REPORT from the stay

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SENSITIVITY/VALIDATION OF THE OPERATIONAL ALADIN model in SLOVENIA (ALADIN_SI)

by

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SOME PRELIMINARI RESULTS FROM THE LOCAL IMPLEMENTATION OF CANARI SNOW ANALYSIS SCHEME IN THE ALADIN-SLOVENIA (ALADIN_SI)

by

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Introduction

The purpose of the work has been to validate the operational ALADIN_SI model with ALARO physics at 9.9 km resolution in the following cases:

- more precise computation of the pressure gradient via activating of R*T as a spectral variable ("virtual temperature" as spectral variable) (LSPRT=.T.)
- changing the way of computation of the inter-layers ETA(L) (LREGETA=.T./.F.) ;
- initialization of the hydrometeors.

To evaluate the impact of each of the first two factors, we have performed case study experiments, while for studying the impact of initialization of the hydrometeors we have performed one month cycling.

Referring to [1] in presentation f the model characteristics, we will point out that:

- the operational ALADIN_SI model is based on CY35T1 (export version)
- grid points: 256 x 270;
- horizontal resolution: 9.9 km;
- vertical levels: 43;
- coupling model: ARPEGE
- coupling frequency: 3h
- dynamics: hydrostatic
- physics:ALARO-0 (3MT)
- forecast range:72 hours
- time step: 400s
- DFI: yes
- initialization of the hydrometeors: no

The study has been done by L.Taseva and N.Pristov, with tuition and preparation of the informatics environment (scripts for performing the experiments in SMS environment and visualization of the results with R (a language and environment for statistical computing and graphics)) by N.Pristov.

I.1 Study of the impact of the more precise computation of the pressure gradient via activating of RT as a spectral variable (LSPRT=.T.)

For some period the option LSPRT=F instead of the correct LSPRT=T has been used in the operational setup. In this study we wanted to see how big is the impact of the switch LSPRT=F/T on the precipitation fields. As it has been mentioned in [1], the key LSPRT=.T. means activating quantity R*T (where R is specific constant for air, T temperature) to be a spectral variable and to have the pressure gradient term computed more precisely in case of precipitating species being presented.

The validation of the ALARO-5km version over Madeira has been done for CLS elements (2m temperature and humidity, 10 m wind), total precipitation and total cloud cover [1].

In our work we have studied the impact of the switch LSPRT=T/F on the forecast of the CLS elements, but have put more attention to study its impact on the forecast of the precipitation fields. For that reason two summer periods have been chosen (2009062000-2009062500 and 2009070100-2009071000), characterized by significant precipitations (mostly convective type) over the large area of central Europe.

I.1.1 Studying the distribution of the 24- and 48-hour accumulated total precipitation fields

We have started our study with visualization of the 24- and 48-hour accumulated total precipitation fields for the first day of each of the case study periods for the following reasons:

- to get feeling about the daily amounts and their distribution;
- to see afterwards more clearly the impact of the changes which would be made during the study

Here we haven't study the distribution of the total accumulated precipitation for both periods from synoptic point of view, we have just considered:

- the configuration of the precipitation fields , its structure with the areas of min a max values and have traced their evolution for each forecast range;
- the histograms with the distribution of the total precipitation amounts in different intervals since we have been interested in the (areas) number of points with significant precipitation amounts (> 20mm)

On Fig. 1 (a,b,c,d,e) and Fig.2 (a,b,c,d,e) for the starting days 2009062000 and 2009070100 for both periods we have plotted for 24- and 48-hour forecasts the following characteristics (Fig.2 (a,b,c,d,e) is included in the Appendix.doc) :
(a) the 24-hour accumulated total precipitation field (left column); boxplot, histogram of the distribution of the total precipitation (right column);
(b) the histogram of the distribution of the 24-hour accumulated total precipitation within the intervals: [0.1, 5], [5.1,20.], >20 mm;
(c,d) same as (a,b) but for 48-hour accumulated total precipitation;
(e) the difference between the 48- and 24- hour accumulated total precipitation fields, boxplot, scatter plot and histogram of that difference.

From Fig.1 (a,b) is seen that the values of 24-hour total precipitation are within the interval [0, 10] mm, but there are quite a lot of points with 24-hour total precipitation greater than 20 mm.
Fig.1 (c,d) show that there are areas with significant total precipitation values (more than 40 mm) for 48-hour forecasts. The difference between 48- and 24-hour accumulated total precipitation for the day 2009062000 is 50mm (Fig.1 (e)).

On Fig. 3 we have presented the evolution of the distribution of the 24-hour accumulated total precipitation fields for all days of the period 2009062000 - 2009063000 and the histograms with the distribution of the 24-hour total precipitation exceeded 30mm.It is seen that the values of 24-hour accumulated total precipitation are within the range 20-40 mm, but for the whole period there are points (their number is of order of 100 to 200) with total precipitation greater than 50 mm

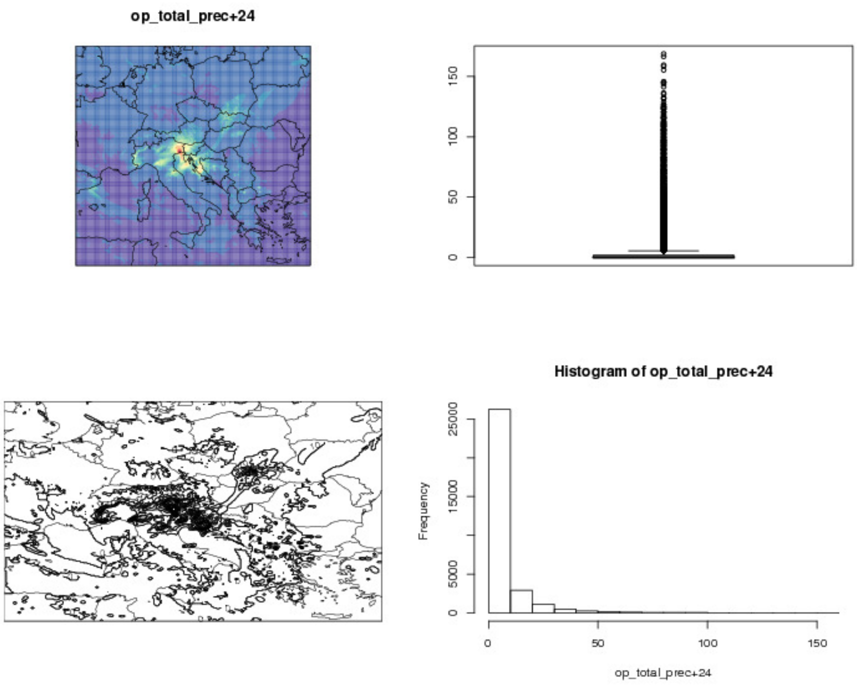


Fig.1 Distribution of the 24-hour and 48-hour accumulated total precipitation fields for 2009062000. Fig. 1 (a) 24-hour accumulated total precipitation field (left column); boxplot, histogram of the distribution of 24-hour total precipitation (right column)

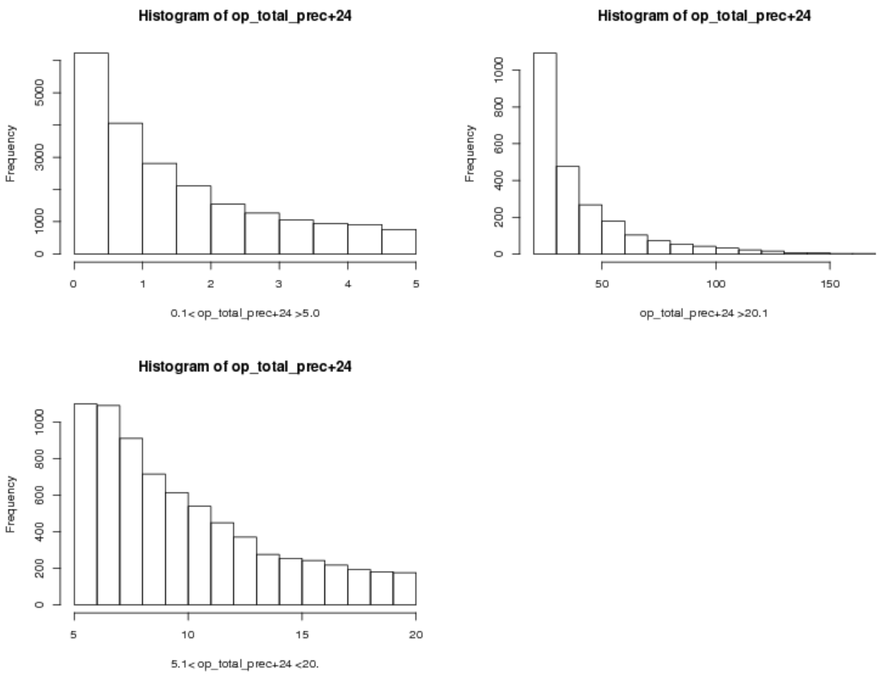


Fig.1 (b) Histogram of the distribution of the 24-hour accumulated total precipitation within the intervals: [0.1, 5]; [5.1, 20.]; >20 mm.

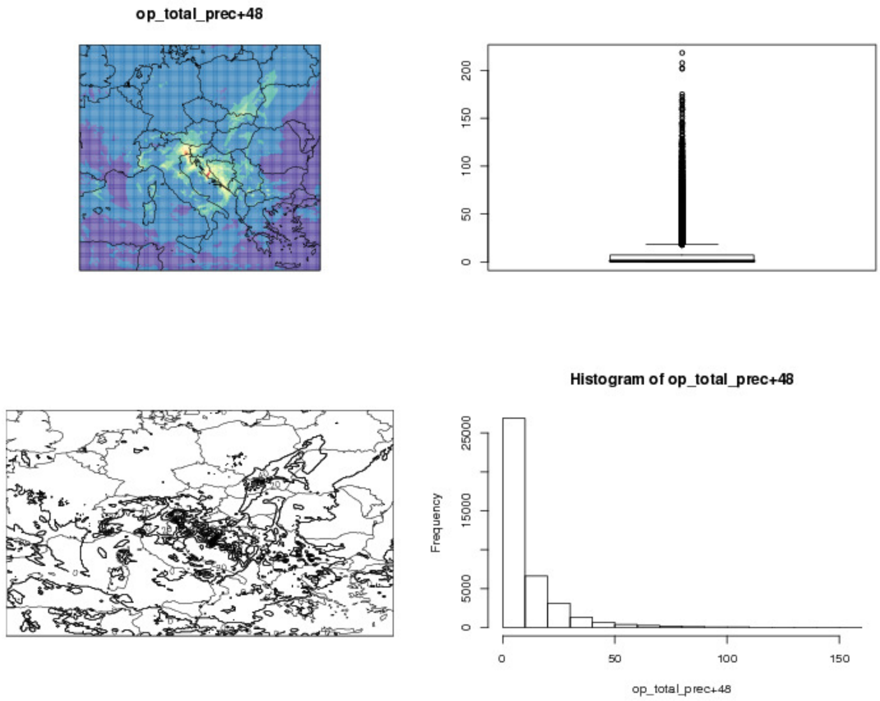


Fig. 1 (c) Same as (a) but for 48-hour accumulated total precipitation

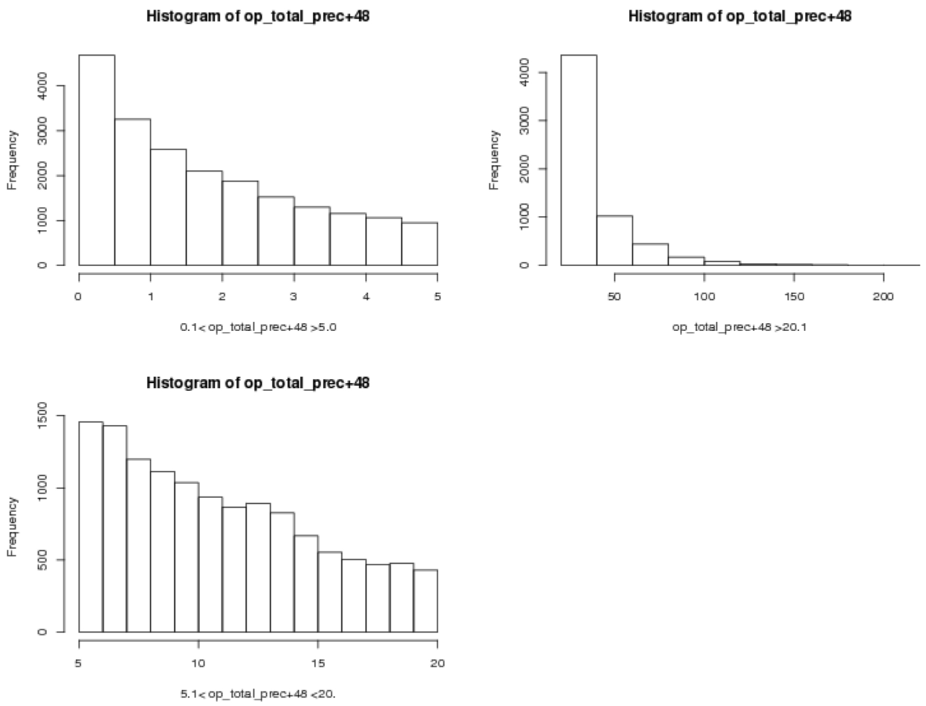


Fig. 1 (d) Same as (b) but for 48-hour accumulated total precipitation

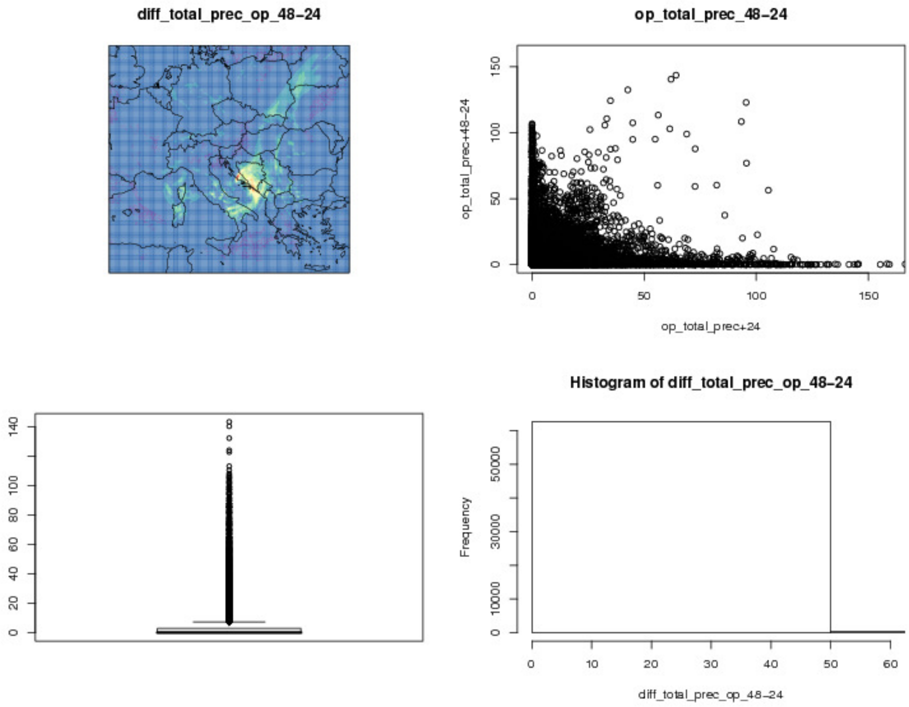
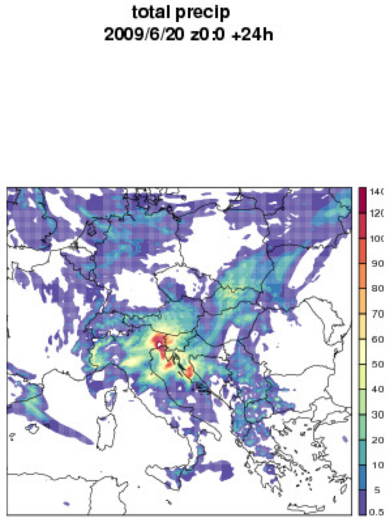
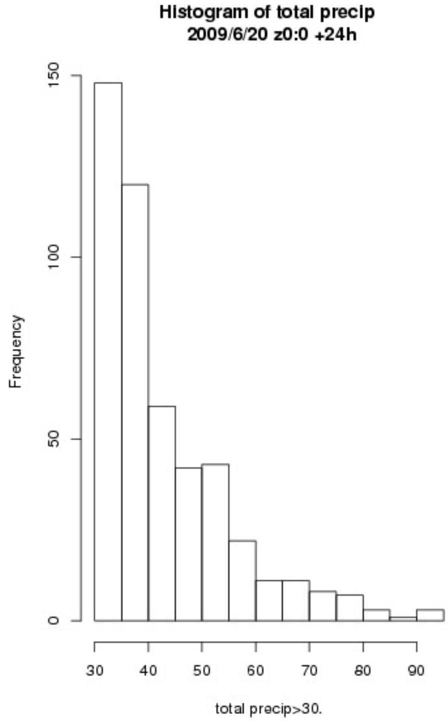
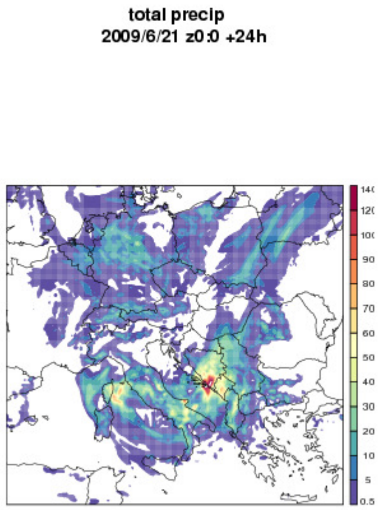


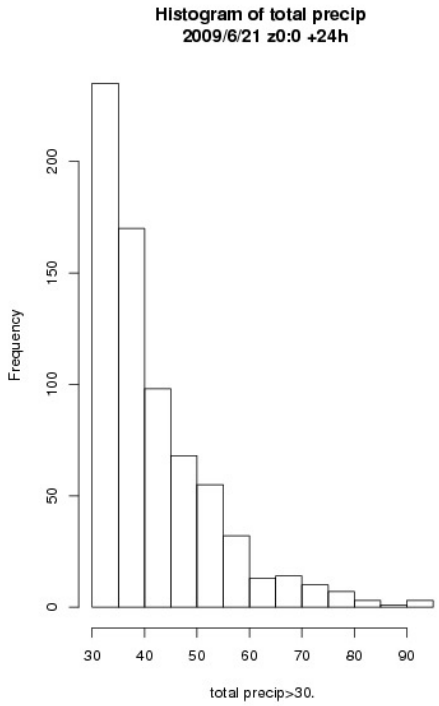
Fig. 1 (e) Difference between the 48- and 24-hour accumulated total precipitation fields, boxplot, scatter plot and histogram of that difference

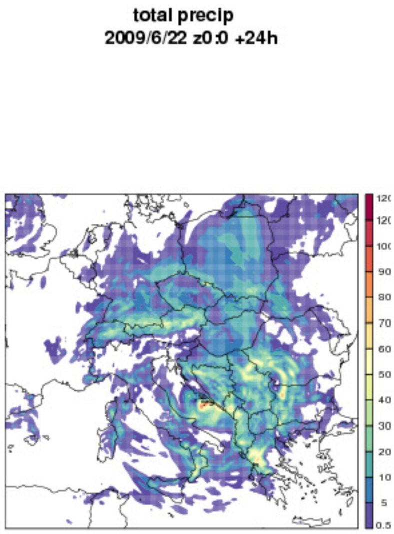
Distribution of the 24-hour accumulated total precipitation fields

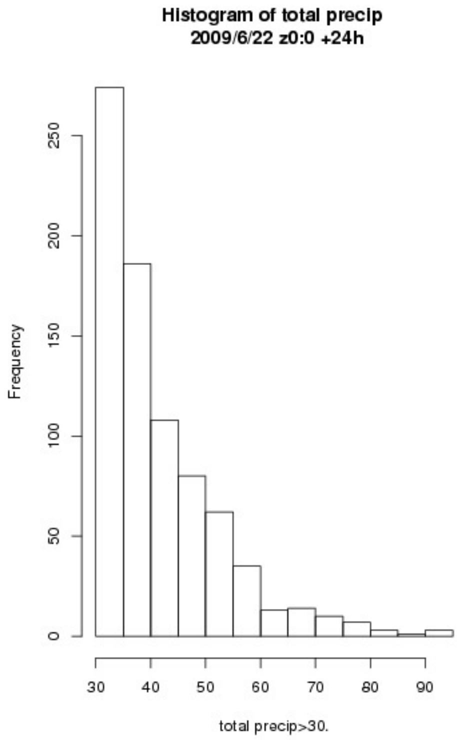


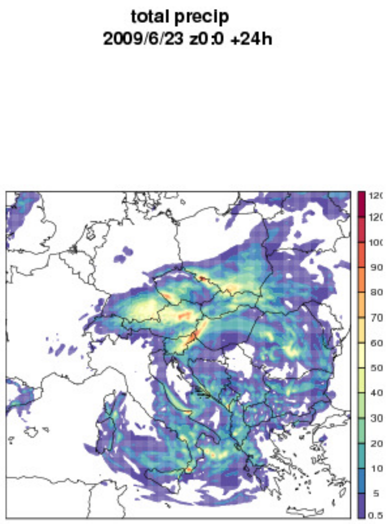


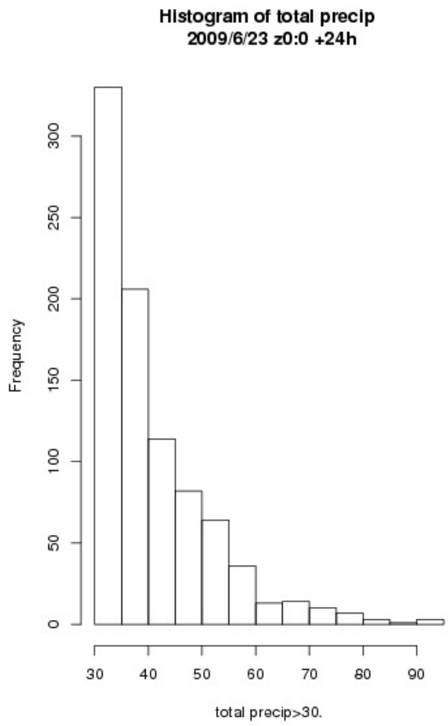


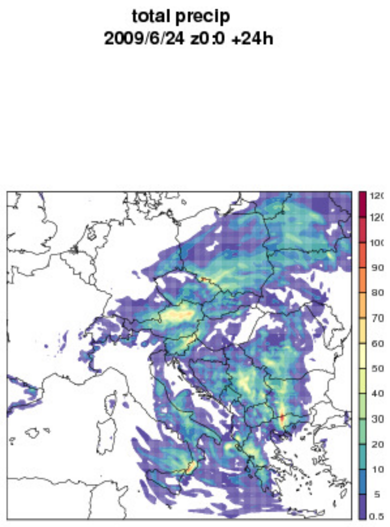


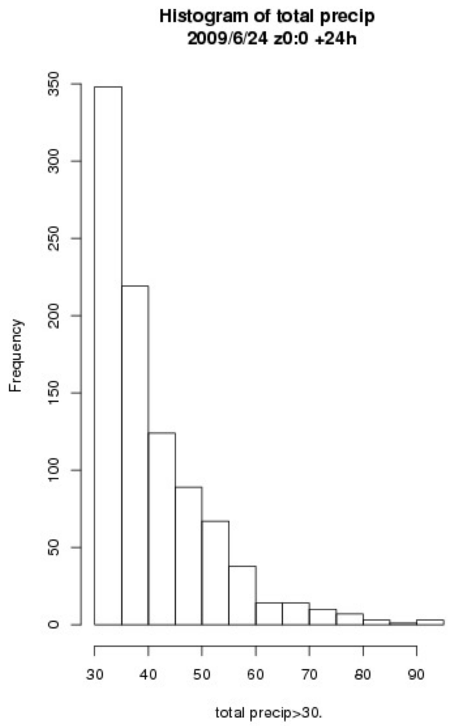

total precip
2009/6/22 z0:0 +24h

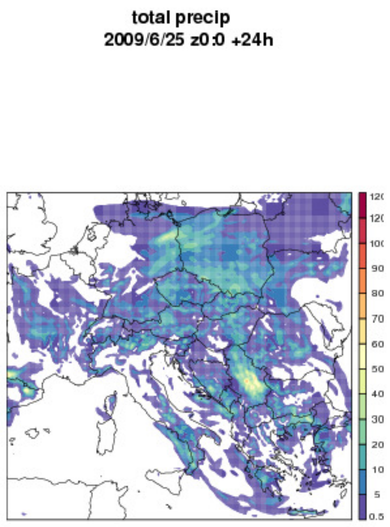

Histogram of total precip
2009/6/22 z0:0 +24h
Frequency
total precip>30.

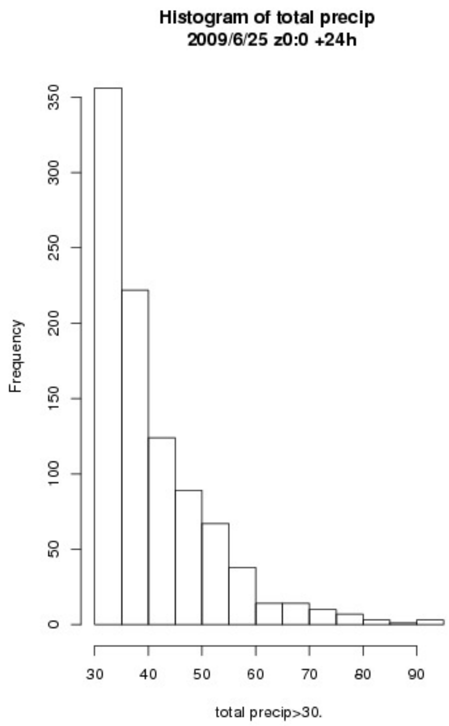

total precip
2009/6/23 z0:0 +24h

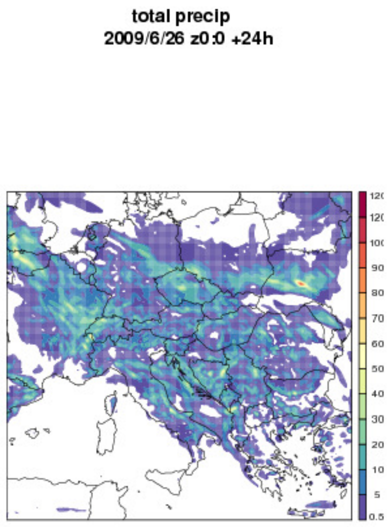

Histogram of total precip
2009/6/23 z0:0 +24h
Frequency
total precip>30.

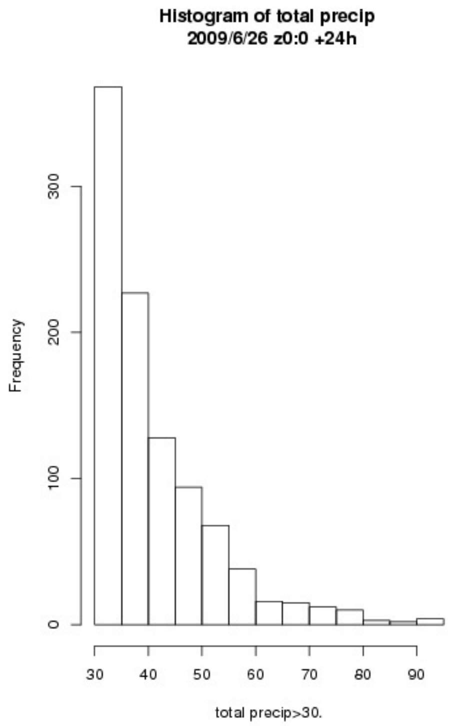

total precip
2009/6/24 z0:0 +24h

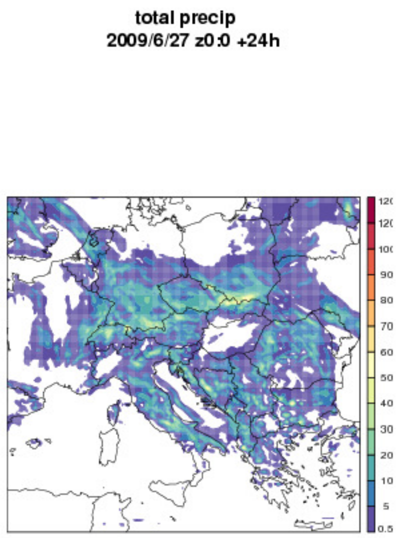

Histogram of total precip
2009/6/24 z0:0 +24h
Frequency
total precip>30.

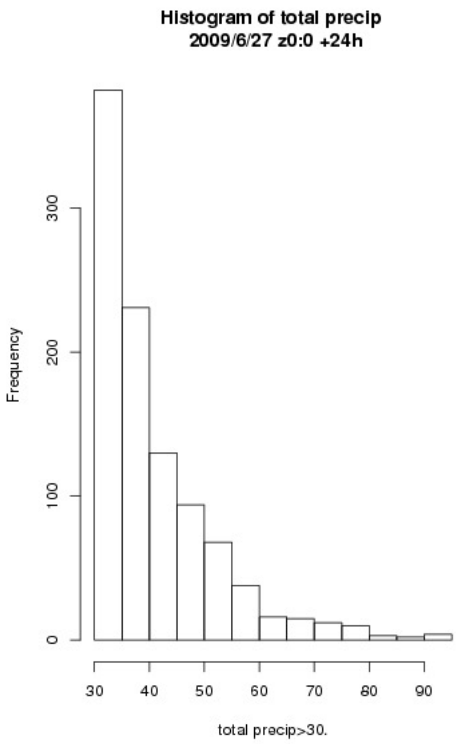

total precip
2009/6/25 z0:0 +24h

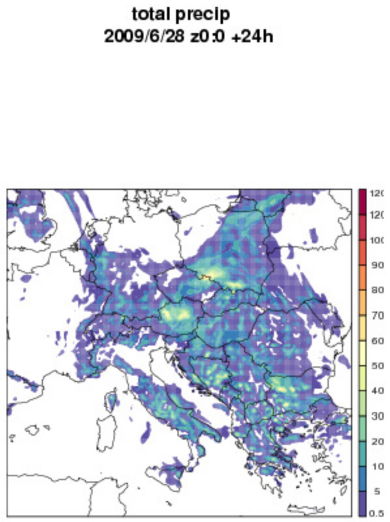

Histogram of total precip
2009/6/25 z0:0 +24h
Frequency
total precip>30.

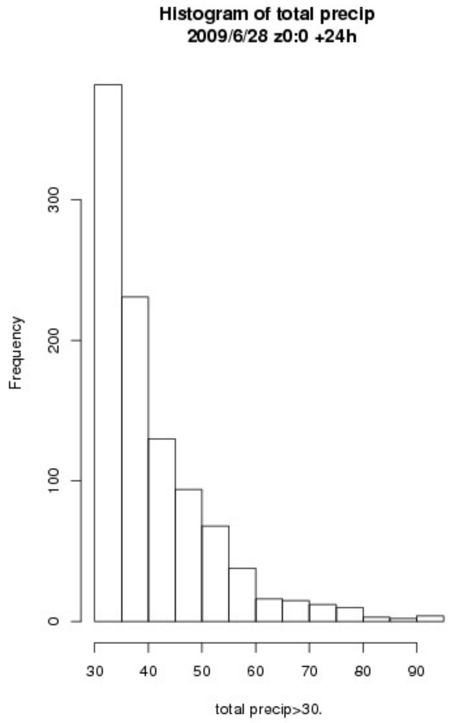

total precip
2009/6/26 z0:0 +24h

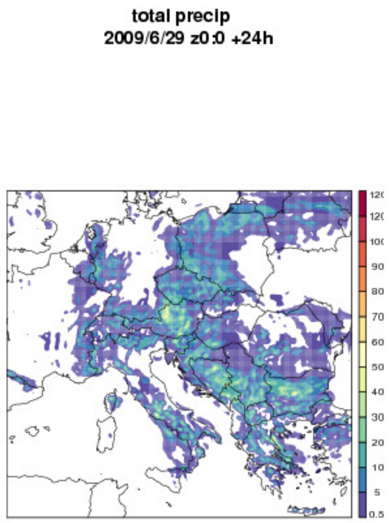

Histogram of total precip
2009/6/26 z0:0 +24h
Frequency
total precip>30.

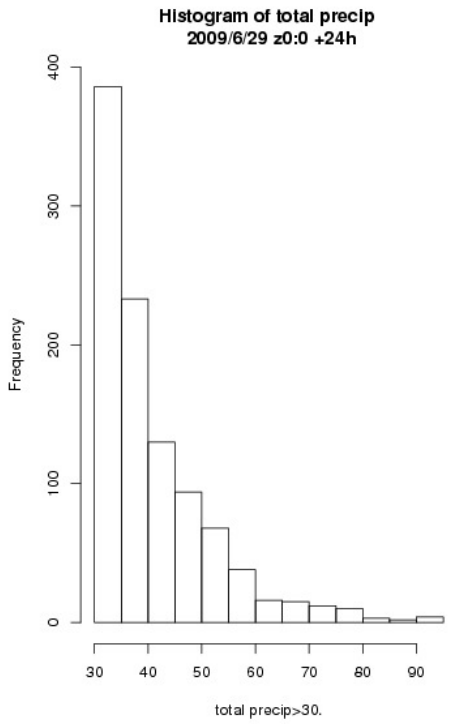

total precip
2009/6/27 z0:0 +24h


Histogram of total precip
2009/6/27 z0:0 +24h
Frequency
total precip>30.


total precip
2009/6/28 z0:0 +24h
90
80
70
60
50
40
30
20
10
5
0.5


Histogram of total precip
2009/6/28 z0:0 +24h
Frequency
0
100
200
300
30
40
50
60
70
80
90
total precip>30.


total precip
2009/6/29 z0:0 +24h
90
80
70
60
50
40
30
20
10
5
0.5


Histogram of total precip
2009/6/29 z0:0 +24h
Frequency
0
100
200
300
400
30
40
50
60
70
80
90
total precip>30.

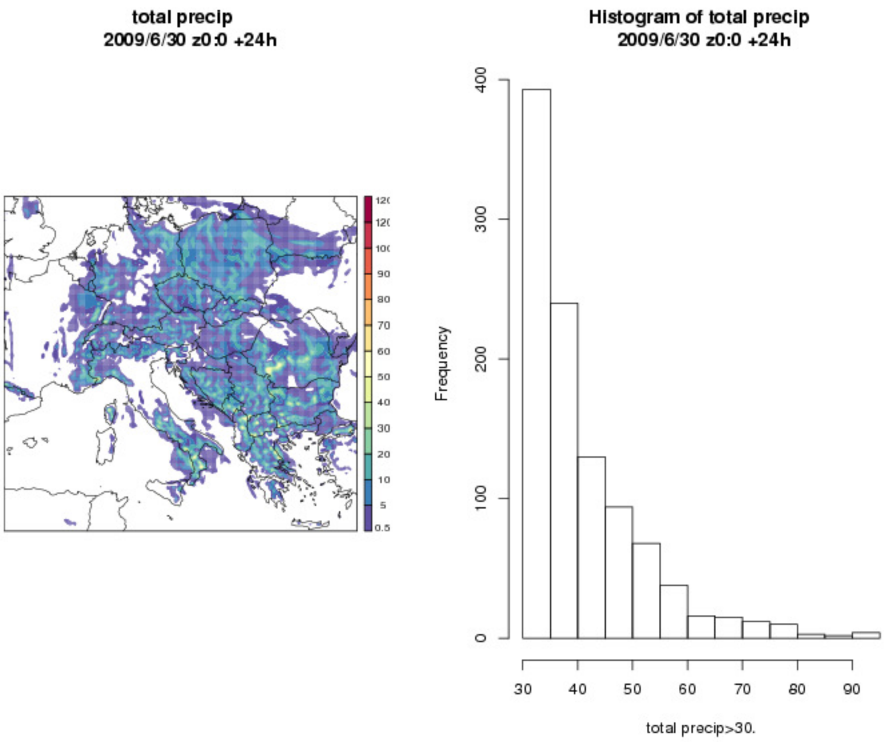


Fig.3 Distribution of the 24-hour accumulated total precipitation fields for 2009062000 - 2009063000

I.1.2 Studying the distribution of 3- and 6-hour accumulated total precipitation fields

Next step has been to study the distribution of the total precipitation amount for the shorter range forecasts which are interesting for the purposes of the nowcasting. On Fig.4 (a,b,c,d,e) and Fig. 5 (a,b,c,d,e) we have presented the same plots as on Fig.1 (a,b,c,d,e) , but for the 3- and 6-hour forecasts (Fig.5 (a,b,c,d,e) is included in the Appendix.doc)

From Fig.4 (a,b) is seen that the 3h-hour total precipitation values are mainly within the interval [0,1] mm, but there are also points with values within the interval [5,20] mm and very few with even higher 3-hour total precipitation.

The distribution of the 6-hour total precipitation (Fig. 4 (c,d)) shows that the values are mainly in the interval [0,5] mm, not negligible number of points are with total precipitation within the interval [5.1,20.] and even with higher values (more than 50 mm). The difference between the 6- and 3-hour total precipitation (Fig. 4(e)) is in the interval [0, 10] mm

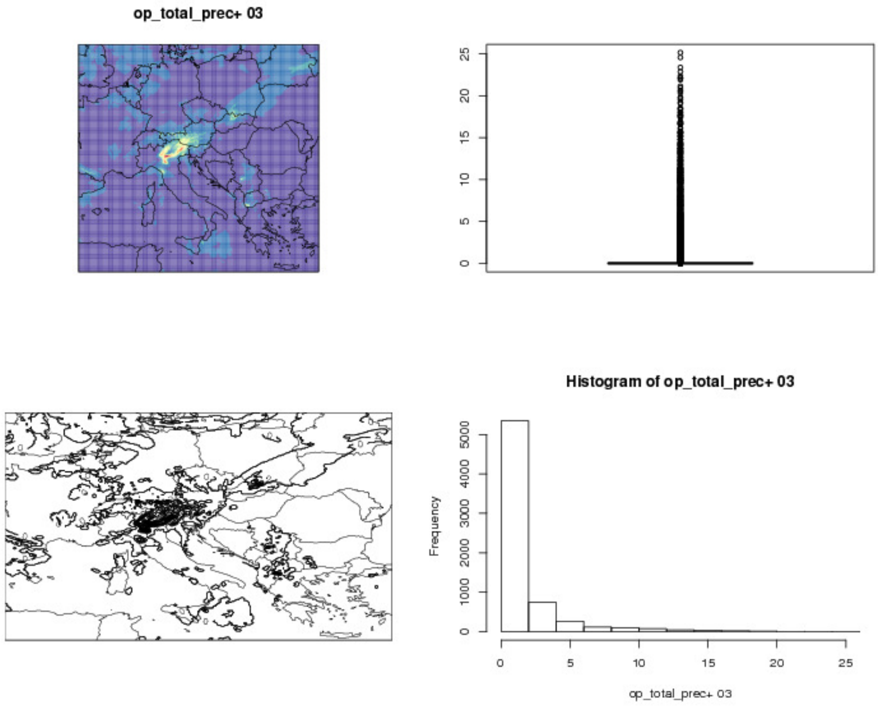


Fig. 4. Distribution of the 3-hour and 6-hour accumulated total precipitation fields for 2009062000. Fig. 4 (a) 3-hour accumulated total precipitation field (left column); boxplot, histogram of the distribution of 3-hour total precipitation (right column)

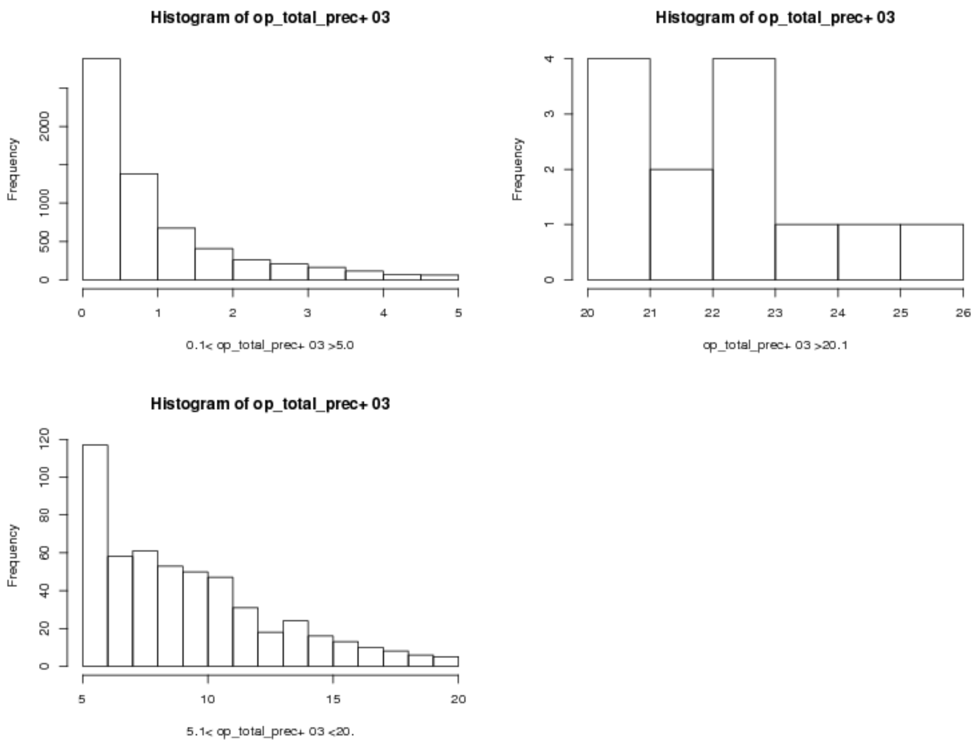


Fig.4 (b) Histogram of the distribution of the 3-hour accumulated total precipitation within the intervals: [0.1, 5]; [5.1,20.]; >20.

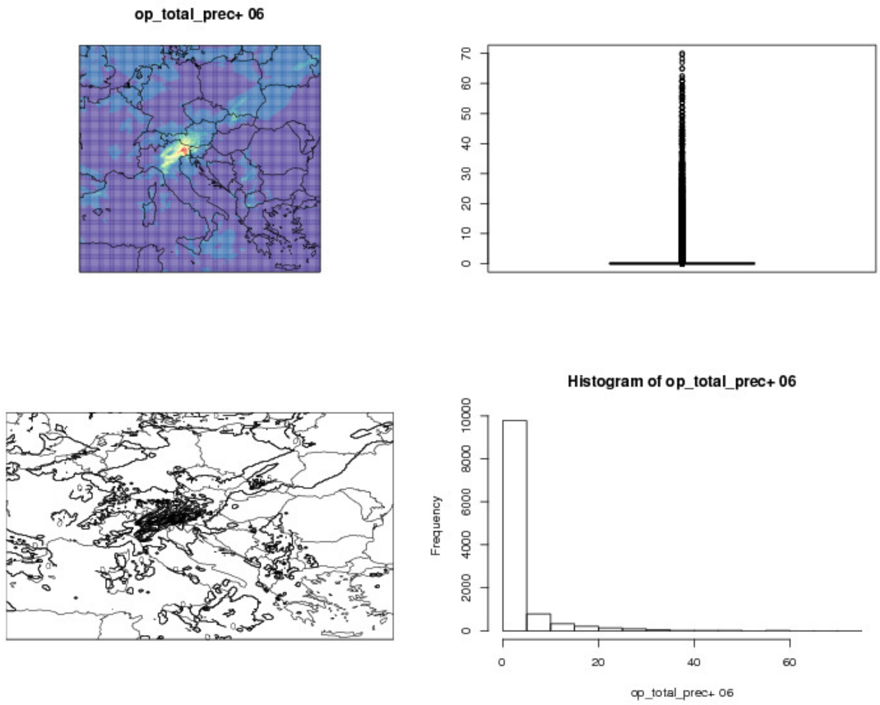


Fig. 4 (c) Same as (a) but for 6-hour accumulated total precipitation

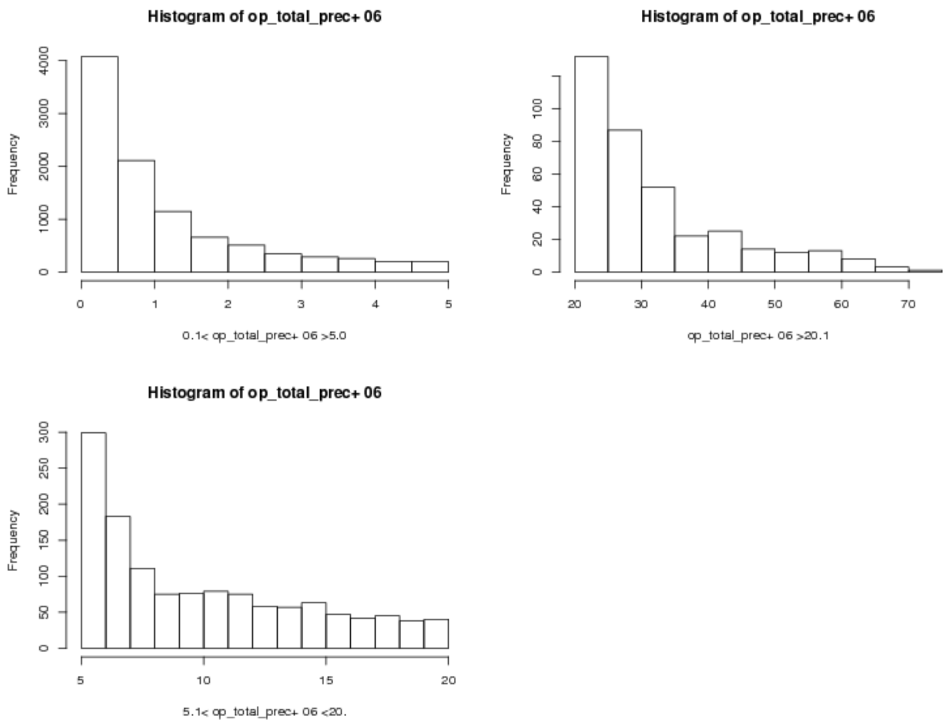


Fig. 4 (d) same as (b) but for 6-hour accumulated total precipitation

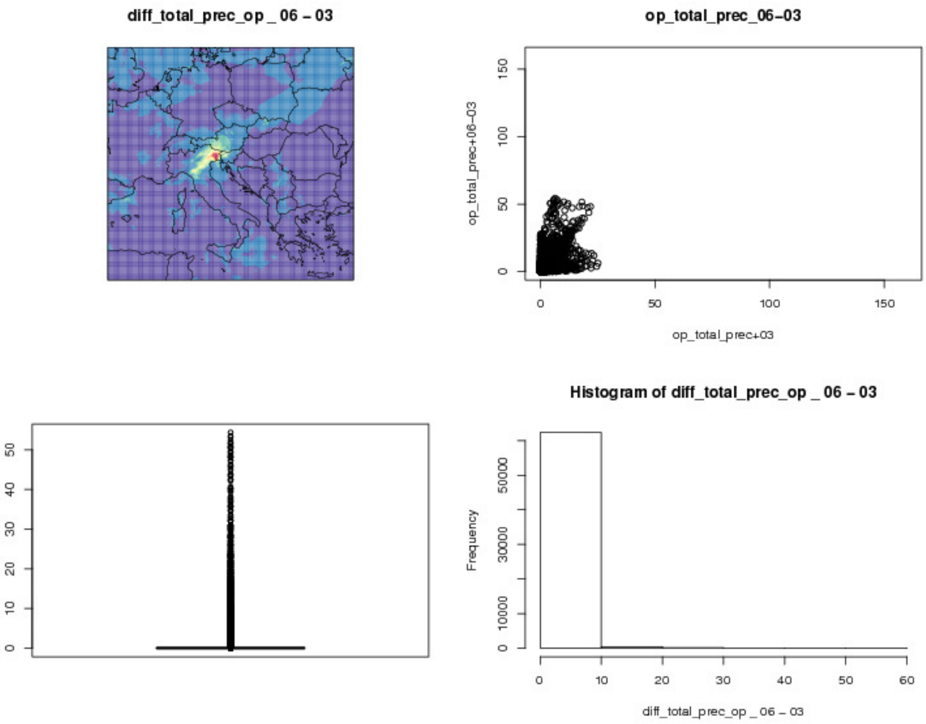


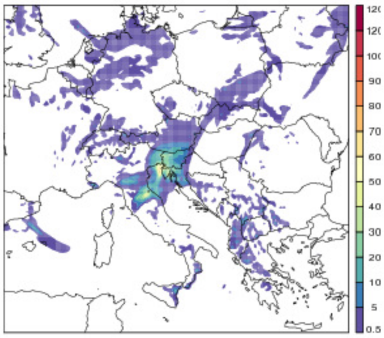
Fig. 4 (e) Difference between the 6- and 3-hour accumulated total precipitation fields, boxplot, scatter plot and histogram of that difference

I.1.3 Studying the distribution of every 3-hour accumulated total precipitation for the 24-hour forecast

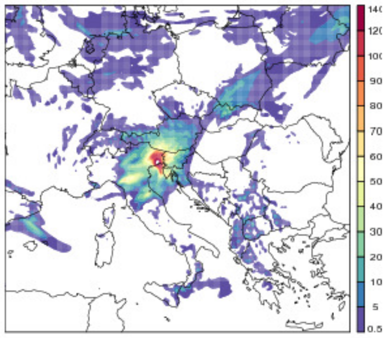
For the days 2009062000 (Fig. 6) and 2009062100 (Fig. 7, which is included in the Appendix.doc) we have visualized the distribution of every 3-hour accumulated total precipitation fields for the 24-hour forecast.

It is seen that the significant total precipitation is a result of the 24-hour accumulation but not for some significant precipitations within each of the 3-hour intervals.

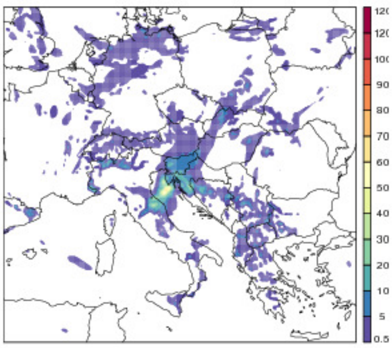
total precip 3h 2009/6/20 z0:0 +12h



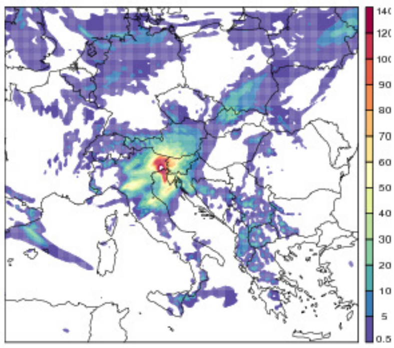
total precip
2009/6/20 z0:0 +12h



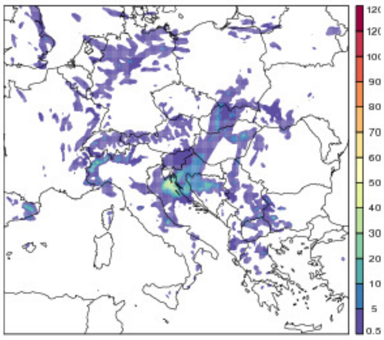
total precip 3h 2009/6/20 z0:0 +15h



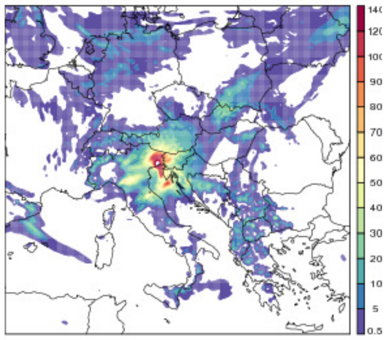
total precip
2009/6/20 z0:0 +15h



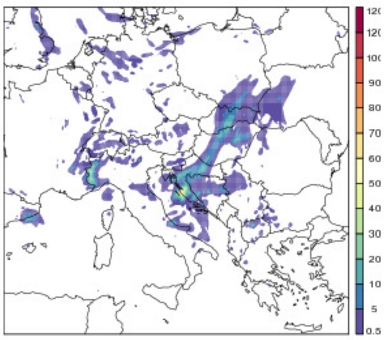
total precip 3h 2009/6/20 z0:0 +18h



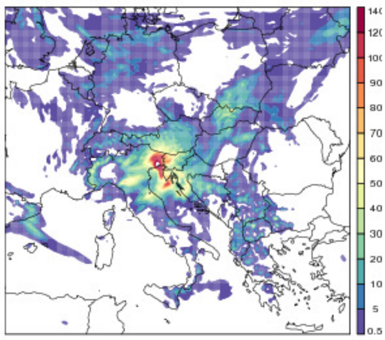
total precip
2009/6/20 z0:0 +18h

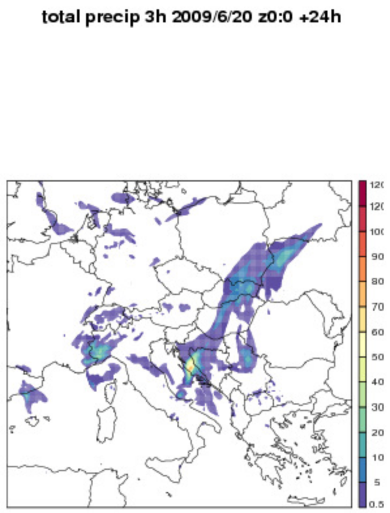


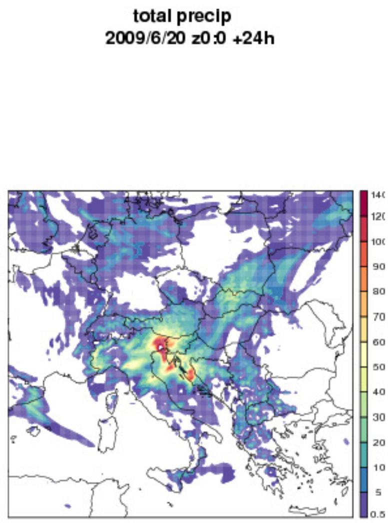
total precip 3h 2009/6/20 z0:0 +21h

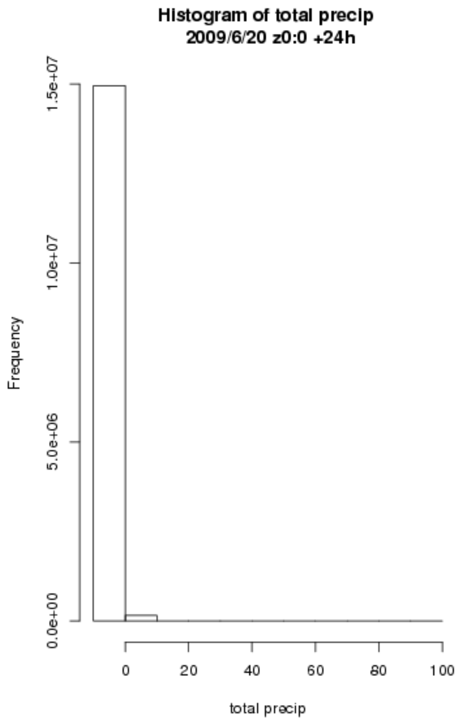


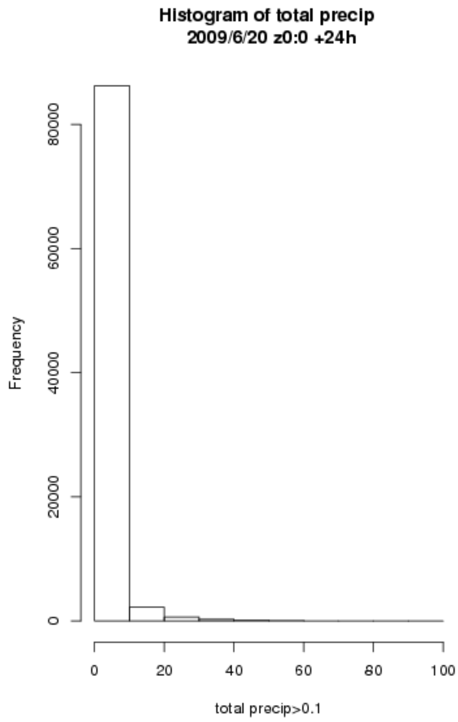
total precip
2009/6/20 z0:0 +21h




total precip 3h 2009/6/20 z0:0 +24h
0.5
5
10
20
30
40
50
60
70
80
90


total precip
2009/6/20 z0:0 +24h
0.5
5
10
20
30
40
50
60
70
80
90


Histogram of total precip
2009/6/20 z0:0 +24h
Frequency
0.0e+00
5.0e+06
1.0e+07
1.5e+07
0
20
40
60
80
100
total precip


Histogram of total precip
2009/6/20 z0:0 +24h
Frequency
0
20000
40000
60000
80000
0
20
40
60
80
100
total precip>0.1

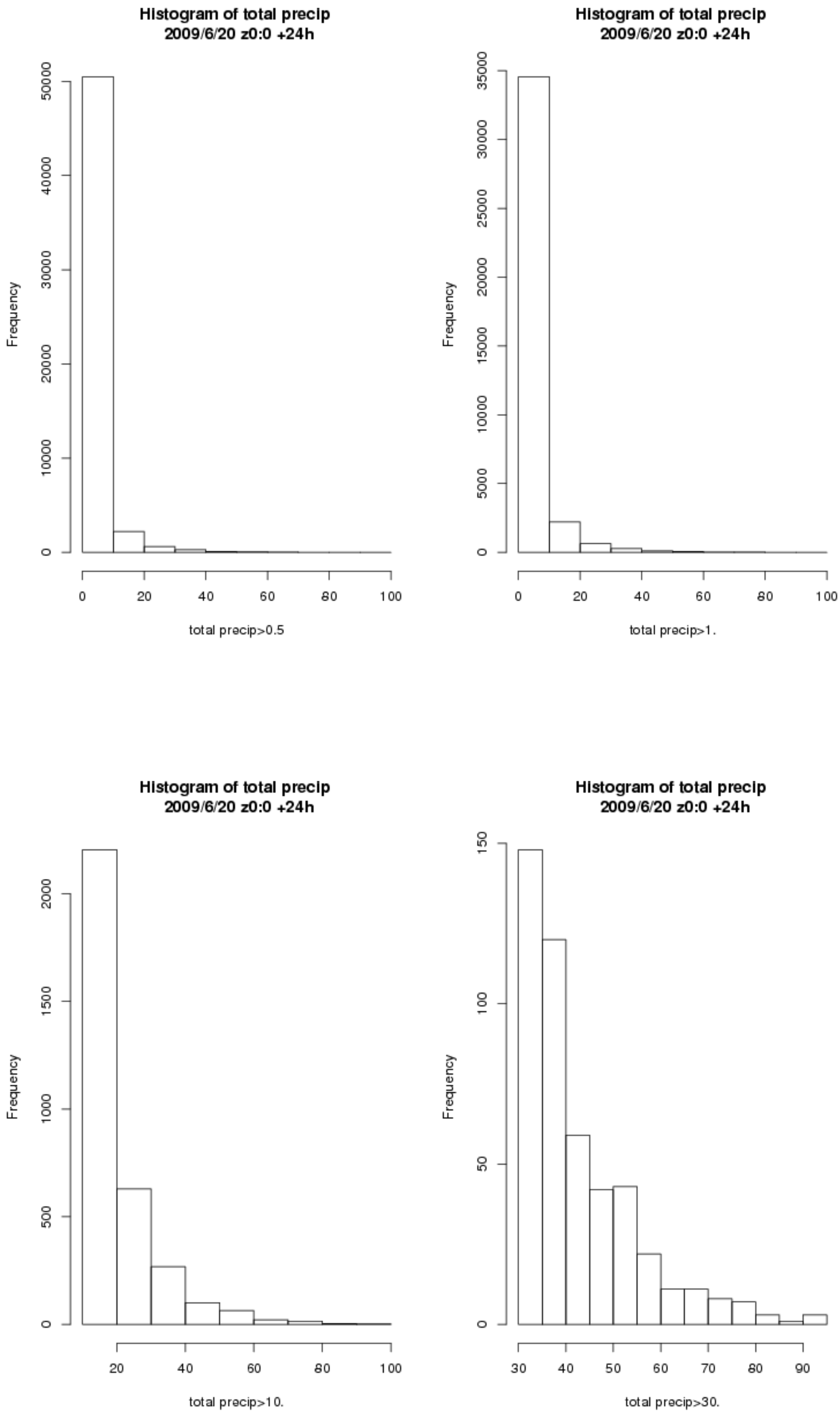


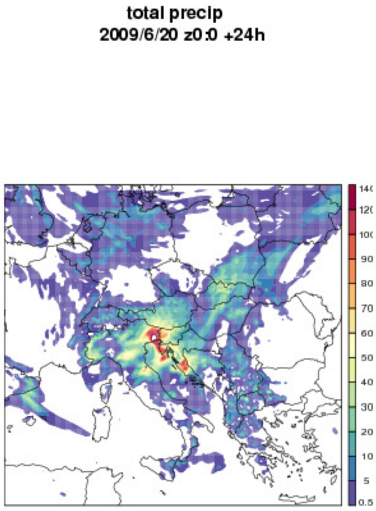
Fig. 6 Distribution of every 3-hour accumulated total precipitation fields for 2009062000

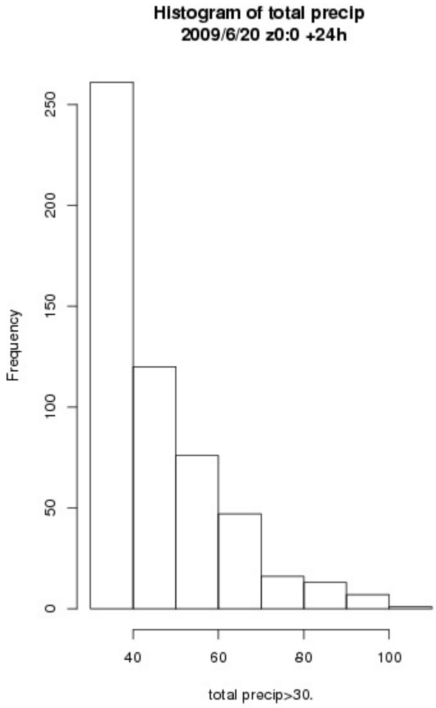
I.2 Study of the impact of switching the key LSPRT to FALSE

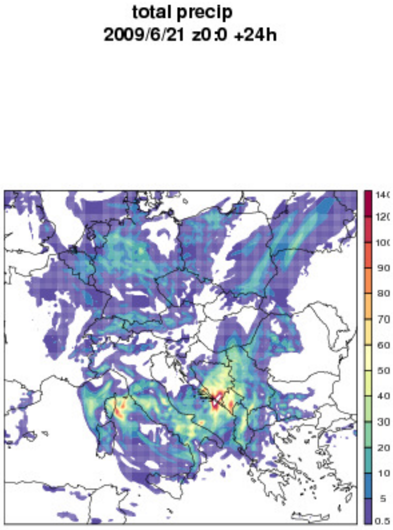
Non the less the setting LSPRT =.F. is wrong, we have performed the same experiments as with the operational setting just to illustrate its impact on the precipitation fields.

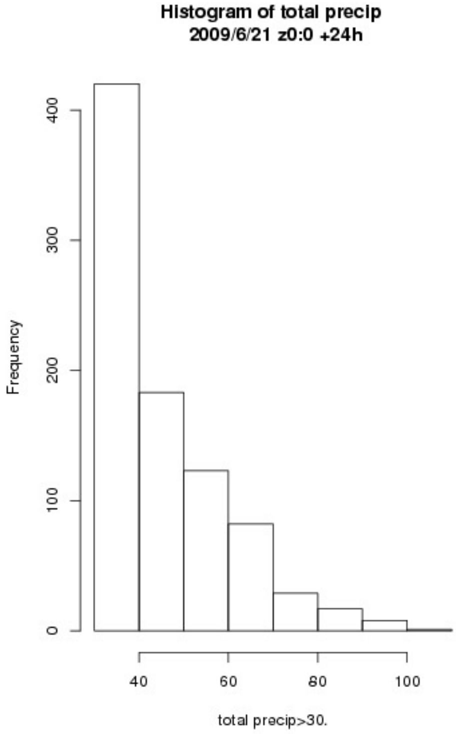
On Fig. 8 we have presented the distribution of the 24-hour accumulated total precipitation fields for the days of the period 2009062000 - 2009062500 and the histograms with the distribution of the 24-hour total precipitation exceeded 30mm The comparison with Fig.(3) shows that LSPRT=.F. leads to changes mainly in the area(s) with maximum of the total precipitation (increase of the values of the 24-hour total precipitation and the number of the grid points with higher values of the total precipitation), while the total structure of the field remains almost the same.

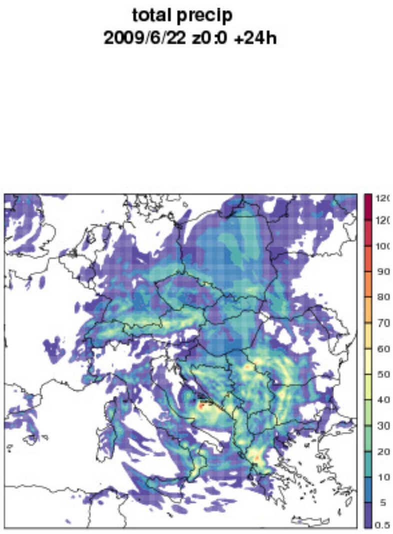
Distribution of the 24-hour accumulated total precipitation fields with LSPRT=.F.

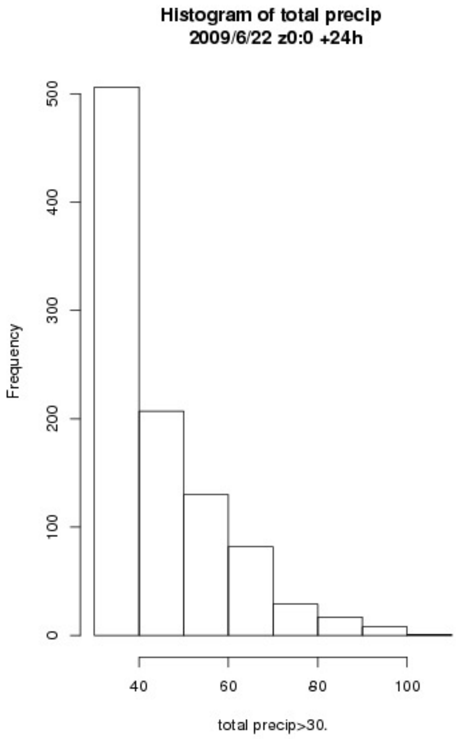


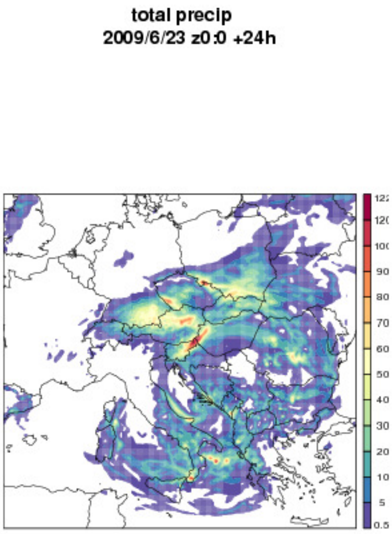


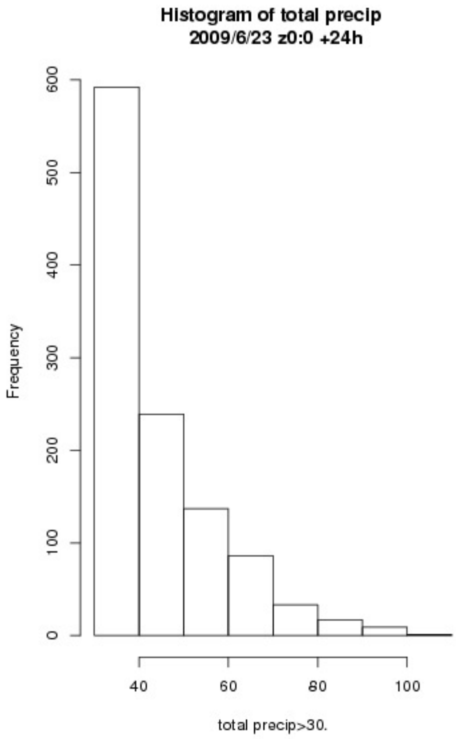

total precip
2009/6/21 z0:0 +24h
90
80
70
60
50
40
30
20
10
5
0.5

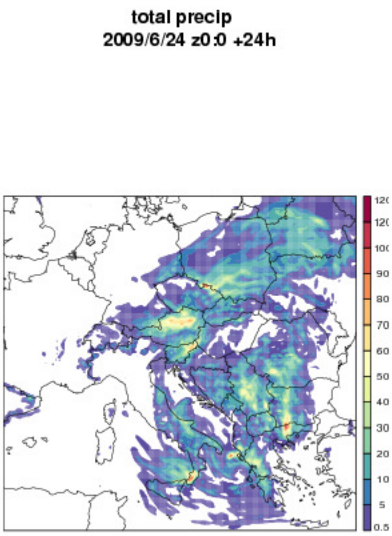

Histogram of total precip
2009/6/21 z0:0 +24h
Frequency
0
100
200
300
400
40
60
80
100
total precip>30.

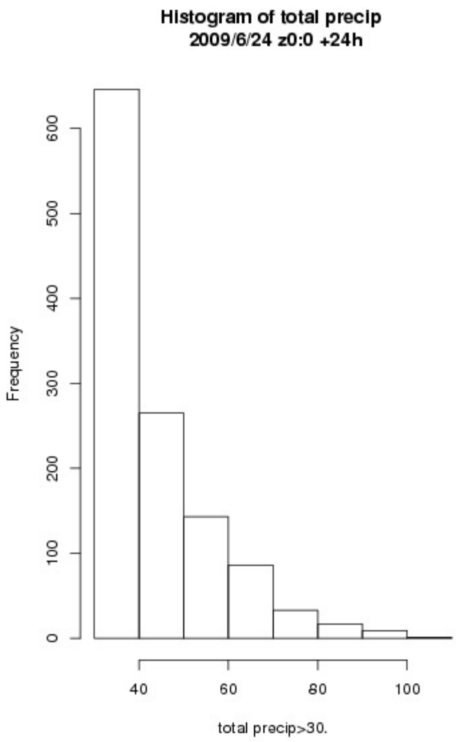

total precip
2009/6/22 z0:0 +24h
90
80
70
60
50
40
30
20
10
5
0.5


Histogram of total precip
2009/6/22 z0:0 +24h
Frequency
0
100
200
300
400
500
40
60
80
100
total precip>30.


total precip
2009/6/23 z0:0 +24h
0.5
5
10
20
30
40
50
60
70
80
90


Histogram of total precip
2009/6/23 z0:0 +24h
Frequency
0
100
200
300
400
500
600
40
60
80
100
total precip>30.


total precip
2009/6/24 z0:0 +24h
0.5
5
10
20
30
40
50
60
70
80
90


Histogram of total precip
2009/6/24 z0:0 +24h
Frequency
0
100
200
300
400
500
600
40
60
80
100
total precip>30.

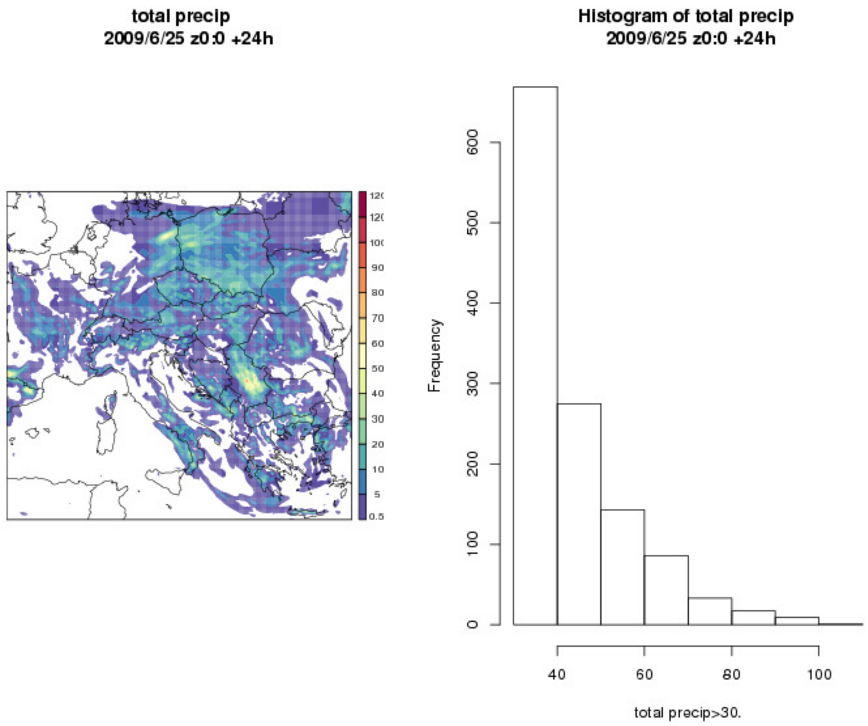


Fig.8 Distribution of the 24-hour accumulated total precipitation fields for 2009062000 - 2009062500 with LSPRT=.F.

II. Study of the impact of the way of the computation of the inter layers by switching the key LREGETA=.F./.T.

The way of computation of the inter-layers is defined as:

ETA(L) = L/NFLEVG (LREGETA=.T.)

or

ETA(L)= A(L)/P0 + B(L) (LREGETA=.F)

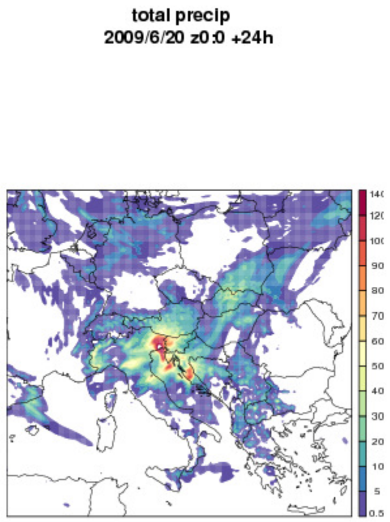
(for the notation of the parameters - see the ALADIN source code documentation)

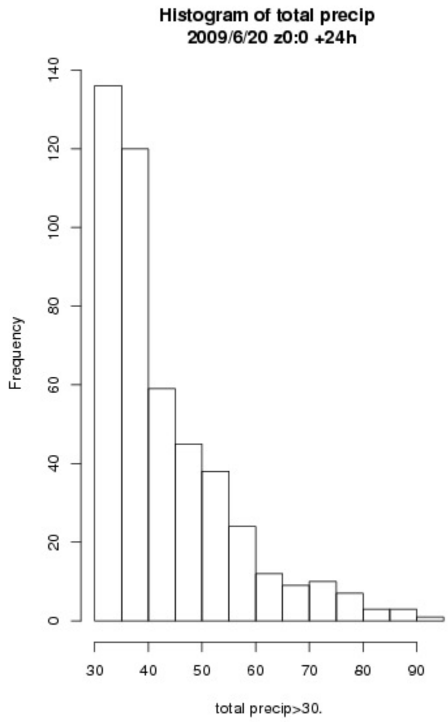
The default value (LREGETA=.F.) is used in Meteo-France, while the value LREGETA=.T. is used in ALADIN-SI .

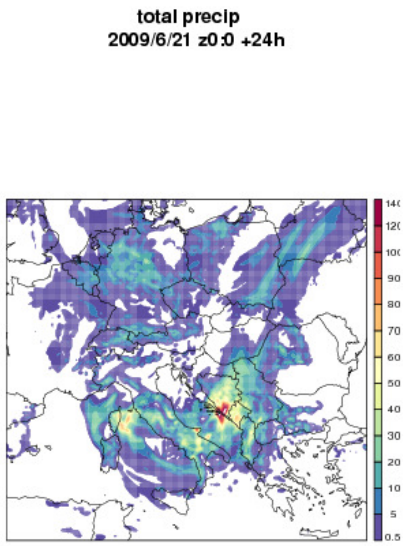
To study the impact of the different values of LREGETA we have focused on 24-hour accumulated total precipitation fields for the days 2009062000 - 2009062500, presented on Fig.9. The comparison with the results from the operational ALADIN-SI plotted on Fig.3. shows that he structure of the fields is kept almost unchanged but LREGETA=.F. leads to slightly decreased total precipitation amount.

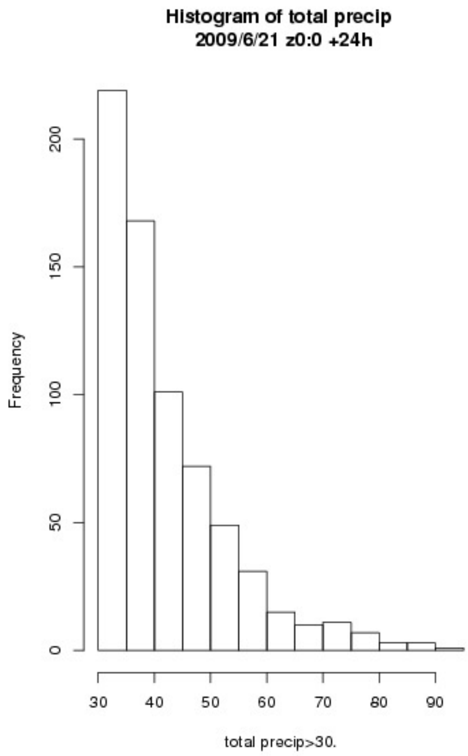
Here it is worth mentioning that it is necessary to perform further study on the impact of the switch LREGETA=F, because we have found some strange features of the distribution of the differences between the fields obtained from the operational run and from the run with LREGETA=F.

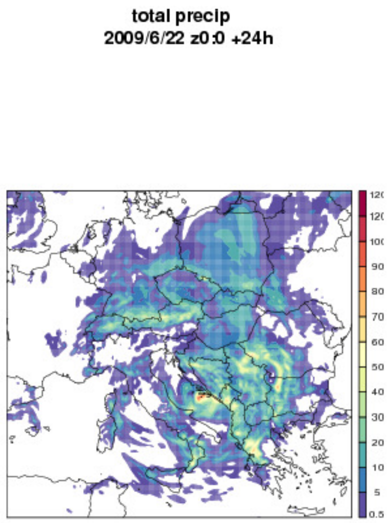
Distribution of the 24-hour accumulated total precipitation fields with LREGETA=.F.

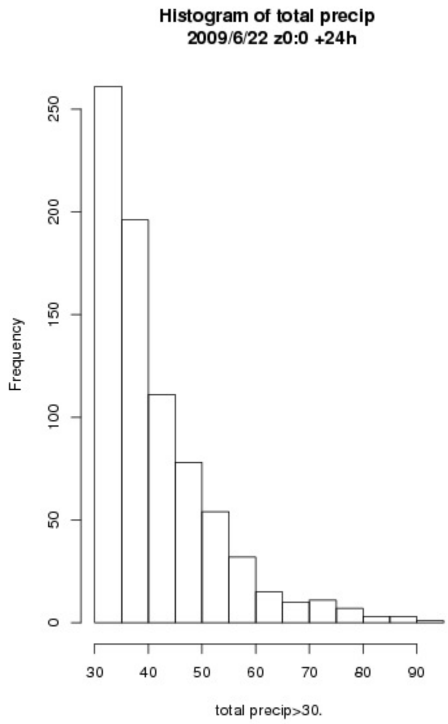


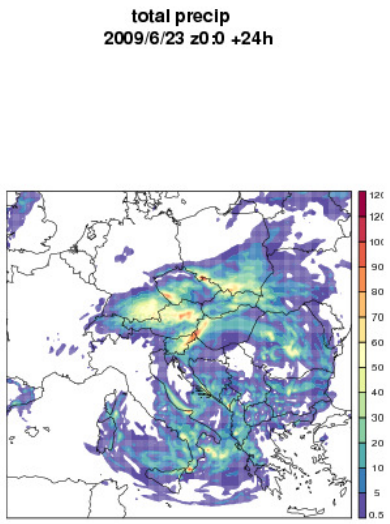


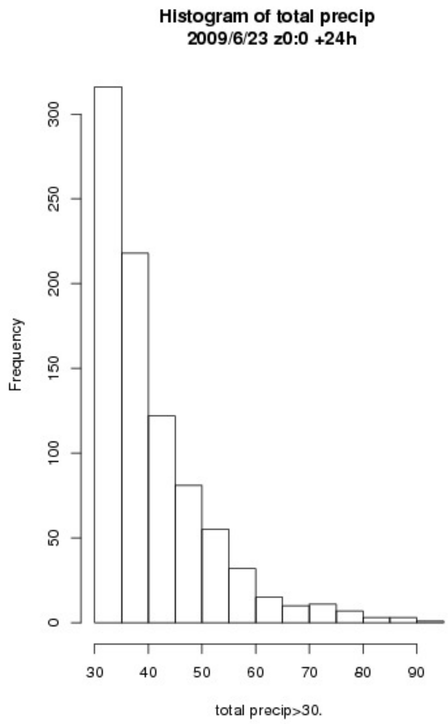





total precip
2009/6/22 z0:0 +24h
90
80
70
60
50
40
30
20
10
5
0.5


Histogram of total precip
2009/6/22 z0:0 +24h
Frequency
0
50
100
150
200
250
30
40
50
60
70
80
90
total precip>30.


total precip
2009/6/23 z0:0 +24h
90
80
70
60
50
40
30
20
10
5
0.5


Histogram of total precip
2009/6/23 z0:0 +24h
Frequency
0
50
100
150
200
250
300
30
40
50
60
70
80
90
total precip>30.

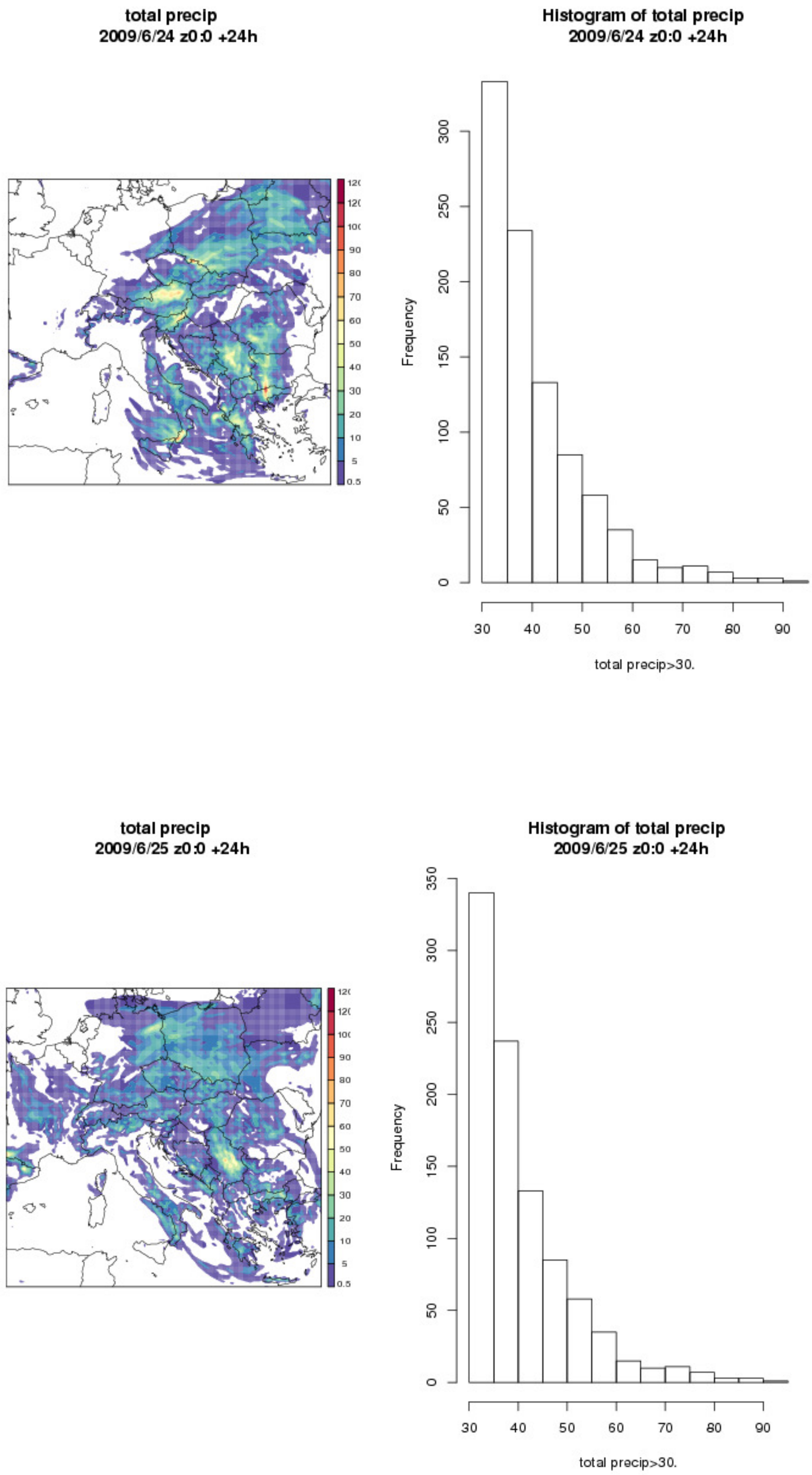


Fig. 9 Distribution of the 24-hour accumulated total precipitation fields for 2009062000 - 2009062500 with LREGETA=.F.

III. Study of the impact of the key LVFE_REGETA

The idea has been also to test LREGETA inside vertical final elements (LVERTFE=.T.) , but the current local ALADIN binary was not working and the problem could not be solved during the stay.

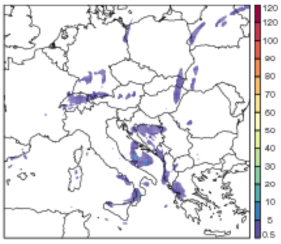
IV. Study of the impact of the 6-hour cycling of the hydrometeors for the period 2009062000 - 2009071700.

The operational ALADIN-SI runs are performed with zero initial values of the hydrometeors at each production time. The idea of that study has been to see the impact of the initialization of the model with non-zero values of the hydrometeors on the forecast of the precipitation fields. To perform this study, for the period 2009062000 - 2009071700 the following algorithm has been performed:
- internal cycle: start of the cycling at 2009061800 with cold start (zero values of the hydrometeors); followed by 6 hour forecasts , with the results saved as "guess" fields and used as initial values of the hydrometeors for the next 6hour forecast ; so 6h forecast is done for 00, 06, 12 and 18UTC runs;
- production of long forecasts (+72) performed for each day of the period 2009062000 - 2009071700 for runs 00 and 12 UTC, initialized with the non-zero values of the hydrometeors obtained from the internal cycle.

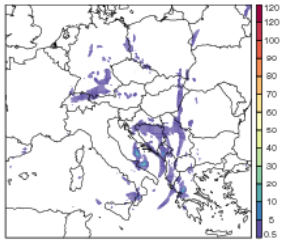
The validation of the impact of that 6hour cycling of the hydrometeors has been done by evaluating the difference between 1hour accumulated total precipitation for the first 6 hour forecasts obtained from the operational run and from the run with cycling from 00 and 12 UTC. The results for the days 2009062100-2009062200 and 2009062112-2009062212 are presented on Fig. 10 (a,b) and Fig.11 (a,b) (Fig.10 (a) for 2009062100 and Fig. 11 (a) for 2009062112 are included in the Appendix.doc file)

From both sets of plots (for 00 and 12 UTC runs) it is definitely seen that cycling the meteors leads do increasing the total precipitation in the 1hourly intervals as well as in the total accumulated total precipitation in the first 6 hour interval.

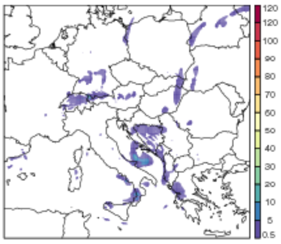
total precip op 1h
2009/6/22 z0:0 +2h



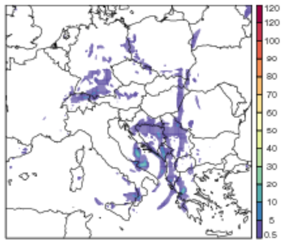
total precip cy 1h
2009/6/22 z0:0 +2h



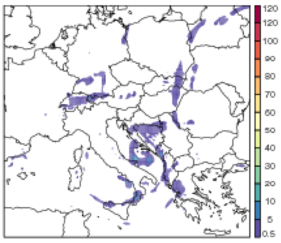
total precip op
2009/6/22 z0:0 +2h



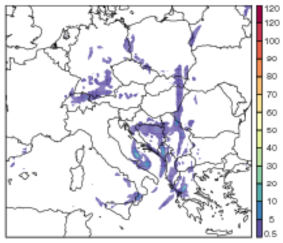
total precip cy
2009/6/22 z0:0 +2h



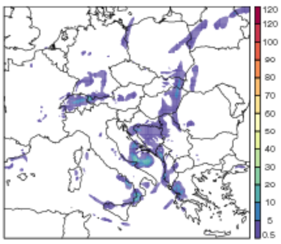
total precip op 1h
2009/6/22 z0:0 +3h



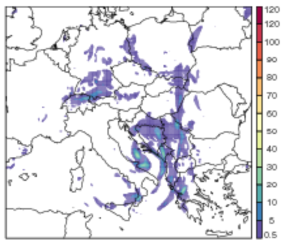
total precip cy 1h
2009/6/22 z0:0 +3h



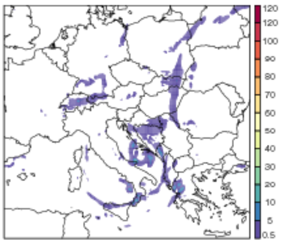
total precip op
2009/6/22 z0:0 +3h



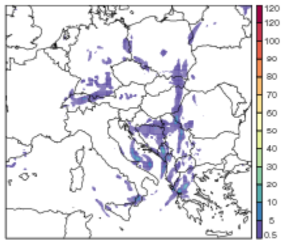
total precip cy
2009/6/22 z0:0 +3h



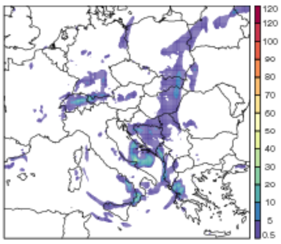
total precip op 1h
2009/6/22 z0:0 +4h



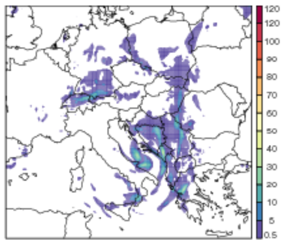
total precip cy 1h
2009/6/22 z0:0 +4h



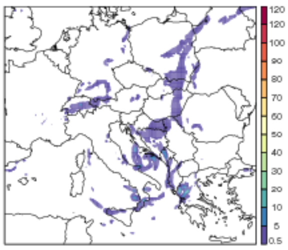
total precip op
2009/6/22 z0:0 +4h



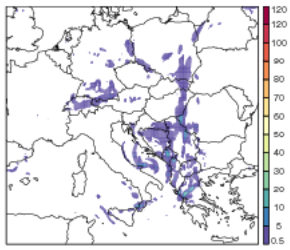
total precip cy
2009/6/22 z0:0 +4h



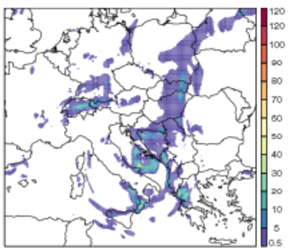
total precip op 1h
2009/6/22 z0:0 +5h



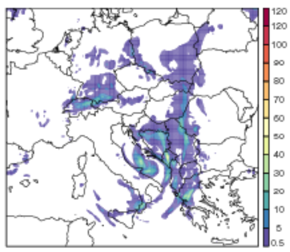
total precip cy 1h
2009/6/22 z0:0 +5h



total precip op
2009/6/22 z0:0 +5h



total precip cy
2009/6/22 z0:0 +5h



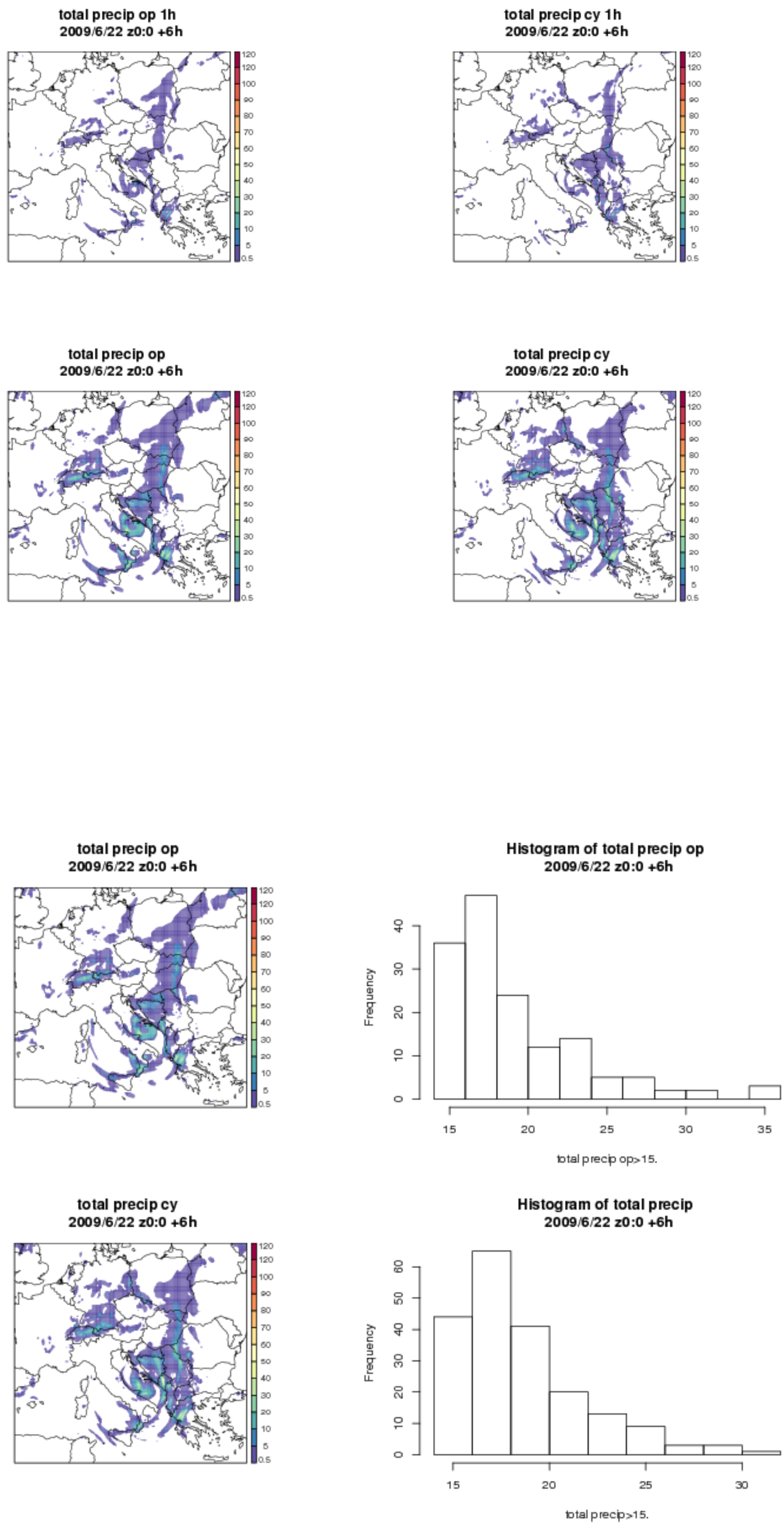
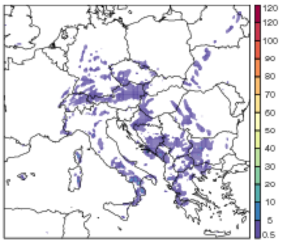
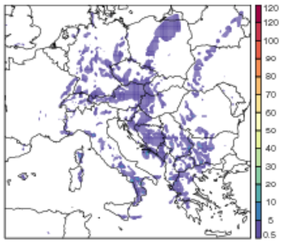


Fig.10b Differences between the 1hour accumulated total precipitations for the first 6 hour forecasts obtained from the operational and cycling model runs for 2009062200

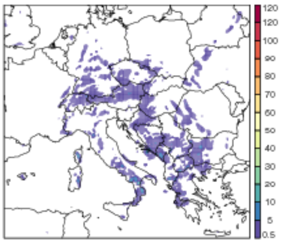
total precip op 1h
2009/6/22 z12:0 +2h



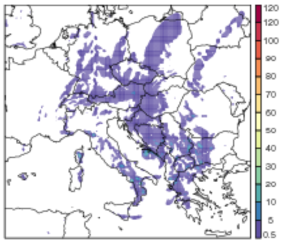
total precip cy 1h
2009/6/22 z12:0 +2h



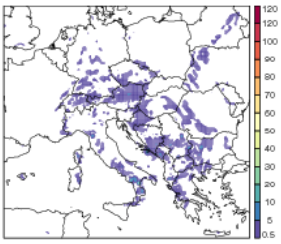
total precip op
2009/6/22 z12:0 +2h



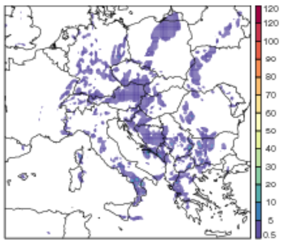
total precip cy
2009/6/22 z12:0 +2h



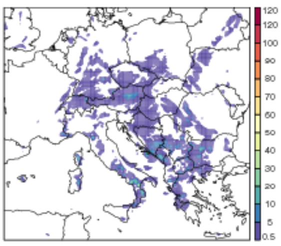
total precip op 1h
2009/6/22 z12:0 +3h



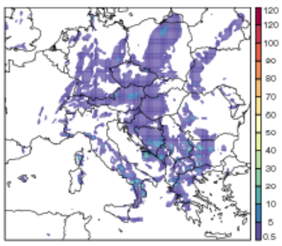
total precip cy 1h
2009/6/22 z12:0 +3h



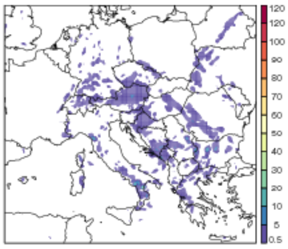
total precip op
2009/6/22 z12:0 +3h



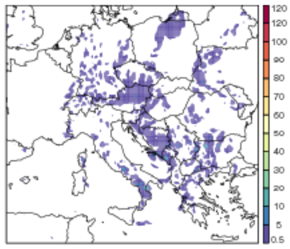
total precip cy
2009/6/22 z12:0 +3h



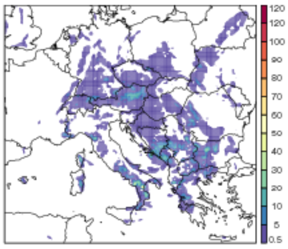
total precip op 1h
2009/6/22 z12:0 +4h



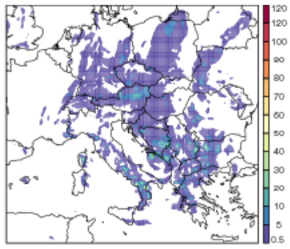
total precip cy 1h
2009/6/22 z12:0 +4h



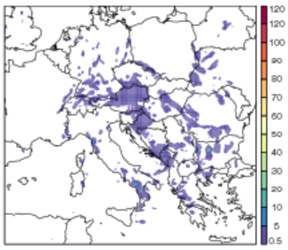
total precip op
2009/6/22 z12:0 +4h



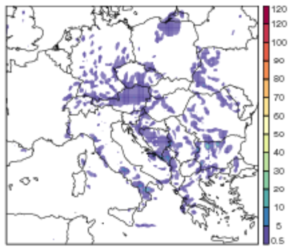
total precip cy
2009/6/22 z12:0 +4h



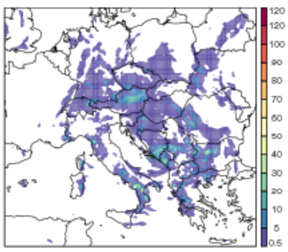
total precip op 1h
2009/6/22 z12:0 +5h



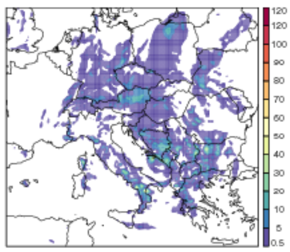
total precip cy 1h
2009/6/22 z12:0 +5h



total precip op
2009/6/22 z12:0 +5h



total precip cy
2009/6/22 z12:0 +5h



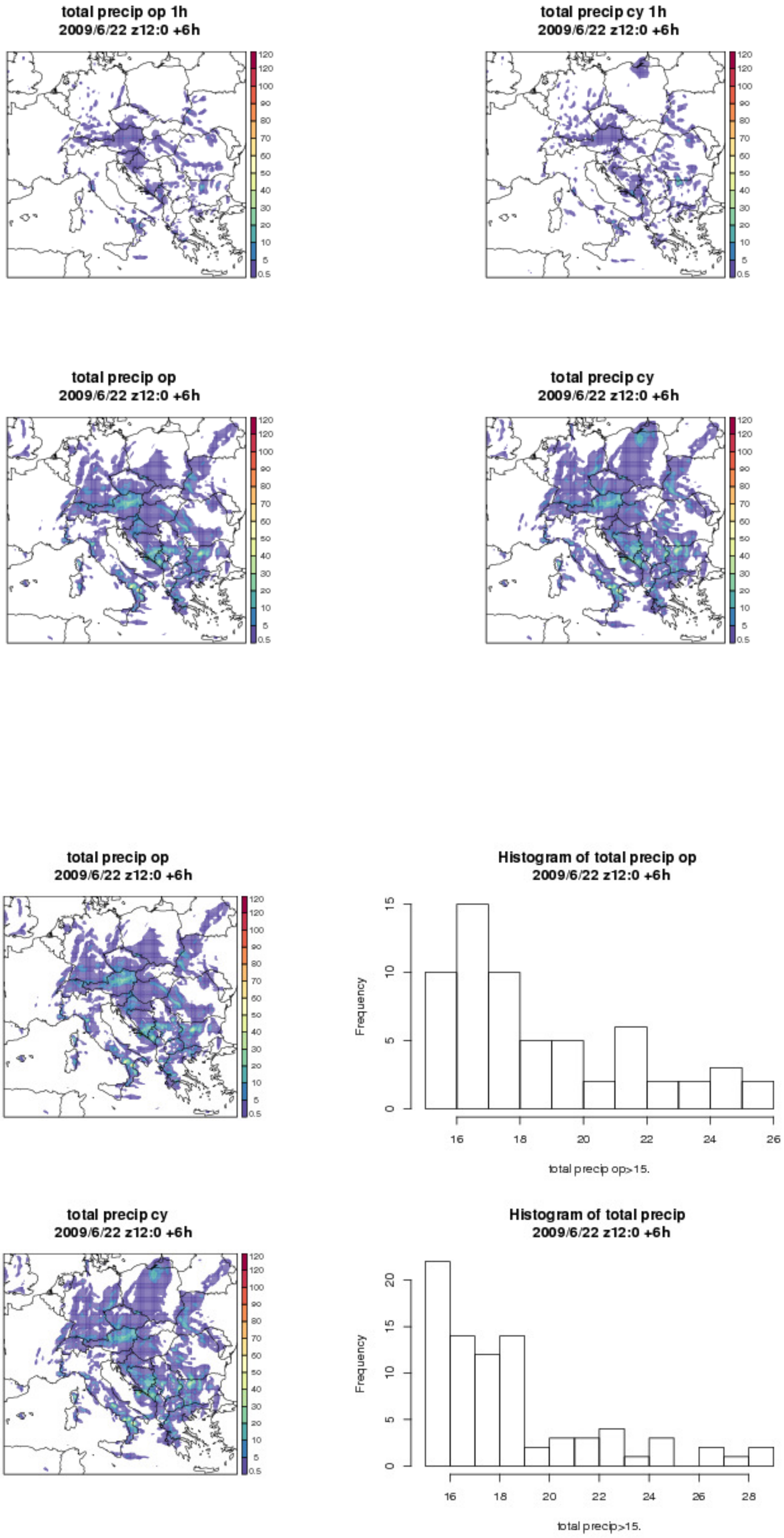
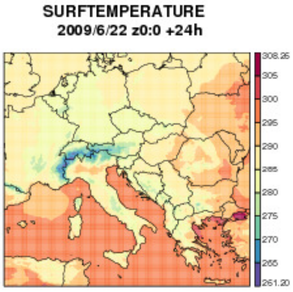


Fig.11b Differences between the 1hour accumulated total precipitations for the first 6 hour forecasts obtained from the operational and cycling model runs for 2009062212

On Fig. 12 we have presented the results of the comparison between the 24-hour forecasts of surface temperature, T2m , hydrometeors and 24-hour accumulated total precipitation from the operational and cycling runs for 2009062200 (oper - cycling). It is seen that after 24 hours the impact of the cycling has decreased but still there are differences in the fields - slightly positive for surface temperature and slightly negative for T2m.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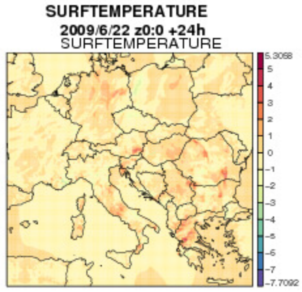
261.20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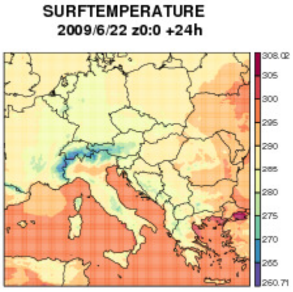
-7.7092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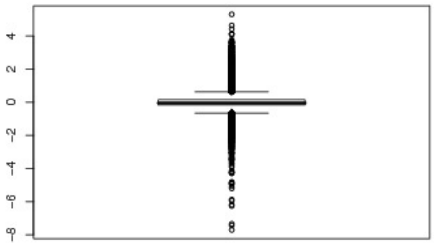
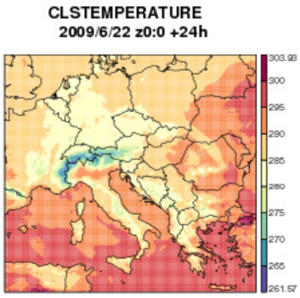
260.71

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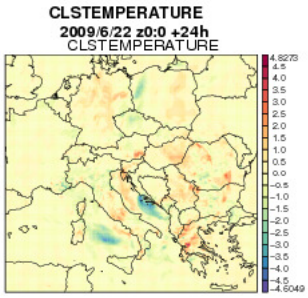
261.57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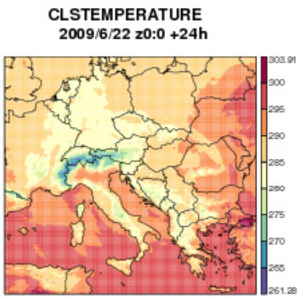
-4.6049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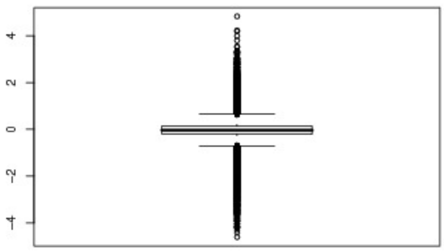

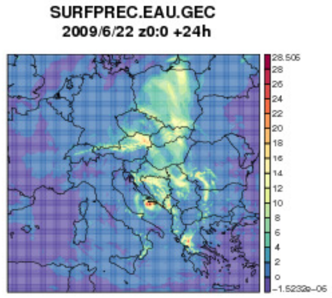
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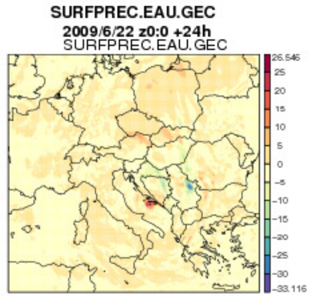
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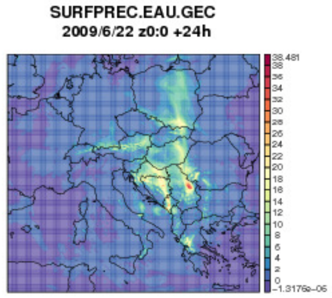
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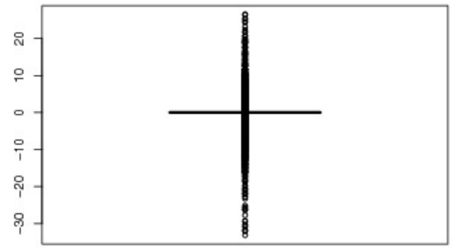
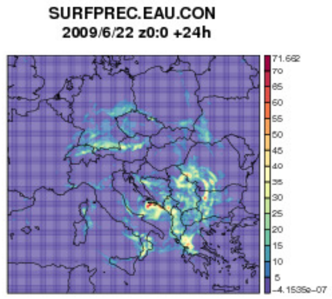

20
10
0
−10
−20
−30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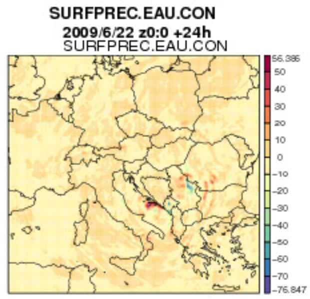
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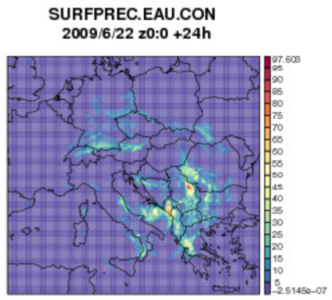
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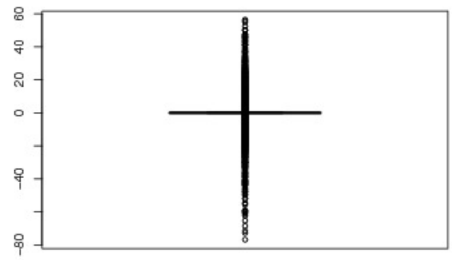
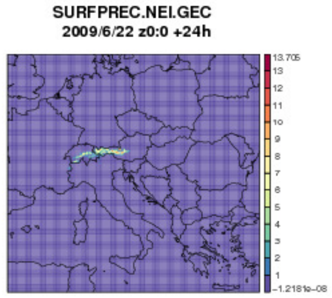

60
40
20
0
−40
−80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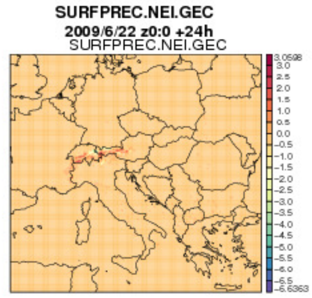
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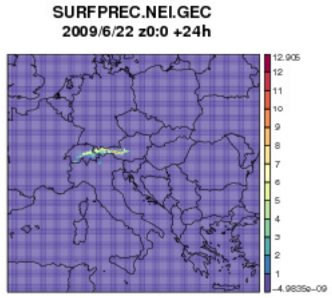
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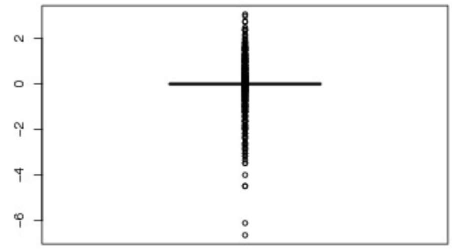

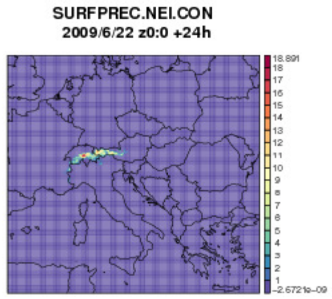
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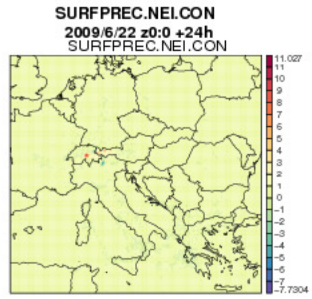
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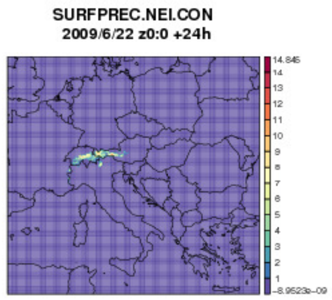
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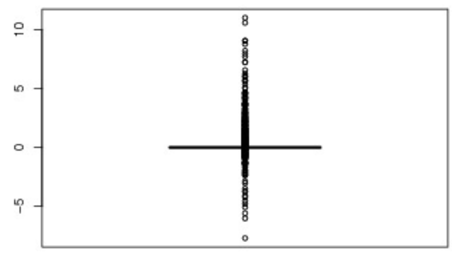
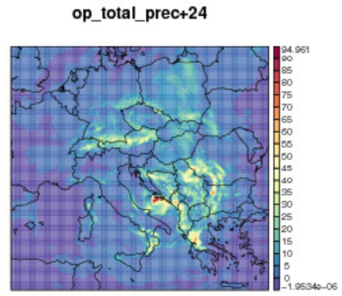
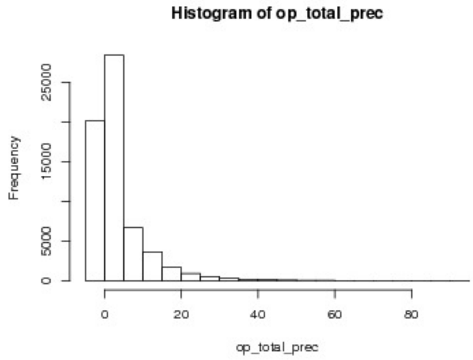
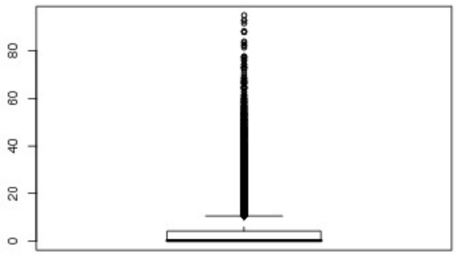
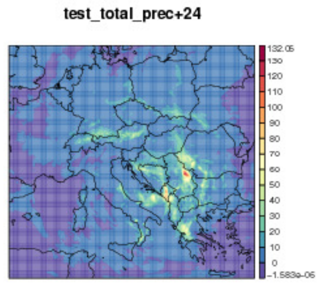
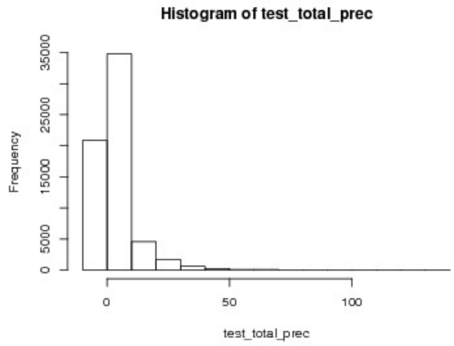


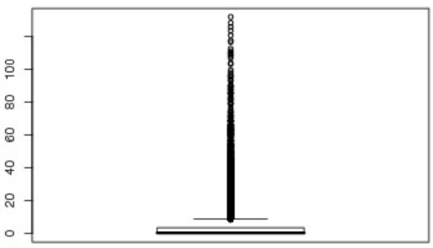

op_total_prec+24
94.961
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-1.9534e-06


Histogram of op_total_prec
Frequency
0
5000
15000
25000
0
20
40
60
80
op_total_prec


0
20
40
60
80


test_total_prec+24
132.05
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-1.583e-06


Histogram of test_total_prec
Frequency
0
5000
15000
25000
35000
0
50
100
test_total_prec


0
20
40
60
80
100

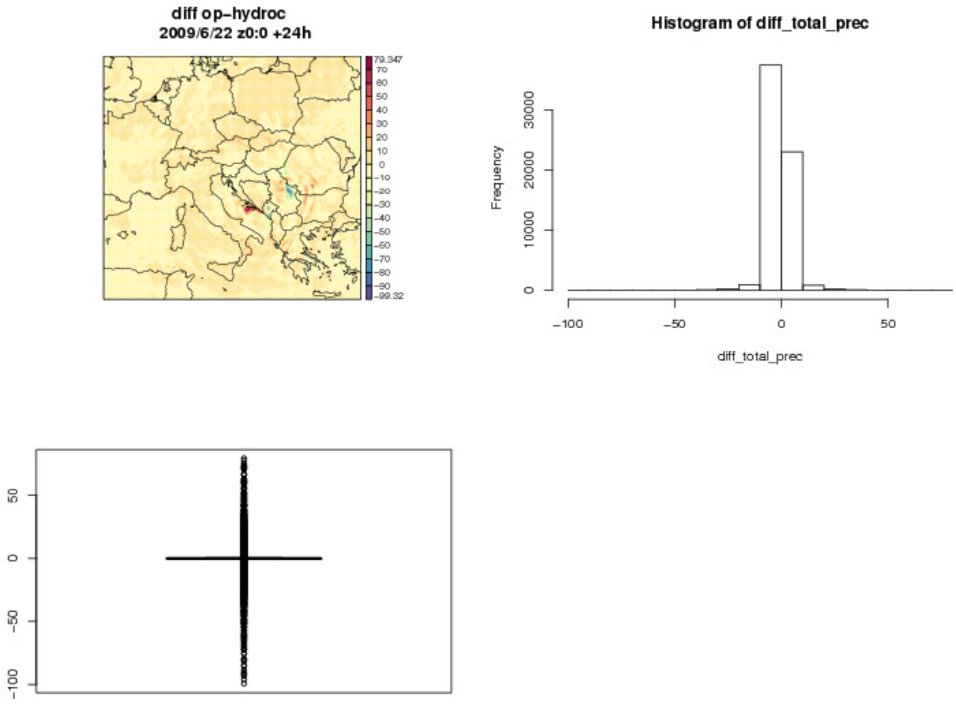
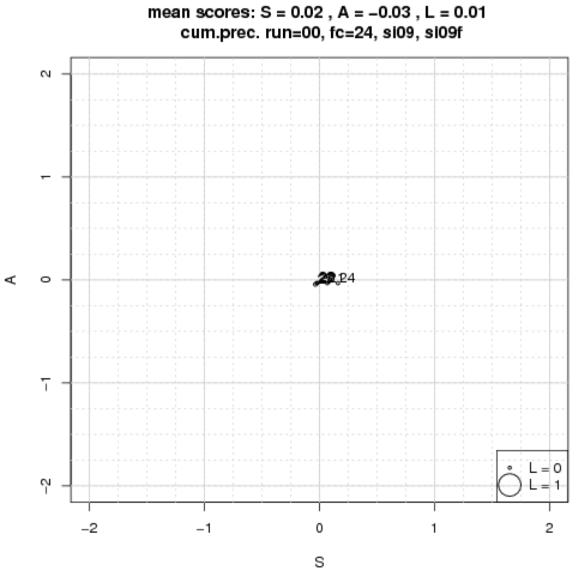


Fig 12: Differences between the 24 hour forecast of accumulated total precipitations obtained from the operational and cycling model runs for 2009062200

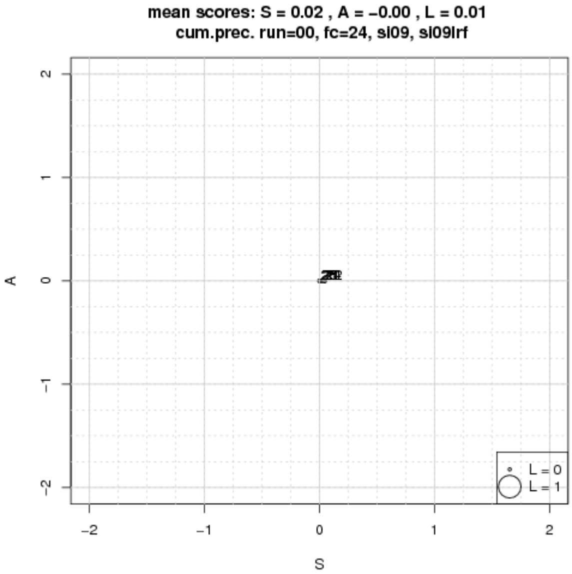
V. Some preliminary results of application the SAL technique to evaluate the impact of LSPRT=.T., LREGETA=.T./.F., initialization of the hydrometeors on the results of the total precipitation forecasts

The SAL method was recently implemented into local R software. We tried to use this method for the comparisons of precipitation fields from various model setups and not against observed precipitation. Here we do not present the SAL technique itself but just try to present the output of applying it on our data sets for the different cases discussed in the previous paragraphs.

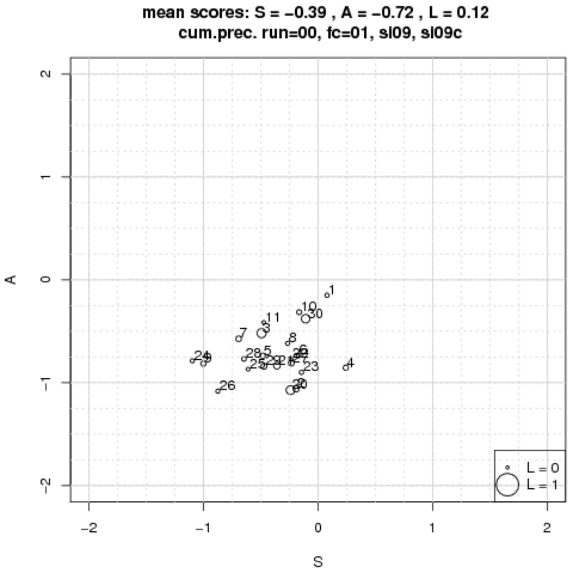
- As it has been pointed out, the switch LSPRT=.F. leads to increase of the values of the 24-hour total precipitation and the number of the grid points with higher values of the total precipitation, while the total structure of the field remains almost the same. Here we present the relevant SAL output, from which it is seen that all points almost coincide for the 24-hour total precipitation (each case is presented by the circle with day number)

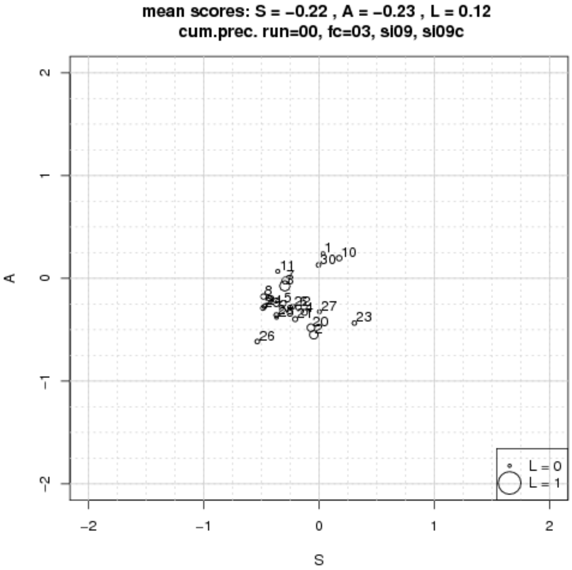


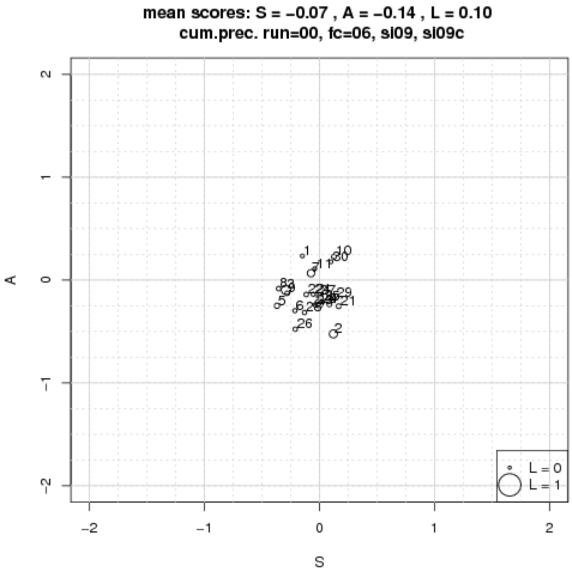
- When we studied the impact of LREGETA, we have pointed out that LREGETA=.F keeps the structure of the total precipitation fields almost unchanged, but leads to slightly decreased total precipitation amount. On the SAL output it is illustrated again with almost coinciding points.

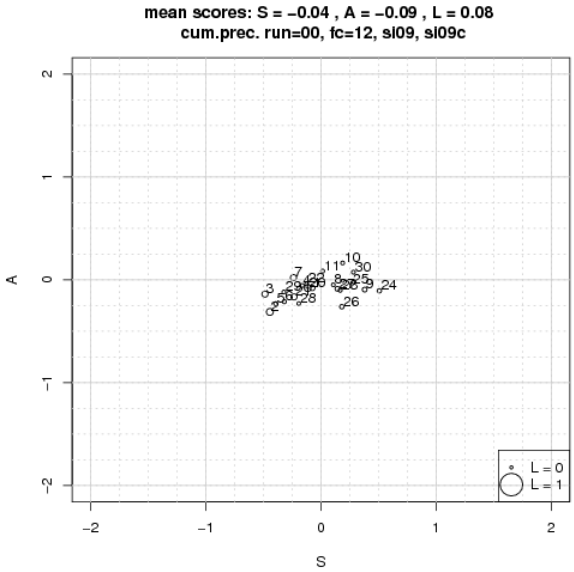


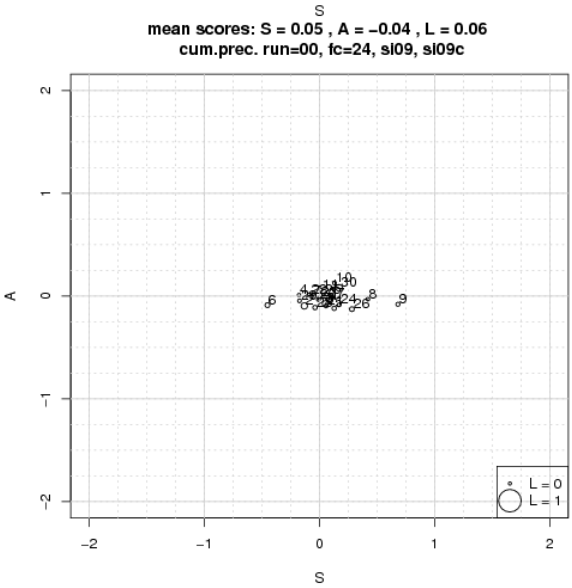
- When evaluating the impact of cycling the hydrometeors, we have pointed, that for all situations (both for 00 and 12 UTC runs) is definitely seen that non-zero initial values of the hydrometeors lead to increasing the total precipitation in first hours, while differences are not so significant for longer forecast ranges. The SAL outputs show the same behavior of the total precipitation for the forecast ranges from 03 up to 48 hours. Perhaps it is worth performing some further study on application of SAL algorithm for validation purposes

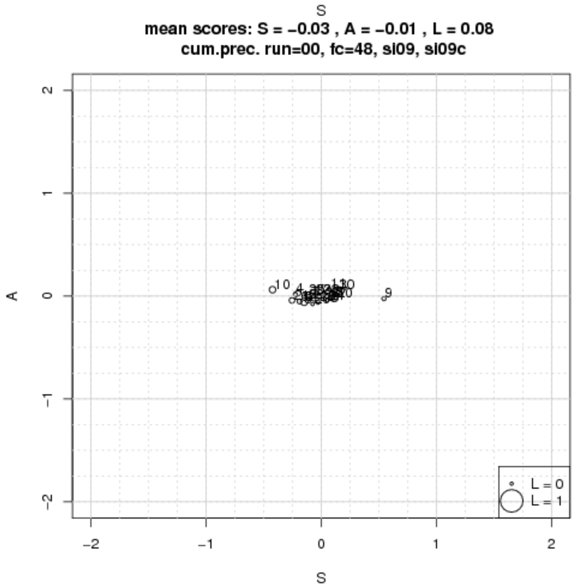

mean scores: S = −0.39 , A = −0.72 , L = 0.12
cum.prec. run=00, fc=01, sl09, sl09c
S
A
L = 0
L = 1


mean scores: S = −0.22 , A = −0.23 , L = 0.12
cum.prec. run=00, fc=03, sl09, sl09c
S
A
L = 0
L = 1


mean scores: S = −0.07 , A = −0.14 , L = 0.10
cum.prec. run=00, fc=06, sl09, sl09c
S
A
L = 0
L = 1


mean scores: S = −0.04 , A = −0.09 , L = 0.08
cum.prec. run=00, fc=12, sl09, sl09c
S
A
L = 0
L = 1


mean scores: S = 0.05 , A = −0.04 , L = 0.06
cum.prec. run=00, fc=24, sl09, sl09c
S
A
L = 0
L = 1


mean scores: S = −0.03 , A = −0.01 , L = 0.08
cum.prec. run=00, fc=48, sl09, sl09c
S
A
L = 0
L = 1

VI. CONCLUSIONS

Non the less the study has been performed over a limited sample of situations and that some of the results should be approved by another scores , some conclusions could be drawn , namely:

- The switch LSPRT=.F. leads to increase of the values of the 24-hour total precipitation and the number of the grid points with higher values of the total precipitation, while the total structure of the field remains almost the same;

- The switch LREGETA=.F keeps the structure of the total precipitation fields almost unchanged, but leads to slightly decreased total precipitation amount;

- For all situations (both for 00 and 12 UTC runs) is definitely seen that non-zero initial values of the hydrometeors leads to increasing of the total precipitation in the first hours, while differences are not so significant for longer forecast ranges ;

- After 24 hours the impact of the cycling has decreased but still there are differences in some of the fields (slightly higher values for surface temperature and slightly lower for T2m).

ACKNOLEDGEMENTS

I, Lora Taseva, would like to express my deep gratitude to Neva Pristov for her tuition and help during my work on validation of ALADIN-SI. I would like to thank Jure Cedilnik for his help in some technical aspects of performing the experiments and visualization of the results. I am grateful to Jure Jerman and the Slovenian colleagues for welcoming me.

References

1. Christoph Wittmann - Evaluation of ALARO-0 5km over Madeira. ALADIN-Fr/LACE stay at the Institute for Meteorology (IM), Portugal

SOME PRELIMINARI RESULTS FROM THE LOCAL IMPLEMENTATION OF CANARI SNOW ANALYSIS SCHEME IN THE ALADIN-SLOVENIA (ALADIN_SI)

Lora Taseva (1), Jure Cedilnik (2)

(1) National Institute of Meteorology and Hydrology, Bulgarian Academy of Sciences
(2) Environmental Agency of the Republic of Slovenia

During the stay a common work has been done on implementation of the CANARI snow analysis scheme in the ALADIN-Slovenia (ALADIN-SI) model.

The source code has been recompiled because of a modification in the hop.F90 routine and the parameters of the reference run have been defined, namely:
= changes in the namelists:
- RCLIMCA=0.0
- ORODIF=500., OROLIM=2000.
= the default snow obs operator , defined in ppobsn.F90
= the default correlation function $\mu(r,p)$, represented by the horizontal and vertical components: $\mu(r,p) = \mu_h(r) * \mu_v(p)$
where
$\mu_h(r) = \exp(-1/2 * (r/d)^2)$ and $\mu_v(p) = \exp(-1/2 * (dp_{ij} / P))$
(for the notations see the report: L.Taseva, F. Taillefer - CANARI snow analysis scheme in ALADIN . Final report on the work done in MF in 11-24.10.2009. Available from the ALADIN web page)

The first validation of the ALADIN-SI snow scheme has been done by comparison with the results obtained in the experiment presented in the above mentioned report, namely:
- case 2009011500-2009011506 for ALADIN-Fr domain,
- same obsoul data taken from MF.

It has been found that the results of the CANARI snow analysis over both domains coincide and the small differences are due to the differences in the orography in the two models. For the same date a comparison has been performed also with the results of the ECMWF snow analysis scheme.

Jure Cedilnik started testing the CANARI snow analysis scheme in assimilation mode.

The results of that common work will be presented in the next ALADIN Newsletter.