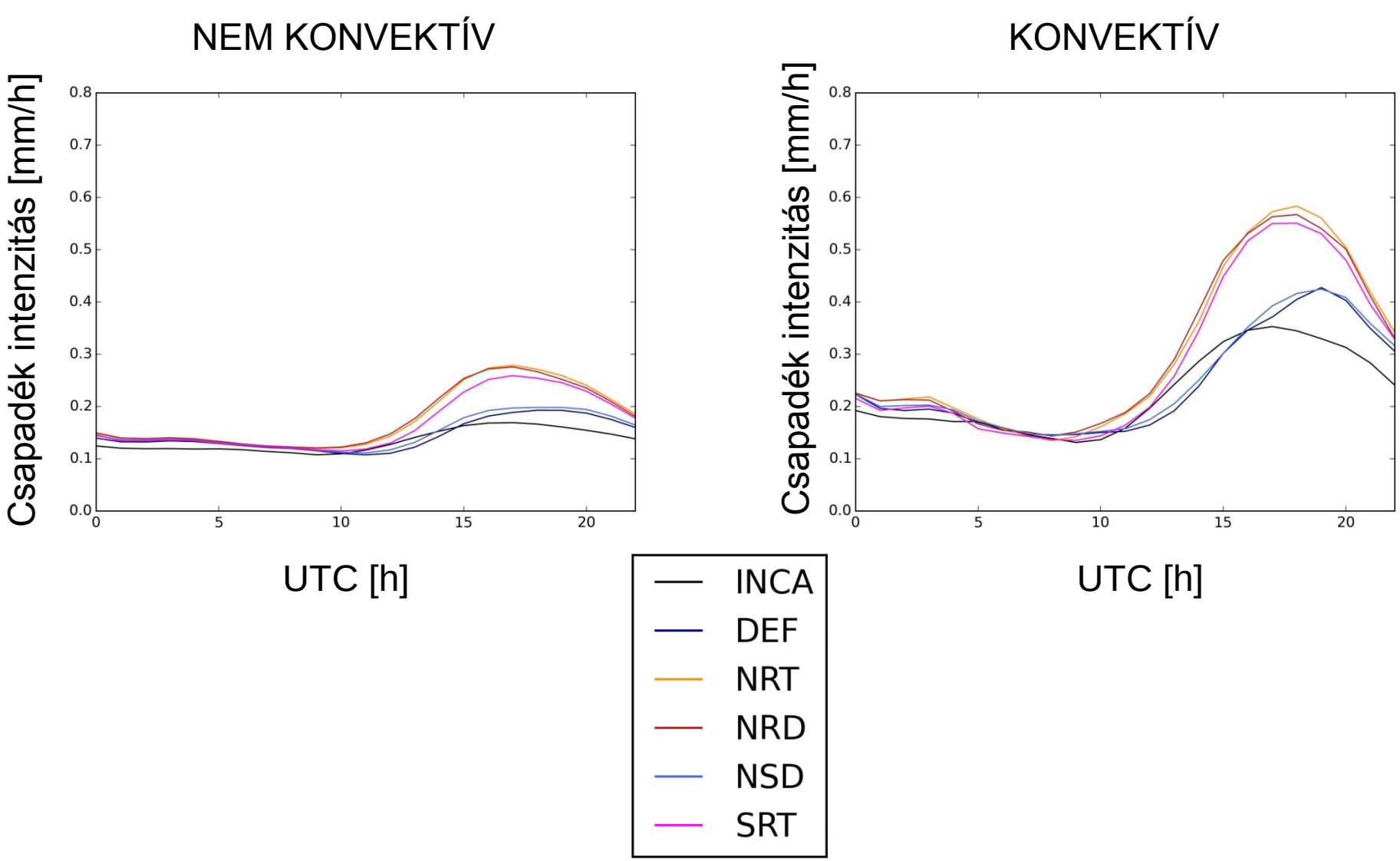
Szimulációk

- COSMO-CLM[1]
- Alpok régió
- IFS (Integrated Forecast System)[2]
- 3 km felbontás
- 4 év: 2006-2009

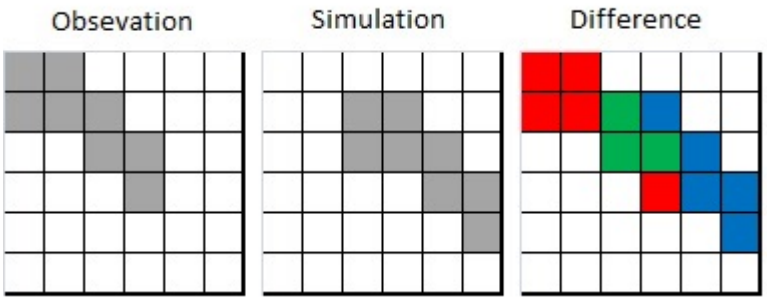
Szimuláció	Konvekció	Felhőséma	Turbulencia
DEFAULT	def	def	def
N-S-D	none	def	def
N-R-D	none	rel hum	def
N-R-T	none	rel hum	TKE-SV
S-R-T	def	rel hum	TKE-SV

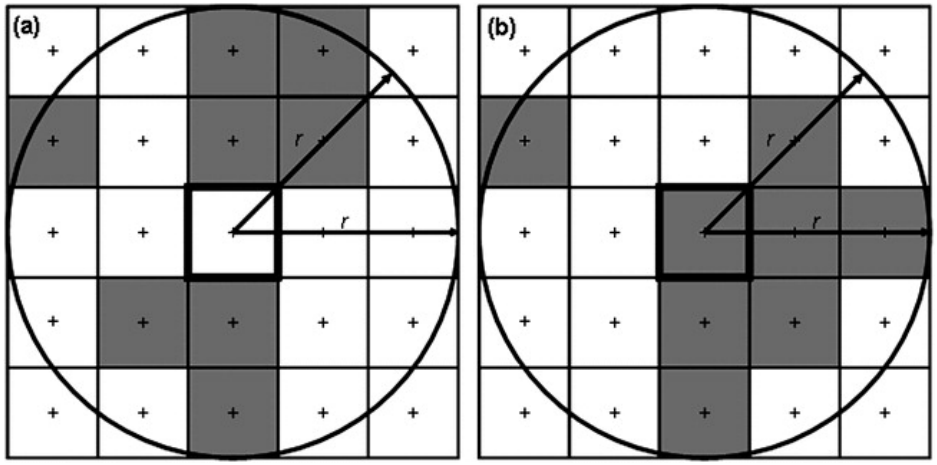
1 Böhm U, Kücken M, Ahrens W, Block A, Hauffe D, Keuler K, Rockel B,Will A. 2006. CLM–the climate version of LM: brief description and long-term applications. Technical Report, COSMO Newsletter No. 6, Offenbach am Main, Germany.
2 Bechtold, P., M. Köhler, T. Jung, F. Doblas-Reyes, M.Leutbrecher, M. J. Rodwell, F. Vitart and G. Balsamo (2008), Advances in simulating atmospheric variability with the ECMWF model: From synoptic to decadal time-scales, Q.J.R Meteorol. Soc. 134(634), 1337-1351, doi: 10.1002/qj.289

Csapadék napi menete



FSS Fraction Skill Score[1]



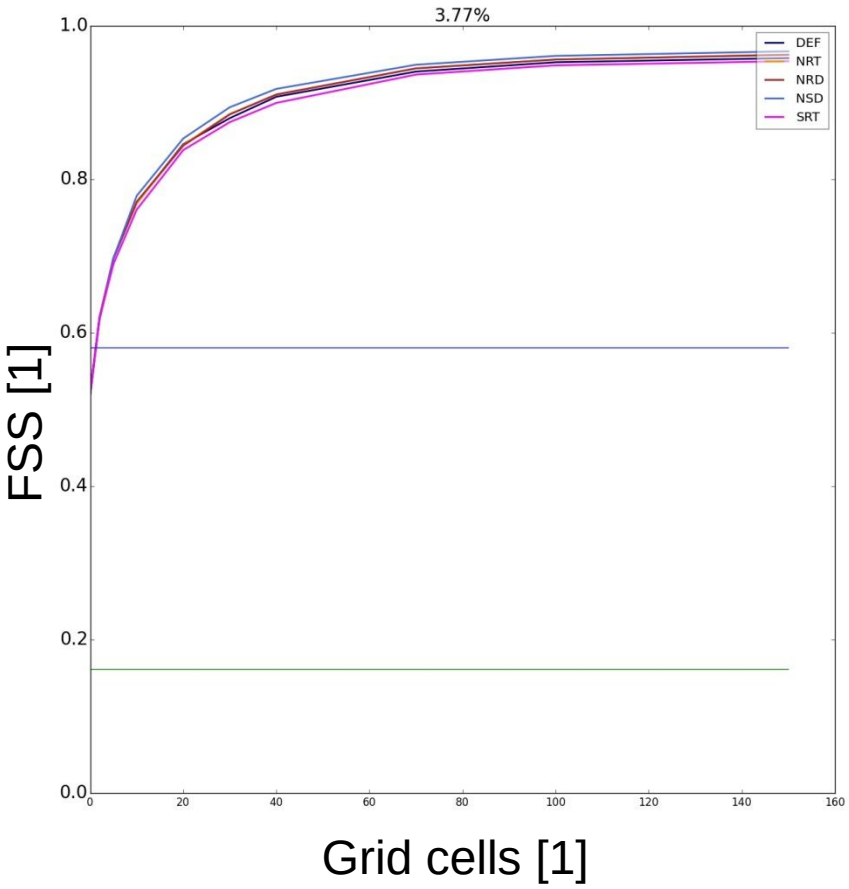


http://fuelberg.met.fsu.edu/~marchand/apcp/methodology.html

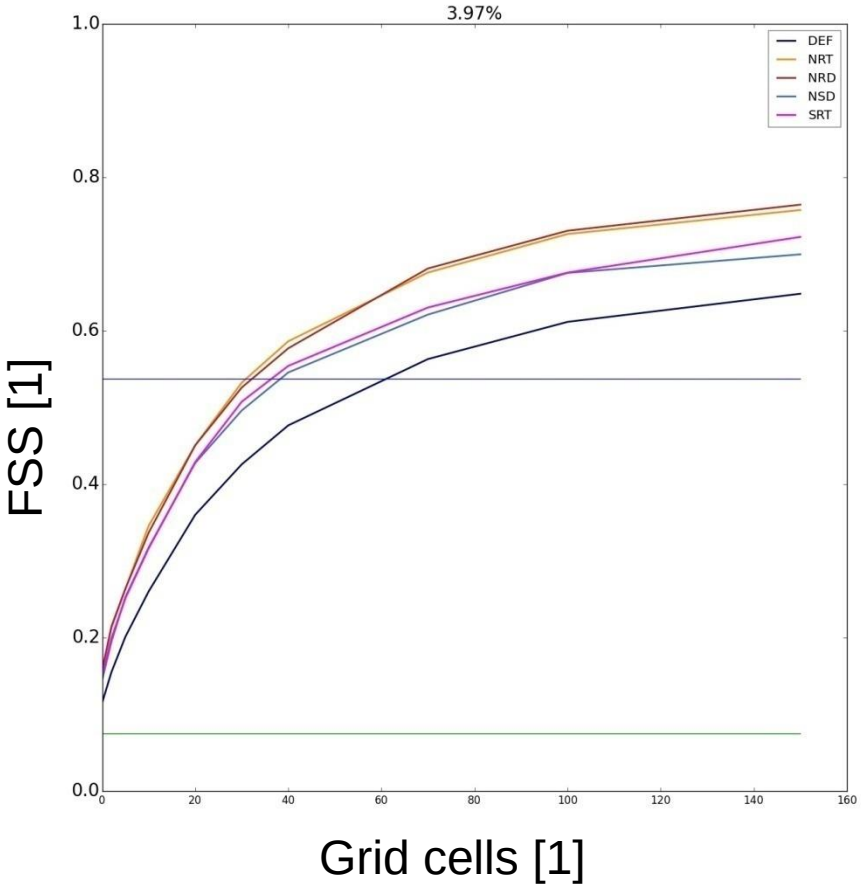
1 Robert 2008: Assessing the spatial and temporal variation in the skill of precipitation forecasts from an NWP
, method1
model.*Meteor. Appl.,* ***15, 163–169.***

Fraction Skill Score (FSS) küszöbérték=0.1 mm/h

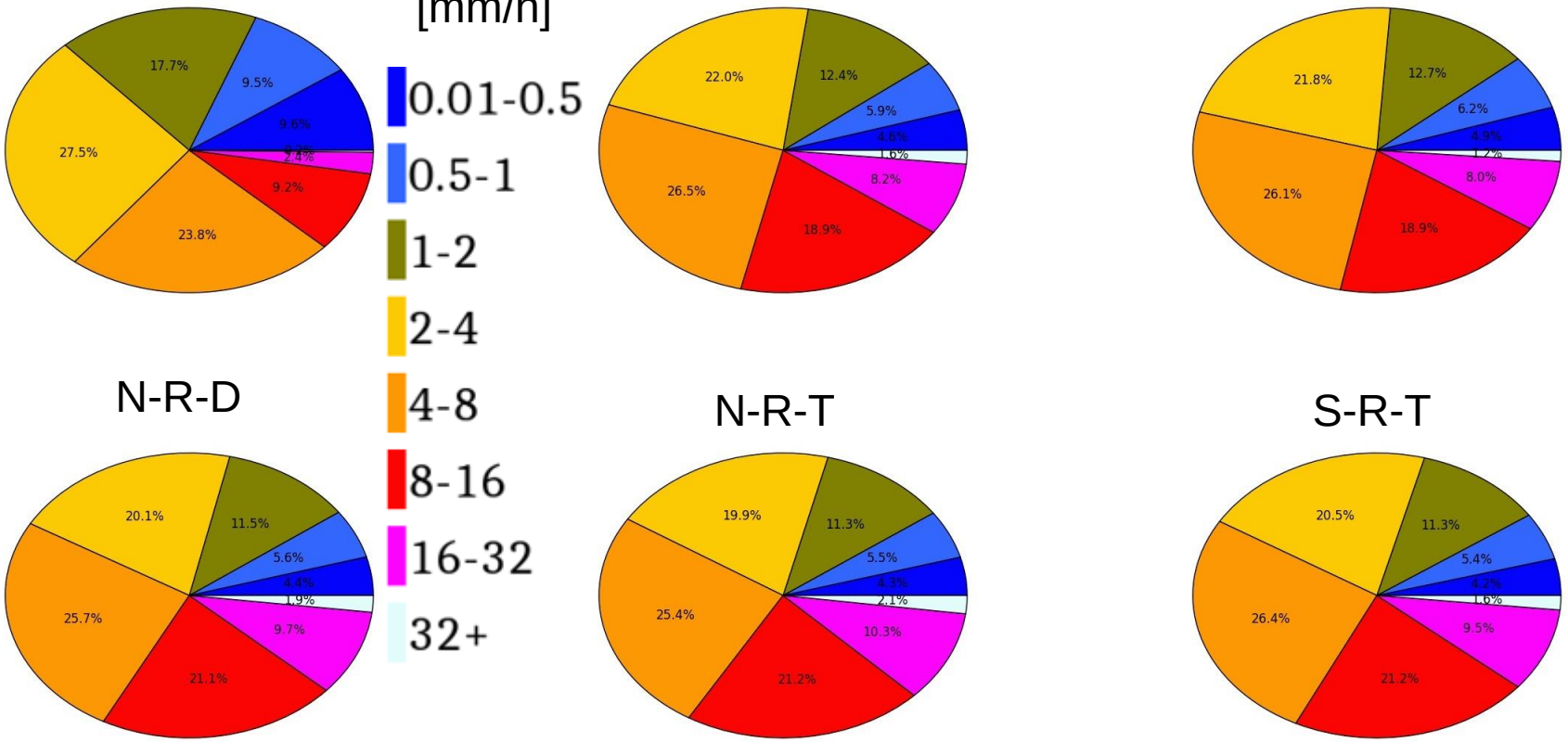
NEM KONVEKTÍV



KONVEKTÍV

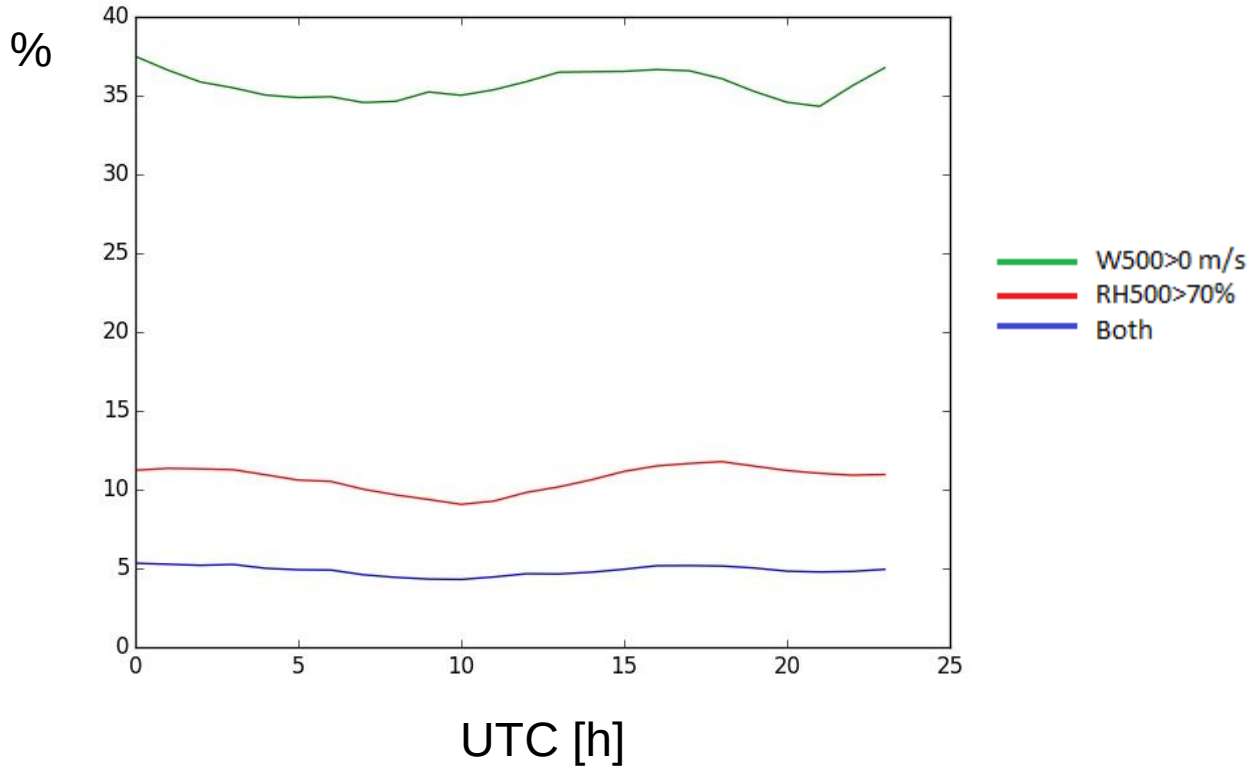


Csapadék mennyisége intenzitás szerint

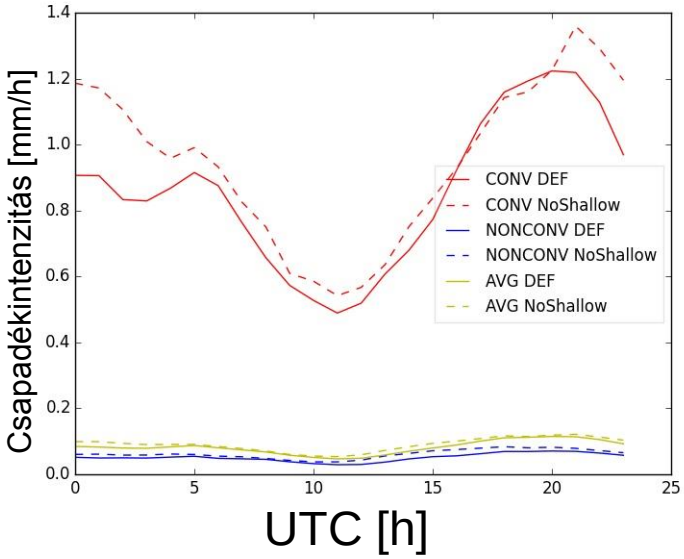


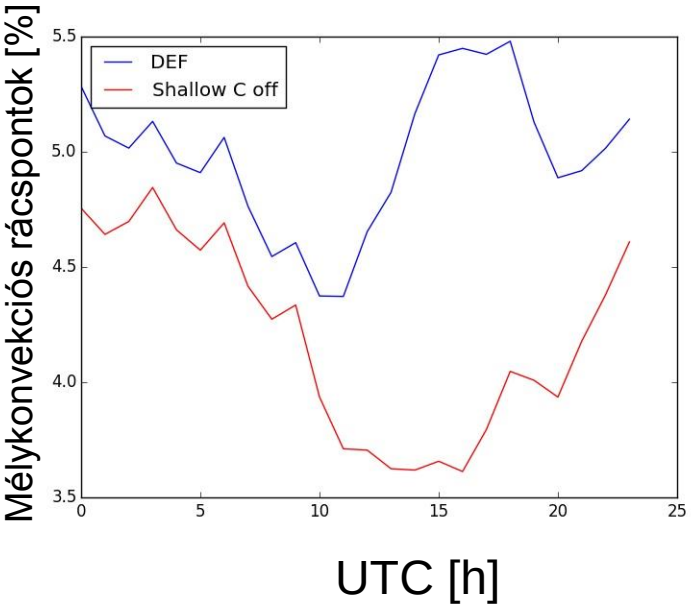
Mélykonvekció azonostása

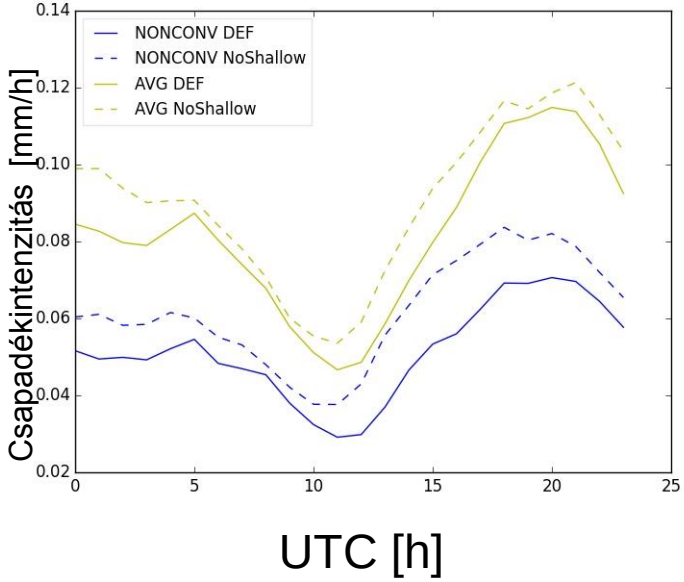
- Termikus turbulens keveredés, ahol a függőleges mozgások áttörik a 500 hPa szintet
- Relatív nedvesség 70% felett



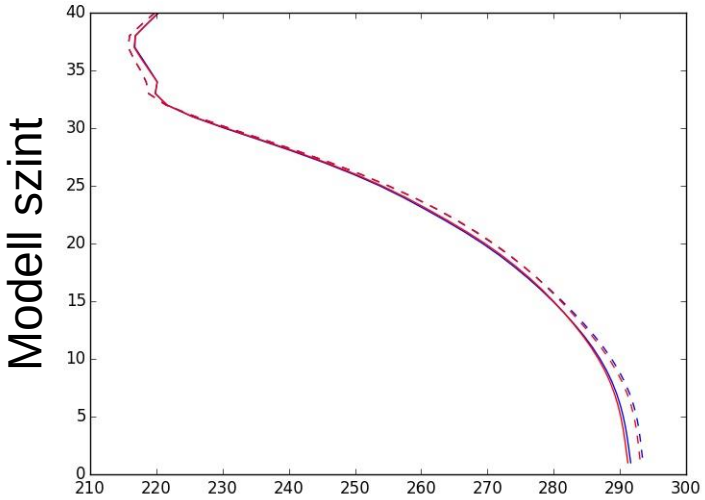
Mélykonvekciós csapadék



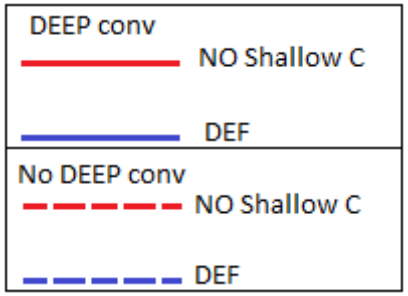


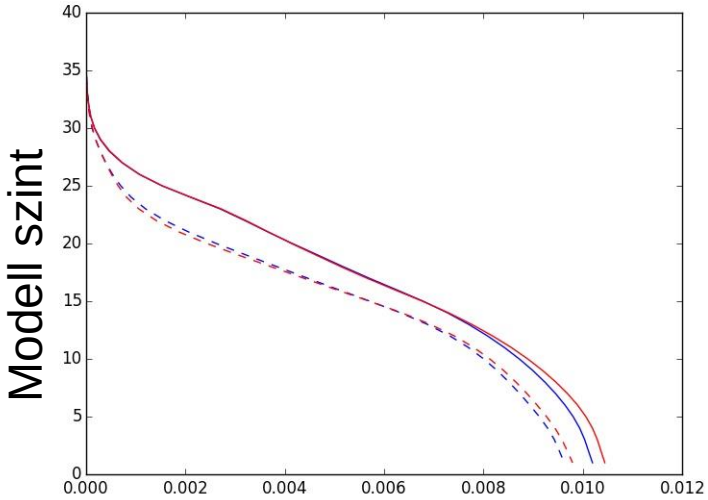


Vertikáis profilok

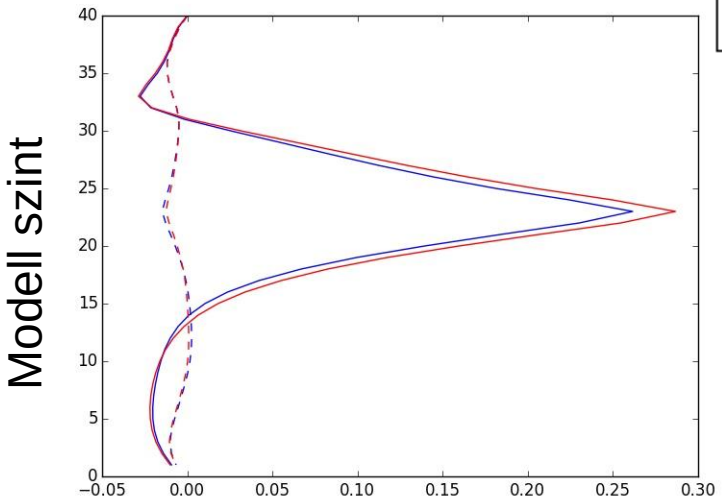


Hőmérséklet T[K°]

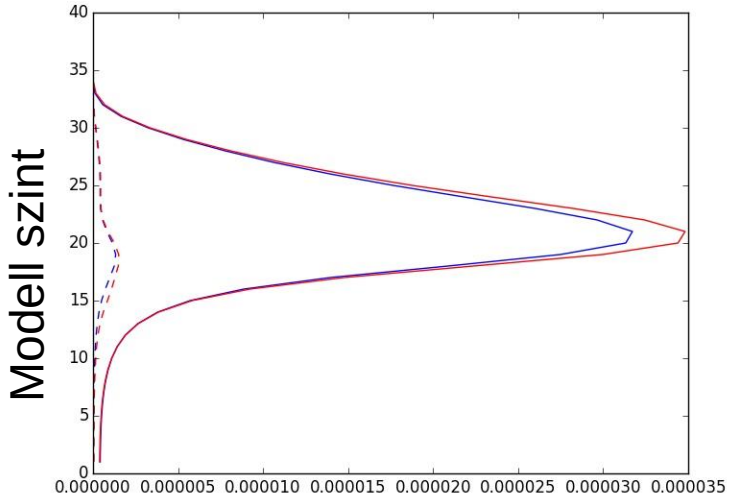




Specifikus nedvesség QV [kg/kg]



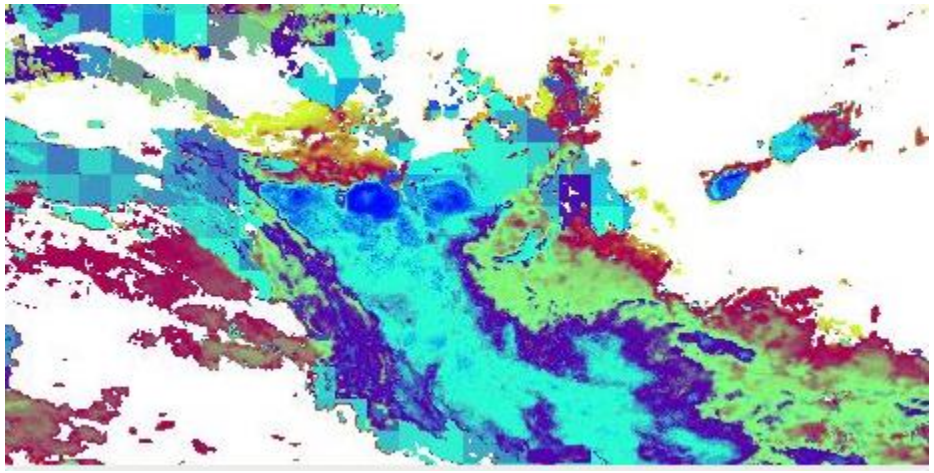
Függőleges szélsebességW [m/s]



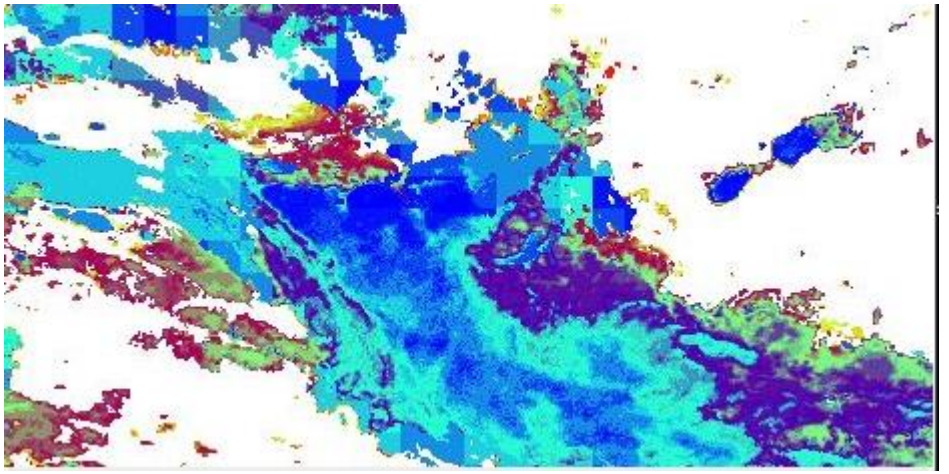
Graupel tartalom QG [kg/kg]

CMSAF műhold adatok

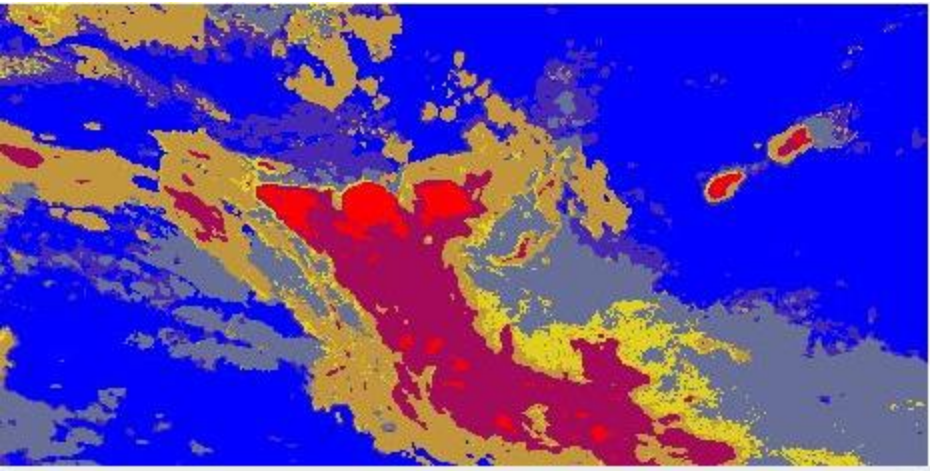
CTT [K°]



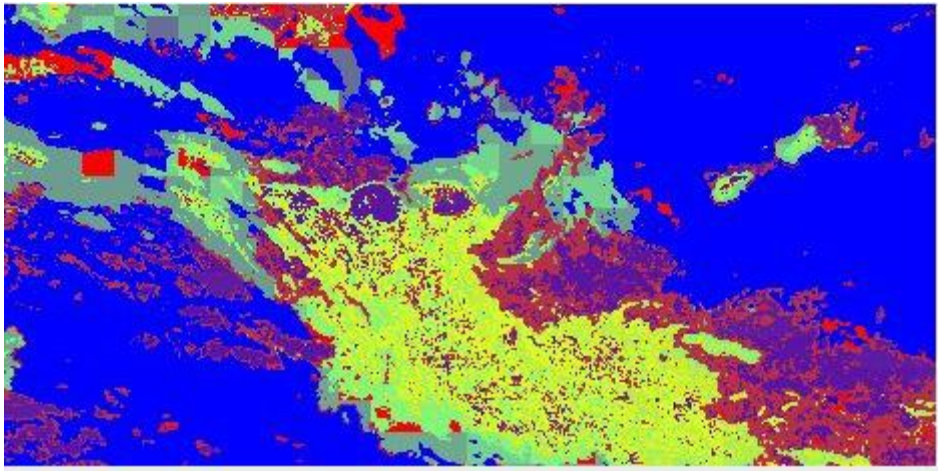
CTP [hPa]



Cloud type

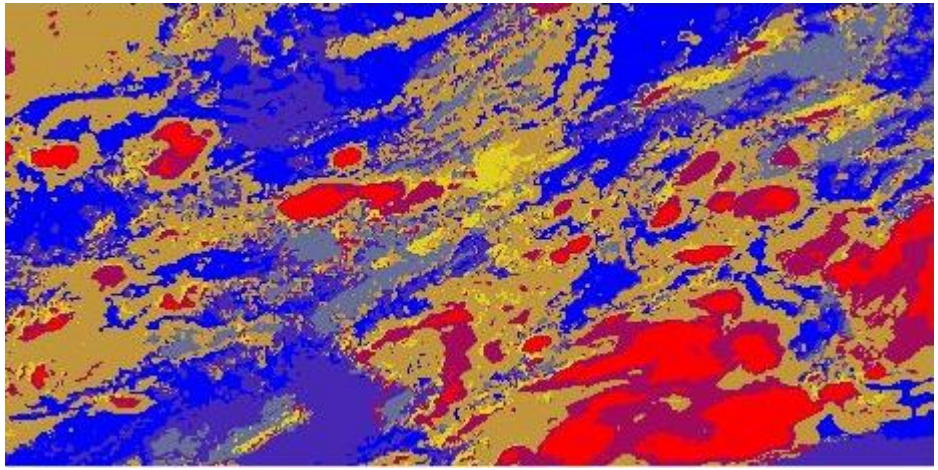


Quality

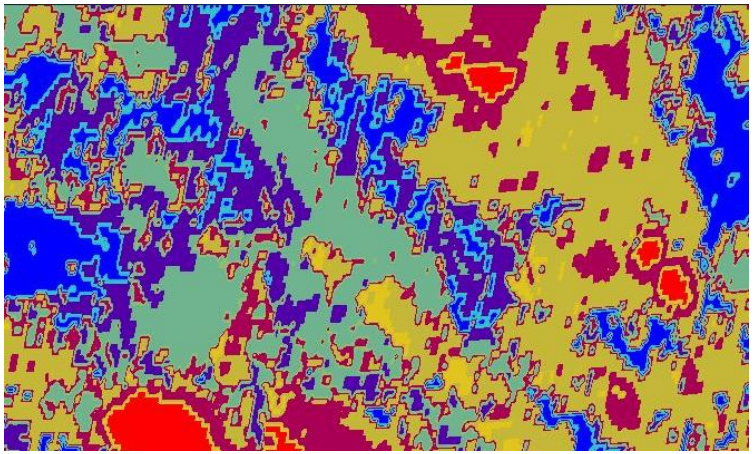


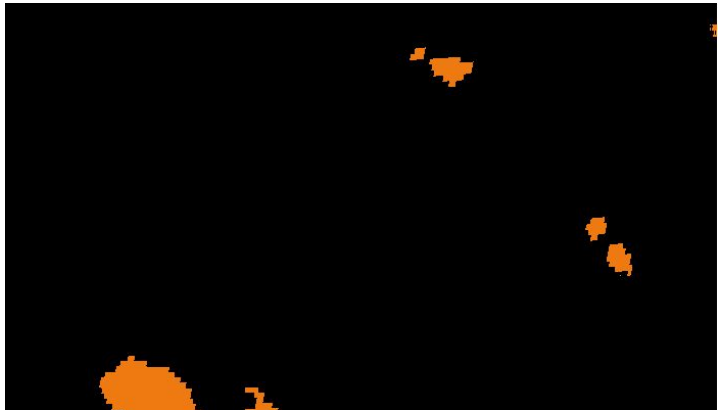
CMSAF műhold adatokkal maszkolt INCA csapadék

CMSAF full

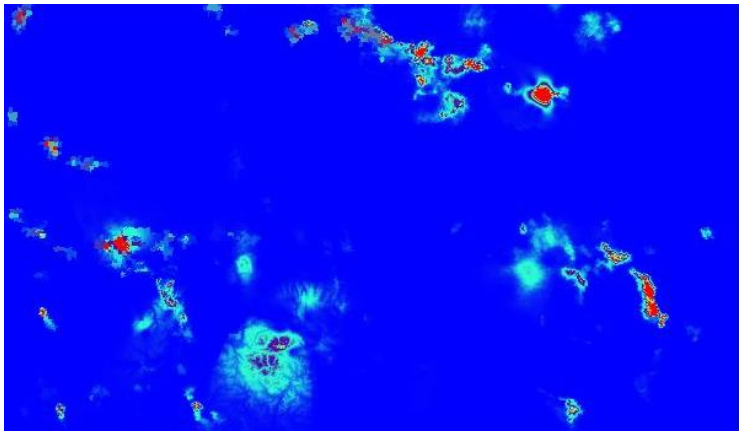


CMSAF INCA domain



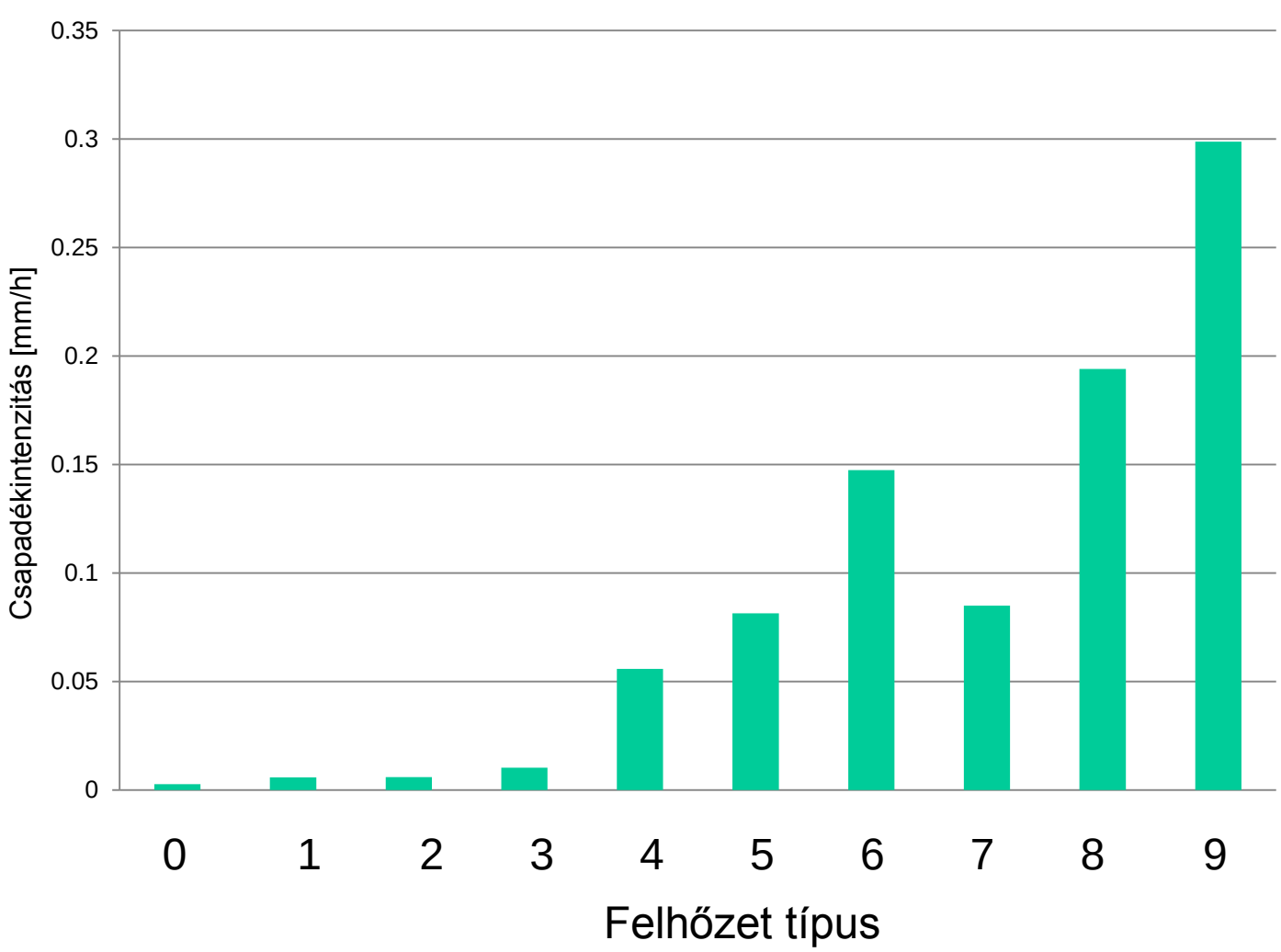


CMSAF masked



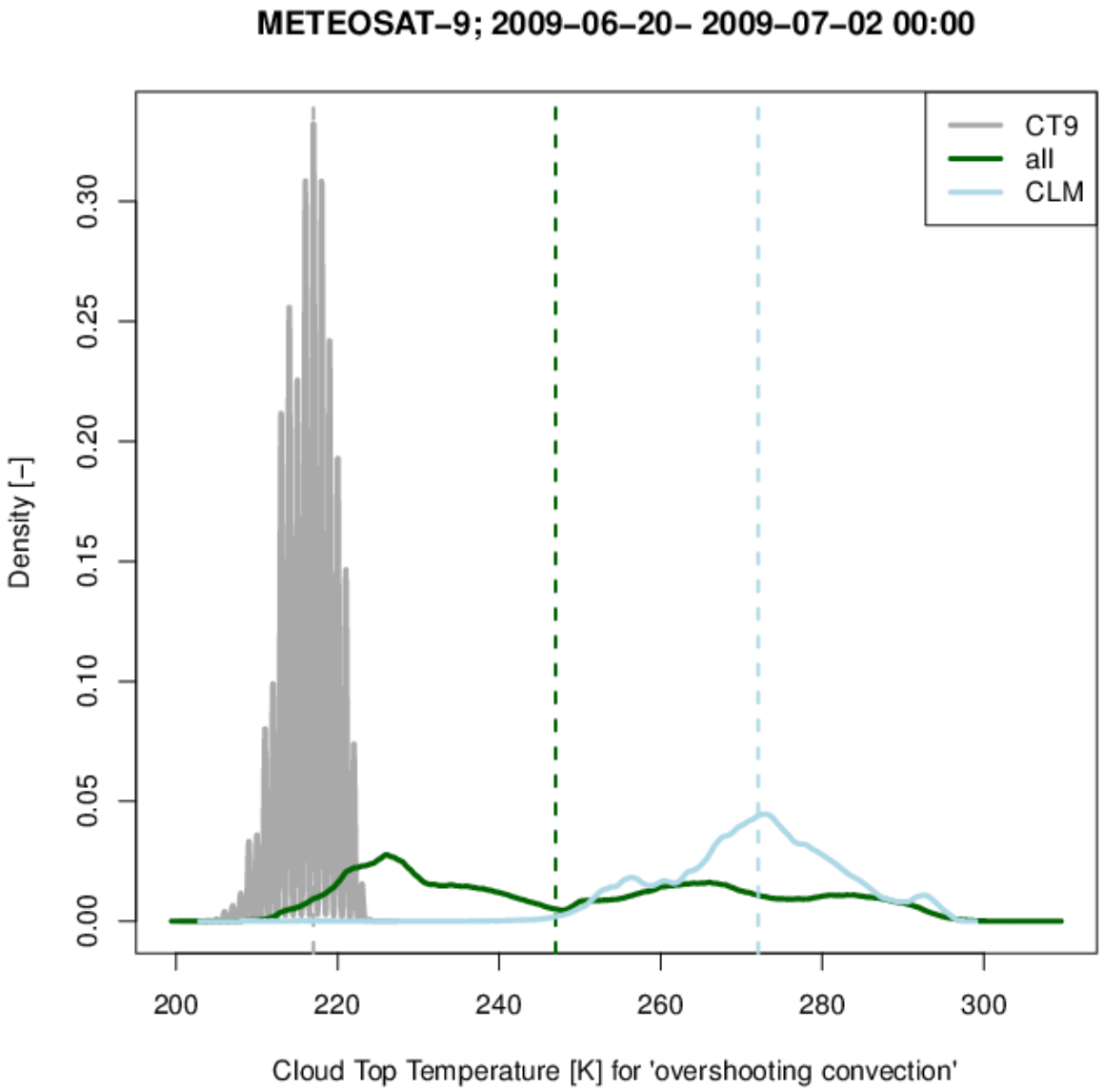
INCA precipitation

Csapadékintenzitás a felhőzettípus függvényében

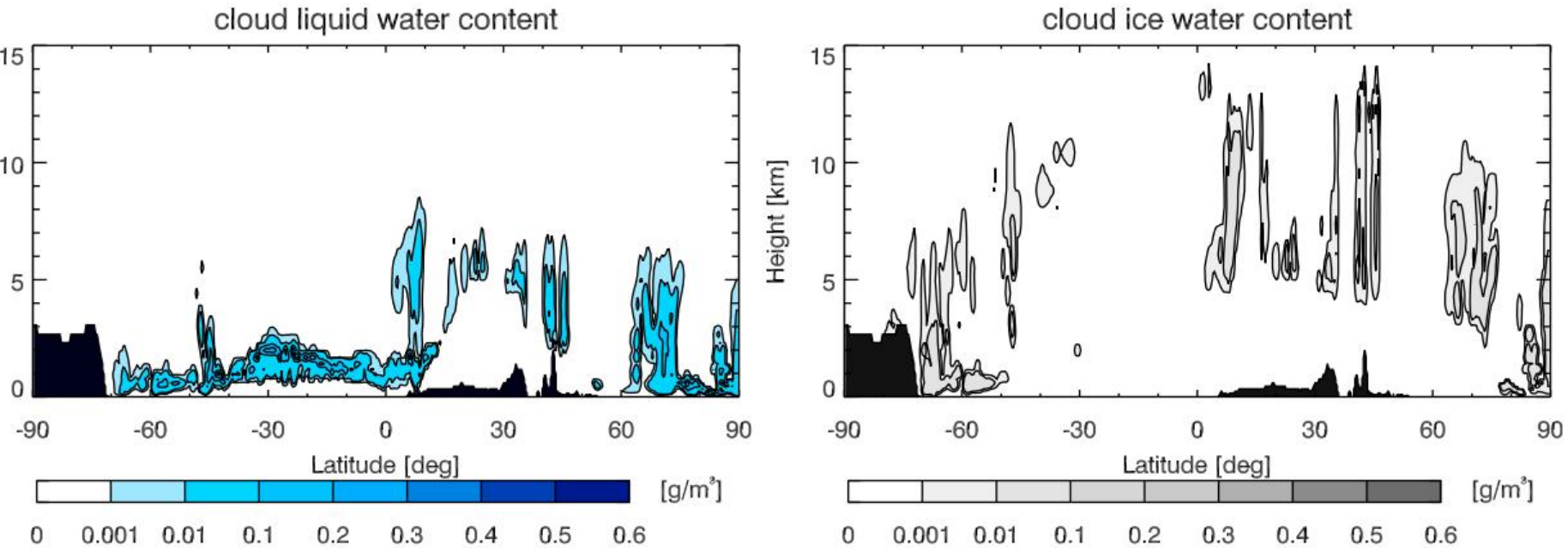


1-clear
2-fog
3-water
4-supercooled
5-mixed
6-opaque_ice
7-cirrus
8-overlap
9-overshooting_convection

Felhőtető hőmérséklet

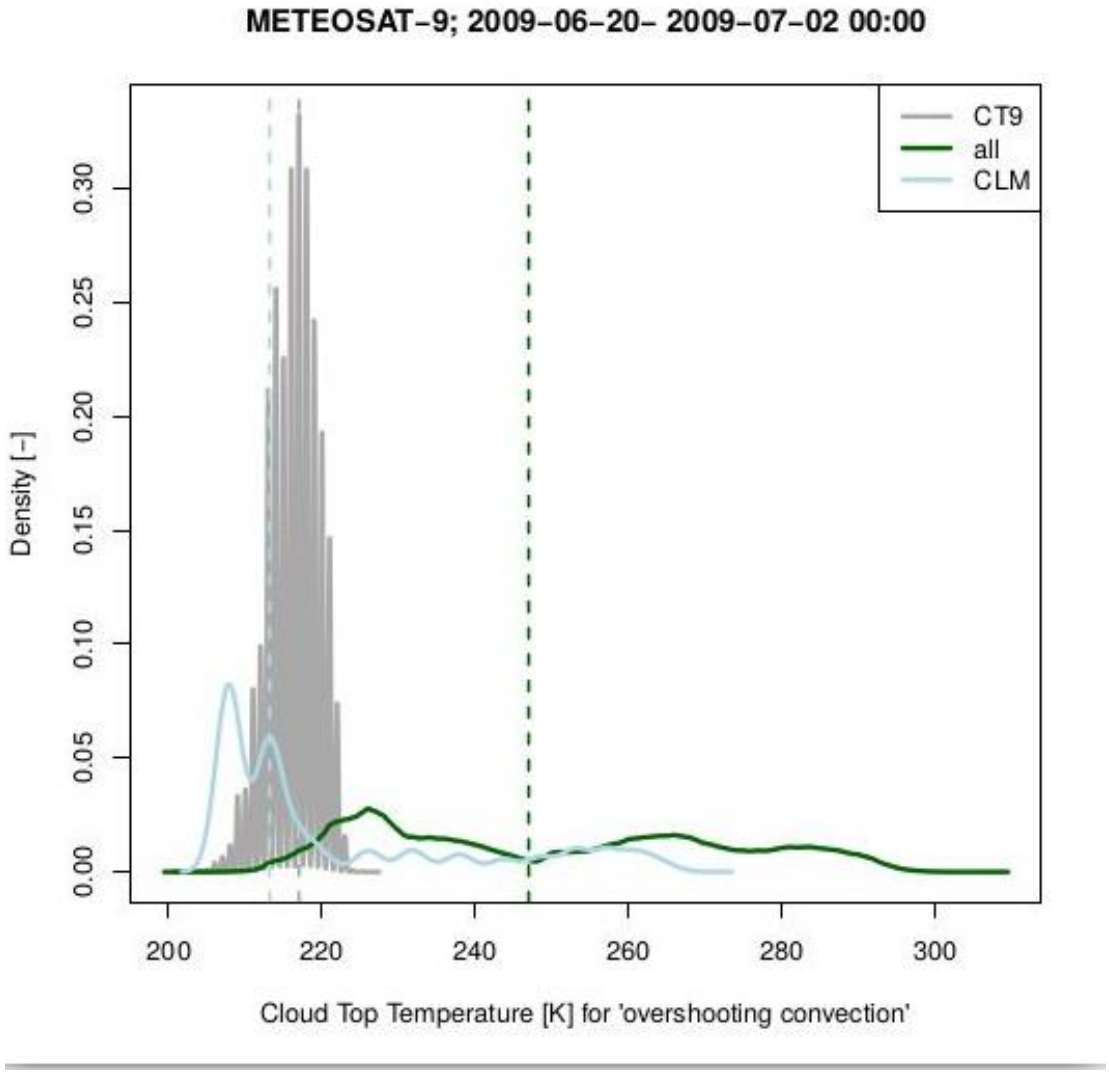


Felhők jégtartalma



Schweitzer, S., G. Kirchengast, M. Schwaerz, J. Fritzer, and M. E. Gorbunov (2011), Thermodynamic state retrieval from microwave occultation data and performance analysis based on end-to-end simulations, J. Geophys. Res., 116, D10301, doi:10.1029/2010JD014850

Felhőtető hőmérséklet figyelembe véve a felhők jégtartalmát



Konklúzió

•Konvektív helyzetekben kicsi az egyezés a modelek közt
•Mélykonvekciós rácspontok száma nagyobb sekélykonvekció parametrizáció esetében
•Mélykonvekciós rácspontok száma nem okoz több csapadékot
• Alacsonyabb nedvesség az alsó atmoszférában sekélykonvekció parametrizáció esetében