

**CALMO-MAX** 

# status since the last meeting in Cottbus, Germany, February 2020

# COSMO General Meeting 3/9/2020

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# Objectives



- Reducing resources for tuning model parameters

   (a) Clustering
   (b) Using only full data records
- 2) The effect of large differences between model and observations when low RH is measured.
- 3) Convert the MM from Matlab to Octave at ECMWF
- 4) Missing Data For The Meta Model Mediterranean domain

# **1a) The clustering method**

- Data source EAR5 (resolution ~ 28 km) at 12 UTC SLP, geopotential height, q, u, v, at 850, 700 and 500 hPa levels from
- **Define the number of clusters** , n = 20 clusters
- **Cluster representative day** how it as find?
- Normalize weights by the fraction of days in each cluster.

RM: 101 20131215 00 lag: 00 elem: 0 11 31 35 77 87 98 101 282 301 306 312 362 RM: 32 20131215 00 lag: 00 elem: cl. pop: 1 33 49 145 150 151 152 328 329 332 333 20131215 00 lag: 00 elem: cl. pop: RM: 4 5 6 7 34 337 338 339 340 341 342 347 pop: RM: 222 20131215 00 lag: 00 elem: 43 8 103 104 105 106 107 126 127 129 130 132 161 162 171 172 173 175 176 177 179 180 181 182 210 211 221 222 223 224 227 228 cl. 229 244 51 255 201 262 206 267 289 290 296 304 cl. 5 op: 34 RM: 45 20131215 00 lag: 00 elem: 9 10 25 27 44 45 46 47 48 50 96 108 110 111 112 131 141 142 143 144 149 160 174 178 253 254 281 302 303 317 323 346 353 363 Cl. 6 95 99 Cl. 7 Cl. 8 Cl. 9 Cl. 10 Cl. 11 Cl. 12 Cl. 13 pcp: 40 70 20131215 00 lag: 00 elem: RM: 12 17 20 21 22 23 26 66 67 68 69 70 74 78 79 80 81 82 83 84 85 88 89 90 91 92 93 94 40 41 65 99 102 138 139 140 145 148 364 16 FM: 16 20131215 00 lag: 00 elem: 13 14 pop 24 32 36 37 38 39 43 71 72 73 324 359 15 pop: pop: pop: 20131215 00 lag: 00 elem: 8 75 18 19 75 76 86 97 307 358 R 1: 309 20131215 00 lag: 00 elem: 28 29 30 259 288 309 6 RN: 54 57 20131215 00 lag: 00 
 42
 51
 52
 53
 54
 55
 109
 318
 325
 326
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 56
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 58
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 60
 61
 62
 320
 334
 335
 11 RM: elem: pop: RM 57 20131215 00 lag: 00 elem: RM: 135 20131215 00 lag: 00 elem: 10 19 pop: pop: 63 64 115 116 117 134 135 136 137 147 236 237 238 271 272 283 284 321 322 299 RM: 20131215 00 lag: 00 elem: 100 133 285 286 287 299 300 305 310 311 Cl. 14 pop: 53 RM: 206 20131215 00 lag: 00 elem: 113 114 119 120 2 215 216 217 234 239 246 247 248 249 256 268 269 270 273 274 275 276 291 pop: 0131215 00 lag: 00 elem: 113 114 119 120 121 122 123 124 125 128 155 156 157 158 159 163 164 165 166 167 168 169 170 203 204 205 206 207 212 213 214 293 294 297 298 Cl. 15 pop: 15 50 20131215 00 lag: 00 elem: 118 183 208 209 218 219 220 230 235 250 252 257 277 292 295 RM: Cl. 16 pop: 40 M: 187 20131215 00 lag: 00 elem: 153 154 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 225 226 231 232 233 240 241 242 243 245 263 264 265 278 279 316 319 280 315 Cl. 17 pop: RM: 368 20131215 00 lag: 00 elem: 258 260 308 313 RM. 339 29131215 00 lag: 00 elem: 314 330 331 Cl. 18 pop: 3 Cl. 19 pop: 343 20131215 00 lag: 00 elem: 336 343 344 345 348 349 6 RM: RM: 356 20131215 00 lag: 00 Cl. 20 pop: 9 elem: 350 351 352 354 355 356 357 360 361

- For example cluster number 1.
- Has 13 days (pop).
- Representative day is 101 (since 1.1.2013 -> 12/3/2013).
- The weight is 13/365 = 0.0356.

## **1b)** Using only full data records

- In the run of all days in 2013 (the run of all 365days in one run), instead of running 36 times the 36 day "decades" (10 days) we run in one job (process) all 365 days.
- In the run of all 365 days the number of grid points was reduce by ~88% because there was not enough machine memory for all grid points in all days.
- We added grid points to the 365 days running by looking on each 10 days ("decade" of days) in 2013.
- we used only grid points where all surface fields where at least 7 days out of 10 days had data on all 5 surface fields.
- Every grid point that was taken into account must have available data in observations and all model simulations.
- In January the number of surface fields is 3 and not 5 because there are not data of daily dew point 2m temperature.

# Results













# 2) The effect of large differences between model and observations

1.) Temp obs – Temp default simulation < |10°c|

2.) Temp obs – Temp default simulation < |7°c|

The difference between 2m daily max of dry temperature default simulation to observations in the last 3 tents days of 2013 (most of the days in December 2013, the period of 3 tents days is : 27/11/2013-26/12/13)



The difference between 2m daily min of dry temperature default simulation to observations in the last 3 tents days of 2013 (most of the days in December 2013, the period of 3 tents days is : 27/11/2013-26/12/13)



The difference between 2m daily max of dew temperature default simulation to observations in the last 3 tents days of 2013 (most of the days in December 2013, the period of 3 tents days is : 27/11/2013-26/12/13)



The difference between 2m daily min of dew temperature default simulation to observations in the last 3 tents days of 2013 (most of the days in December 2013, the period of 3 tents days is : 27/11/2013-26/12/13)



The differences between The running CALMOMAX performance Score with and without the restriction of no more than |10°c| difference between observation to default simulation model forecast.

- All data points which the absolute differences between the model default simulation to observation is higher or equal **10°c are changed to NaN (Not Avaliable).**
- In the differences (model-obs) temperature restriction test, notice that the number of grid points remains the same but the number of available data points change.

#### Tkhmin



rlam



#### V0snow









#### 3) Convert the Meta Model from Matlab to Octave at ECMWF

- The MM code is converted to octave-4.2.0 from the Matlab code.
- **Open issue** graphical files is not working at ECGATE server. ECMWF Technical Mars staff is working to solving the problem.
- **Code location** At ECGATE server /scratch/ms/il/ili/CALMOMAX/MM\_code\_May2018/main.
- **Recommendations** not to work in CCA server as qsub is limited to 48 hours, however in ECGATE server you are able to run 7 days !!! Using sbatach.
- Medium Stage Before iteration Stage
  - 1.) datamatrix.mat for surface observation,
  - 2.) datamatrix\_so.mat for radiosondes observations,
  - 3.) output file main\_data.mat contain all data from observations and all model simulations the Meta Model Coefficients: "a", "b" & "c".
- Output file from the final stage: Iteration Stage. 6 files of output (see the next table)

Stage	files which are produces	Type of date			
Read data	datamatrix.mat	File in octave format (structure format*) that contain surface observation and surface model simulation forecasts in one structure names datamatrix			
	datamatrix_so.mat	File in octave format of radiosondes observation and atmospheric model simulation forecasts in one structure names datamatrix_so			
Meta model	moddata.mat.mat	File in octave format that contains the coefficients "a", "b" and "c" for the surface meta model			
	Metmodel_s.mat	File in octave format (structure format) that contains the atmospheric coefficients "a", "b" and "c" for the meta model			
	Main_data.mat	File in octave format (structure format) that contains all data from observations and all model simulations the Meta Model Coefficients: "a", "b" & "c".			
	"Ihscore_save_(iteration number).mat" **	File in octave format (array format) which contains the all 1000 Performance scores (PS) for every iteration.			
Final stage (The iteration stage which finds the Best performance score and the best optimal	"UB_(Iteration number).mat"	Files in octave format (matrix format) which contain all the parameters combination for the maximum PS, from the first iteration until the iteration which is in the name of the file, for example <b>UB_3.mat</b> conations the five parameters combination for the max performance score (PS) for iteration 1 to 3.			
parameters	LB_(iteration number).mat	The same as above but for the minimum PS			
combination	delta_popt_(iteration number).mat	Files in octave format (array format). The difference between maximum to minimum PS in each iteration. For example for iterations 1 to 5 the file will be called: "delta_popt_5.mat".			
	popt_arr_max.mat_(iteration number).mat	Files in octave format (array format) .The maximum PS for each iteration. For example for iterations 1 to 10 the file name is: "popt_arr_max_10.mat"			
	popt_arr_min.mat_(iteration number).mat	The same as above but for the minimum PS			
	Popt_reg.txt	Ascii file of one line. The optimal parameter combination. Taken from the Maximum PS in the last iteration.			
	Last_iteration.txt	The last iteration which the iteration loop stops. The file format is in Ascii and conations only one number. The last iteration can be because of convergence or because the iteration loop reached the maximum number of allowed iteration, usually it is 40.			

\*A structre format in Octave and Matlab is structre which conatians certaion matrix and or arry. For example Is obsdata is a matrix of observation and refdata is a matrix of default simulation forecast results . Than the structure datamatrix is built of two matrixes in the following way: datamatrix.obsdata (for the observation matrix) and datamatrix.refdata (for the default simulation matrix).

\*\* Iteration number for example to iteration 3 the file name is "Ihscore\_save.3.mat"

#### 4) Missing Data For The Meta Model Mediterranean domain

- Surface observation fields such as: Daily Max 2m Tdry, Daily Min 2m Tdry, Daily Max 2m Tdew, Daily Min 2m Tdew and Daily Rain.
- All surface observations should be for 2019.
- Radio Observation for the year 2019.
- External data such as topography height of every grid point, latitude of every grid point and longitude of every grid point.
- Minimum and Maximum model simulation as will be detailed in the next slide (next table).
- The simulations files and the external files should be in NetCDF files in order not to change the MM model commands.

#### Missing model COSMO simulation\* for the Mediterranean Domain

Simulation	missing
Default	missing
simulation	
Tkhmin minimum value	Missing
Rlam heat	Missing
Minimum	
value	
Rat sea minimum value	Missing
Tur length	Missing
Minimum value	
C_soil minimum value	Missing
Tkhmin maximum value	Missing
Rlam heat	Missing
maximum	
value	
Rat sea maximum value	Missing
Tur length	Missing
Maximum	
value	
C_soil maximum value	Missing

\* It is recommends to have the simulations in NetCDF format in order not to change the MM code.

#### **Summary and Conclusions**

- 1.) The methods of finding the optimal parameters by using 36 times 10 days compared to the method of 365 days, is quite success at least for 4 parameters out 5.
- 2.) The results of optimal parameters for 2013 by using 36 times 10 days is different in the parameter **RLAM** compared to the run of all 365days.
- 3.) The optimal Parameter of RLAM is 0.93 for the median of 36 decade but for all 365 the optimal RLAM is 1.76.
- 4.) In the 365 days method we didn't take into account all grid points (only ~12% compared to the 36 runs of ten days) maybe because of that we find differences.
- 5.) The clustering method results in 3 parameters are very close to the 365 days method and 36 ten days method (VOsnow, Radfac and Uc1).
- 6.) However , in the clustering method the results of 2 parameters (Tkhmin and rlam) are different from the 365 days method and 36 running method.
- 7.) The results of the methods with and without restriction on temperature differences (model-obs) are quite the same.

Thanks for you attention

#### **Summary and Conclusions**

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- 2.) The results of optimal parameters for 2013 by using 36 times 10 days is different in the parameter **RLAM** compared to the run with full records and on run for all 365 days.
- 3.) The optimal Parameter of RLAM is 0.93 for the median of 36 decade but for all 365 the optimal RLAM is 1.76.
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## T2m daily maximum temperature bias on 3/12/2020 Observation minus default simulation, Swiss domain grid points



#### Slide 1: The format of the files in order to Run The MM for the Mediterranean Domain.

• For example . The default simulations file in the SWISS domain where daily surface fields:

- rw- r r	1	itsik	scientist	39448252	May	15	2018	aggregated_DEF_2013110700.nc
- rw- r r	1	itsik	scientist	39448252	May	15	2018	aggregated_DEF_2013110800.nc
- rw- r r	1	itsik	scientist	39448252	May	15	2018	aggregated_DEF_2013110900.nc
- rw- r r	1	itsik	scientist	39448252	May	15	2018	aggregated_DEF_2013111000.nc
- rw- r r	1	itsik	scientist	39448252	May	15	2018	aggregated_DEF_2013111100.nc
- rw- r r	1	itsik	scientist	39448252	May	15	2018	aggregated_DEF_2013111200.nc

 Another example of surface (fields) daily simulation for high HTKM and low UC1 (interaction simulation):

-rw-r--r-- 1 itsik scientist 39448248 Jan 24 2019 aggregated\_HTKHMLUC1\_2013110800.nc -rw-r--r-- 1 itsik scientist 39448248 Jan 24 2019 aggregated\_HTKHMLUC1\_2013110900.nc -rw-r--r-- 1 itsik scientist 39448248 Jan 24 2019 aggregated\_HTKHMLUC1\_2013111000.nc -rw-r--r-- 1 itsik scientist 39448248 Jan 24 2019 aggregated\_HTKHMLUC1\_201311100.nc -rw-r--r-- 1 itsik scientist 39448248 Jan 24 2019 aggregated\_HTKHMLUC1\_2013111200.nc -rw-r--r-- 1 itsik scientist 39448248 Jan 24 2019 aggregated\_HTKHMLUC1\_2013111200.nc -rw-r--r-- 1 itsik scientist 39448248 Jan 24 2019 aggregated\_HTKHMLUC1\_2013111200.nc -rw-r--r-- 1 itsik scientist 39448248 Jan 24 2019 aggregated\_HTKHMLUC1\_2013111300.nc

#### Slide 2: The format of the files in order to Run The MM for the Mediterranean Domain.

Radiosonde simulation in Text format (Text files): for example in the default simulation for 14/11/2013. Filed named "LMvert\_DEF\_2013111400" and the format is:



surface	*53066100494	4 4681	6959913111	40300000063		
	70 9659 494	4 19	13 218	161 0029999E+04 -	.9999E+049900E+02	2
	00 8880 1167	7 13	34 240	594 003 0.3681E-02 0	.0000E+00 0.7823E+02	2
	00 8810 1230	9 23	48 242	705 004 0.3592E-02 0	.0000E+00 0.7035E+0	
	00 8736 1299	9 28	58 244	768 005 0.3500E-02 0	.0000E+00 0.6563E+02	Rh [%
	00 8658 1372	2 33	68 244	790 006 0.3404E-02 0	.0000E+00 0.6089E+02	2
	00 8575 1450	9 33	73 245	780 007 0.3310E-02 0	.0000E+00 0.5880E+02	2
	00 8487 1534	4 38	83 253	644 008 0.3205E-02 0	.0000E+00 0.5444E+02	2
	00 8394 1623	3 41	93 269	493 009 0.3079E-02 0	.0000E+00 0.5069E+02	2
	00 8296 1718	B 43	104 291	401 010 0.2910E-02 0	.0000E+00 0.4659E+02	2
	00 8194 1819	9 41	112 314	351 011 0.2736E-02 0	.0000E+00 0.4377E+02	
00 is line for	00 8086 192	/ 39	114 334	298 012 0.2664E-02 0	.0000E+00 0.4289E+02	
altitude	00 7973 204	1 35	114 331	279 013 0.2637E-02 0	.0000E100 0 4299E+02	
						g – mixing ration [kg/kg]
observations						
	Pressu	re		$\langle \rangle$	Wind	d direction azimuth [°]
	[mb/1	O] H	eight [m/10	0]		
				Dry air Tem [°c/10]	perature Dry Ter	mperature – Dew Temp [°c/10]

Model output "Laf" file after converting it to NetCDF format. 3 fields should be ٠ in the "Laf" file : Height (topography), latitude and longitude of the grid points. The date of the "Laf" file does not matter.

-rwxrwxrwx 1 itsik scientist 10764924 Feb 22 2017 laf2013111600 filtered.nc

The Surface observation and Radiosonde observations can be in text format, asci format or NetCDF format.



## For ten days in 27/11/2013-06/12/2013

IMS matlab	How many data surface points now because of the condition That Tmodel- Tobs	Tkhmin [0.1-1]	Rlam [0.1-2]	V0snow [10-30]	Radfac [0.3-0.9]	Uc1 [0-1]
With out any condition	100%	0.3082 (0.3108)	1.677 (16.33)	17.99	0.8832 (0.8738)	0.8724
With the condition of temp diff <  10°c	99.34%	0.3108	1.633	18.03	0.8738	0.8759
With the condition of temp diff <  7°c	97.84%	0.3376	1.4028	19.3575	0.8170	0.9191
With the condition of temp diff <  5°c	94.63%					



## For ten days in 07/12/2013-16/12/2013

IMS matlab	How many data surface points now because of the condition That Tmodel- Tobs	Tkhmin [0.1-1]	Rlam [0.1-2]	V0snow [10-30]	Radfac [0.3-0.9]	Uc1 [0-1]
With out any condition	100%	0.1004	1.6995	16.36	0.8302	0.7379
With the condition of temp diff <  10°c	99.60%	0.1003	1.6926	16.38	0.8304	0.7383
With the condition of temp diff <  7°c	97.53%	0.1101	1.6521	16.74	0.8148	0.7466
With the condition of temp diff <  5°c	92.10%					



## For ten days in 17/12/2013-26/12/2013

IMS matlab	How many data surface points now because of the condition That Tmodel- Tobs	Tkhmin [0.1-1]	Rlam [0.1-2]	V0snow [10-30]	Radfac [0.3-0.9]	Uc1 [0-1]
With out any condition	100%	0.9874	0.3689	19.85	0.5914	0.8817
With the condition of temp diff <  10°c	94.29%	0.8877	0.4020	19.30	0.5342	0.8907
With the condition of temp diff <  7°c	91.82%	0.9628	0.3091	19.77	0.5705	0.8847
With the condition of temp diff <  5°c	88.47%					

Investigation of Dry Temperature , Daily minimum of T2m on 3/12/2020 Observation minus Default Simulation for all available Swiss Domain Grid points



Investigation of Dew Point Temperature , Daily maximum of Tdew2m on 3/12/2020 Observation minus Default Simulation for all available Swiss Domain Grid points



Investigation of Dew Point Temperature , Daily minimum of Tdew2m on 3/12/2020 Observation minus Default Simulation for all available Swiss Domain Grid points





# Distribution of observation minimum Default simulation on 3/12/2013

## (Distribution [%] on all available grid points in Swiss Domain)

	>=10°c	<-10°c
Daily Maximum Tdry differences between Obs minus default simulation	0.162%	0.018%
Daily Minimum Tdry differences between Obs minus default simulation	0.010%	1.475%
Daily Maximum Tdew differences between Obs minus default simulation	0.0004%	0.394%
Daily Minimum Tdew differences between Obs minus default simulation	0.0038%	2.058%



To recall what we have done in Summer 2019, The Running on 36 decade: Optimum Parameters summary of 36 decades in Swiss Domain for 2013 (from 1/1/2013-26/12/2013)

Tkhmin	Rlam	V0snow	Radfac	UC1
				How many available data surface points* with data now because of the condition That Tobs-Tmodel < 10c  [%]
0.3530	1.0128	18.41	0.6843	
0.2791	0.9296	18.95	0.6775	
0.2451	0.3481	3.00	0.1219	
0.9999	1.7265	25.29	0.8880	
0.1004	0.3689	12.44	0.3685	96.62% (compared to one line above)
	Tkhmin         0.3530         0.2791         0.2451         0.9999         0.1004	Tkhmin       Rlam         0.3530       1.0128         0.2791       0.9296         0.2451       0.3481         0.9999       1.7265         0.1004       0.3689	TkhminRlamV0snow0.35301.012818.410.27910.929618.950.24510.34813.000.99991.726525.290.10040.368912.44	Tkhmin         Rlam         V0snow         Radfac           0.3530         1.0128         18.41         0.6843           0.2791         0.9296         18.95         0.6775           0.2451         0.3481         3.00         0.1219           0.9999         1.7265         25.29         0.8880           0.1004         0.3689         12.44         0.3685

95 37% (compared to one

# The differences between The running CALMOMAX performance Score with and without the restriction of no more than |10°c| difference between observation to default simulation model forecast.

- In all data points which are connected to surface temperature such as: Daily Tmax, Daily Tdry minimum, Daily Tdew maximum and Daily Tdew minimum. All data points which the absolute differences between the model default simulation to observation is higher or equal 10°c, Than we replace the value for the observation and the model for NaN (not available)
- Notice that the number of grid points remains the same but the number of available grid points change because some of them
  will be assign as NaN if the difference between the model default temperature to observation is more or equal 10°c. It will be
  assign as NaN only for the special date and fields not for all days or other fields therefore the number of grid points remains the
  same.
- Notice that in the methods of taking all 365 days in one run (without any connection to what is written above about the restriction of 10°c), instead of running 36 times the 36 decades. The number of grid points was reduce by ~88% because there was not enough machine memory and sources to run all 365 days. It was huge number of grid points for one run.

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- rw- r r	1	itsik	scientist	39448252	May	15	2018	aggregated_DEF_2013111000.nc
- rw- r r	1	itsik	scientist	39448252	May	15	2018	aggregated_DEF_2013111100.nc
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	00 8810 1230	9 23	48 242	705 004 0.3592E-02 0	.0000E+00 0.7035E+0	
	00 8736 1299	9 28	58 244	768 005 0.3500E-02 0	.0000E+00 0.6563E+02	Rh [%
	00 8658 1372	2 33	68 244	790 006 0.3404E-02 0	.0000E+00 0.6089E+02	2
	00 8575 1450	9 33	73 245	780 007 0.3310E-02 0	.0000E+00 0.5880E+02	2
	00 8487 1534	4 38	83 253	644 008 0.3205E-02 0	.0000E+00 0.5444E+02	2
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	00 8296 1718	B 43	104 291	401 010 0.2910E-02 0	.0000E+00 0.4659E+02	2
	00 8194 1819	9 41	112 314	351 011 0.2736E-02 0	.0000E+00 0.4377E+02	
00 is line for	00 8086 192	/ 39	114 334	298 012 0.2664E-02 0	.0000E+00 0.4289E+02	
altitude	00 7973 204	1 35	114 331	279 013 0.2637E-02 0	.0000E100 0 4299E+02	
						g – mixing ration [kg/kg]
observations						
	Pressu	re		$\langle \rangle$	Wind	d direction azimuth [°]
	[mb/1	O] H	eight [m/10	0]		
				Dry air Tem [°c/10]	perature Dry Ter	mperature – Dew Temp [°c/10]

Model output "Laf" file after converting it to NetCDF format. 3 fields should be ٠ in the "Laf" file : Height (topography), latitude and longitude of the grid points. The date of the "Laf" file does not matter.

-rwxrwxrwx 1 itsik scientist 10764924 Feb 22 2017 laf2013111600 filtered.nc

The Surface observation and Radiosonde observations can be in text format, asci format or NetCDF format.

The compassion in the SWISS DOMAIN, December 2013 between the surface Temperature Dry and Dew point Observation and COSMO default model results.



	<u>Optin</u>	<u>num Parame</u>	eters summa	ry	
3	Number of	Tkhmin	Rlam	V0snow	Radfa

The optimum Parameters	grid points (year)	IKNMIN	Riam	vusnow	каотас	UCI
Mean *						
	9,894,175	0.3530	1.0128	18.41	0.6843	0.4638
Median *	9,894,175	0.0501	0.0007	10.05	0 (777	0 7000
		0.2791	0.9296	18.95	0.6775	0.7686
For all 365 days (in one runs) Where we take grid points that all 5 surface fields exists in each day (~12% of grid points) (Stopped running in iteration 38)**	1,212,645	0.2703	1.7588	18.64	0.7775	0.8297
For all 365 but with the condition only grid points whew Tobs-Tmodel<10°c *	(96.62%)	0.2613	1.6901	18.26	0.7786	0.8328
for 20 reprehensive including weight of each cluster **			0.4070	47.00	0 7400	
	558,925	0.8763	0.4076	17.23	0.7100	0.8434
for 20 reprehensive including weight of each cluster with absolute(Temp obs- Temp model<10°c) **	(95.37%)	0.8720	0.4049	17.25	0.7109	0.8381

\* With regular memory 16Gybte.

\*\* With extended memory 64Gybte.



#### COSI-FSS for COSMO 1km (SWISS DOMAIN) : OPTIMAL PARMETERS daily T2max, T2min, Rain (Tdew is not availed for JAN 2013).

#### With and Without the condition of temperature difference no more than 10°c

IMS matlab	Best iteration number	How many available data surface points with data now because of the condition That Tobs- Tmodel <  10c  [%]	Tkhmin [0.1-1] Without 10°c condition	Tkhmin [0.1-1] With 10°c condition	Rlam [0.1-2] With out 10°c condition	Rlam [0.1-2] With 10°c condition	V0snow [10-30] Without 10°c condition	V0snow [10-30] With 10°c condition	Radfac [0.3-0.9] default Without 10°c condition	Radfac [0.3-0.9] default With 10°c condition	Uc1 [0-1] default 0.8 Without 10°c condition	Uc1 [0-1] default 0.8 With 10°c condition
1-10/1/2013***	19	96.48%	0.3776	0.3759	1.1848	1.1639	25.29	24.91	0.5272	0.5305	0.9990	0.9967
11-20/1/2013***	50* (40**)	90.87%	0.48131	0.5255	0.94376	1.111	16.32	16.93	0.6539	0.6454	0.00004	0.0126
21-30/1/2013***	28	96.67%	0.3090	0.3113	1.601	1.637	17.15	17.32	0.8132	0.8165	0.9326	0.9290
31/1/- 9/2/2013	25	94.29%	0.9999	0.9998	0.7696	0.7650	20.72	20.79	0.7968	0.7973	0.8163	0.8143
10-19/2/2013	19	98.23%	0.9960	0.9988	0.6045	0.5825	18.45	18.41	0.6535	0.6552	0.8331	0.8296
20/2/2013- 1/3/2013	32	98.54%	0.1547	0.1522	1.3944	(1.3702)	21.18	20.91	0.6629	0.6614	0.1092	0.1026
2-11/3/2013	29	97.31%	0.3231	0.3027	1.1654	1.1654	13.53	13.57	0.5429	0.5436	0.00019	0.001564

\* With the special treatment when there is no convergence in iteration number 40 (see slides before that explain how to treat this problem)

\*\* For the condition difference of no more than |10°c| between the default simulation temperature to observation temperature , The program run only until iteration 40 ant there was not Convergence. However when the program we finish running in the last decade we will investigate the second decade (11-20/2/2013) and continue until iteration 50.

\*\*\* w/o Td : without Tdew data (in January there was not observation for surface dry tempature, therefore the surface fields number where 3 instead of 5.