Local validation of numerical experiments with COSMO-EU

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Experimental set-up

Time interval: March and April 2009

Forecast model: COSMO-EU

Model domain: COSMO-EU

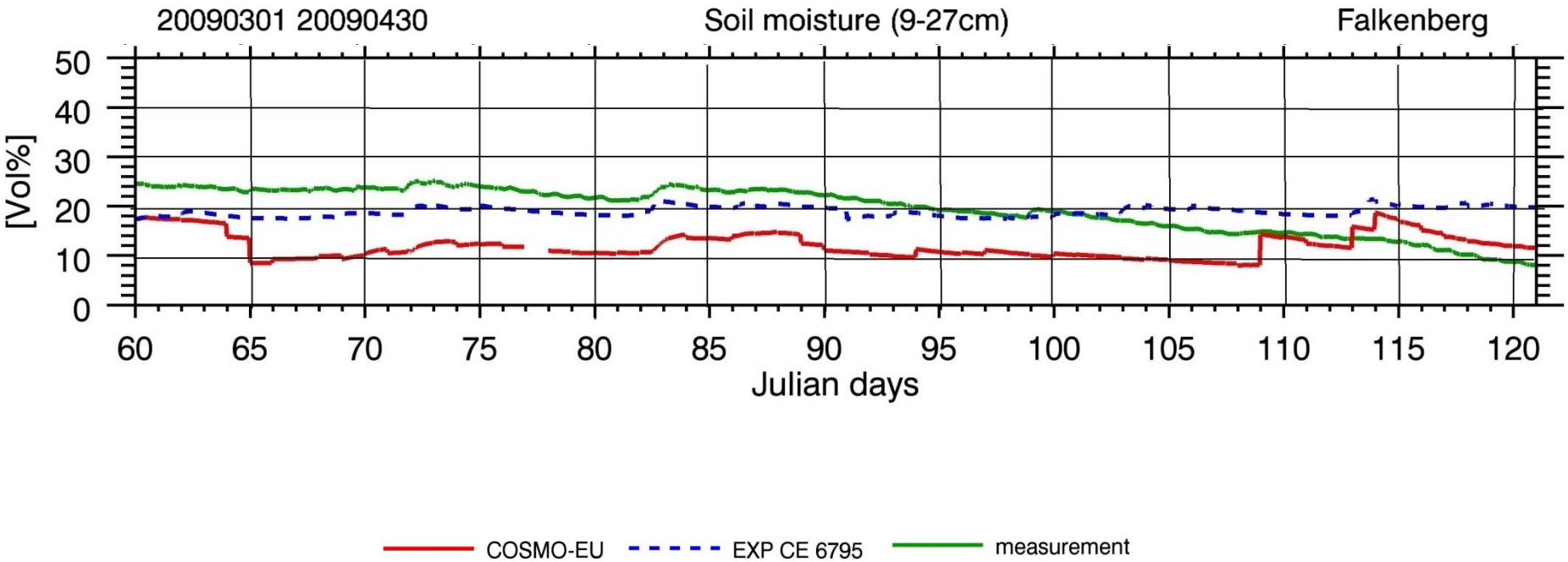
Options: exponential depletion of root density with depth

groundwater coupling

bare soil evaporation (Noilhan & Planton, 1989)

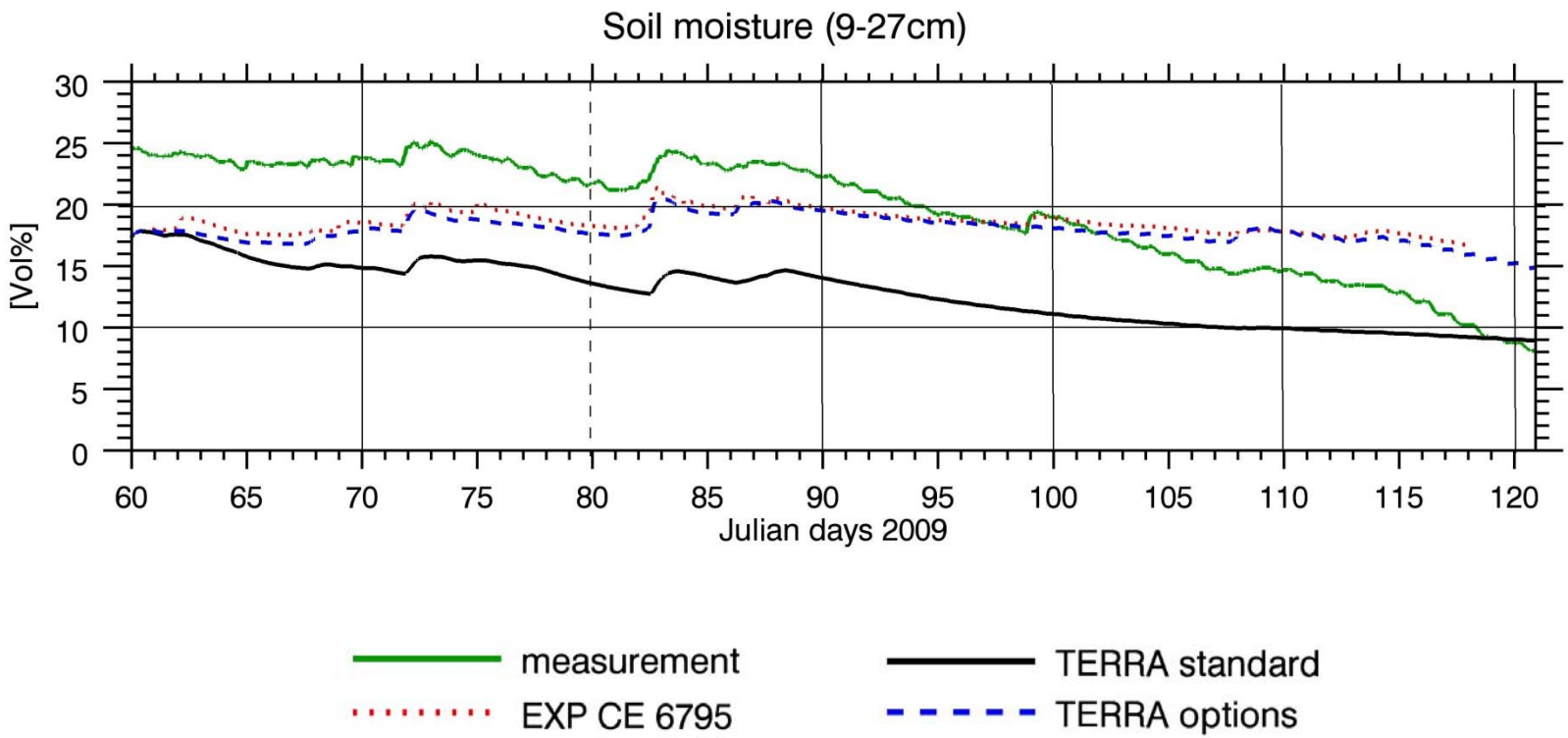
No soil moisture analysis (SMA) applied

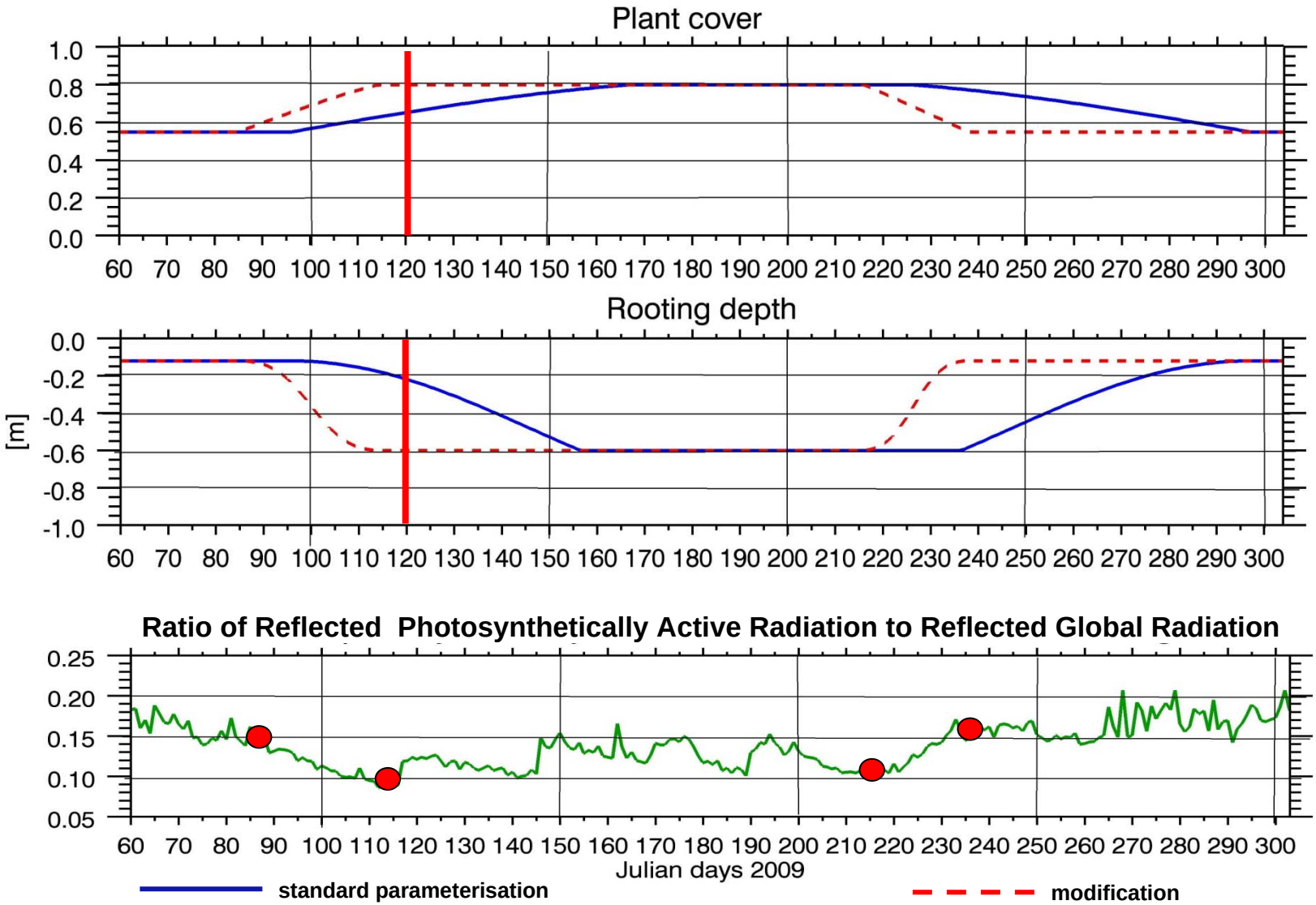
Local validation of results at Falkenberg, (Payerne, Toulouse)


20090301 20090430
Soil moisture (9-27cm)
Falkenberg
[Vol%]
50
40
30
20
10
0
60
65
70
75
80
85
90
95
100
105
110
115
120
Julian days
COSMO-EU
EXP CE 6795
measurement

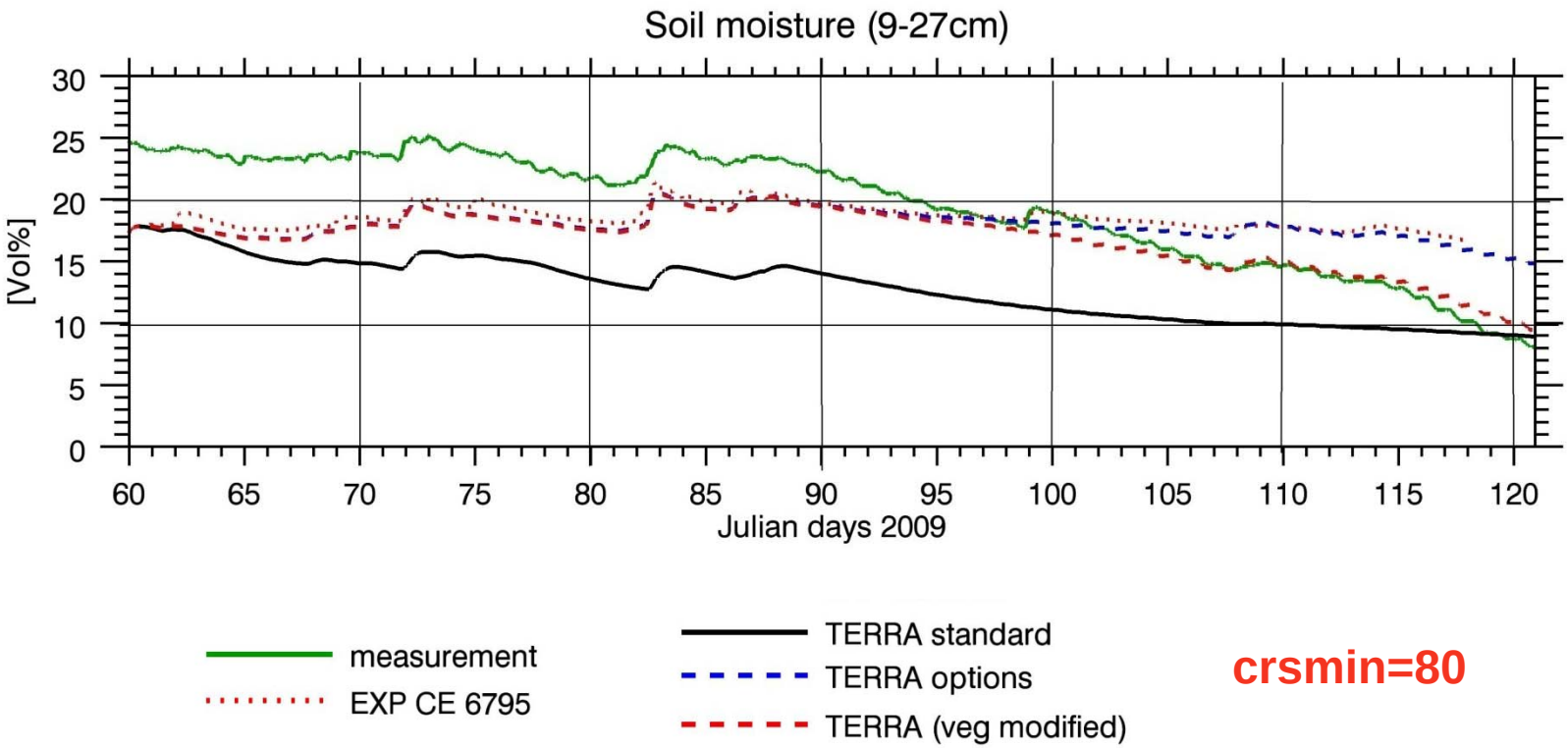
Impact of plant cover and rooting depth on temporal variation of soil moisture

20090301 20090430 Falkenberg

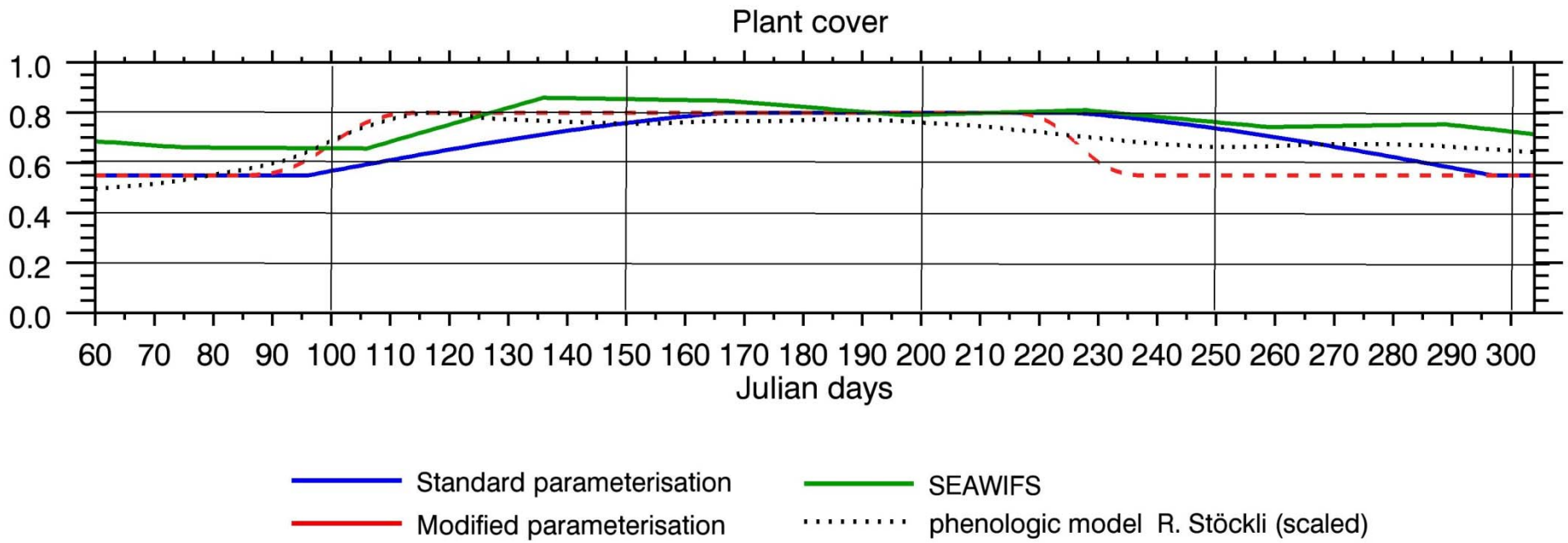



Plant cover
1.0
0.8
0.6
0.4
0.2
0.0
60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300
Rooting depth
[m]
0.0
-0.2
-0.4
-0.6
-0.8
-1.0
60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300
Ratio of Reflected Photosynthetically Active Radiation to Reflected Global Radiation
0.25
0.20
0.15
0.10
0.05
60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300
Julian days 2009
standard parameterisation
modification

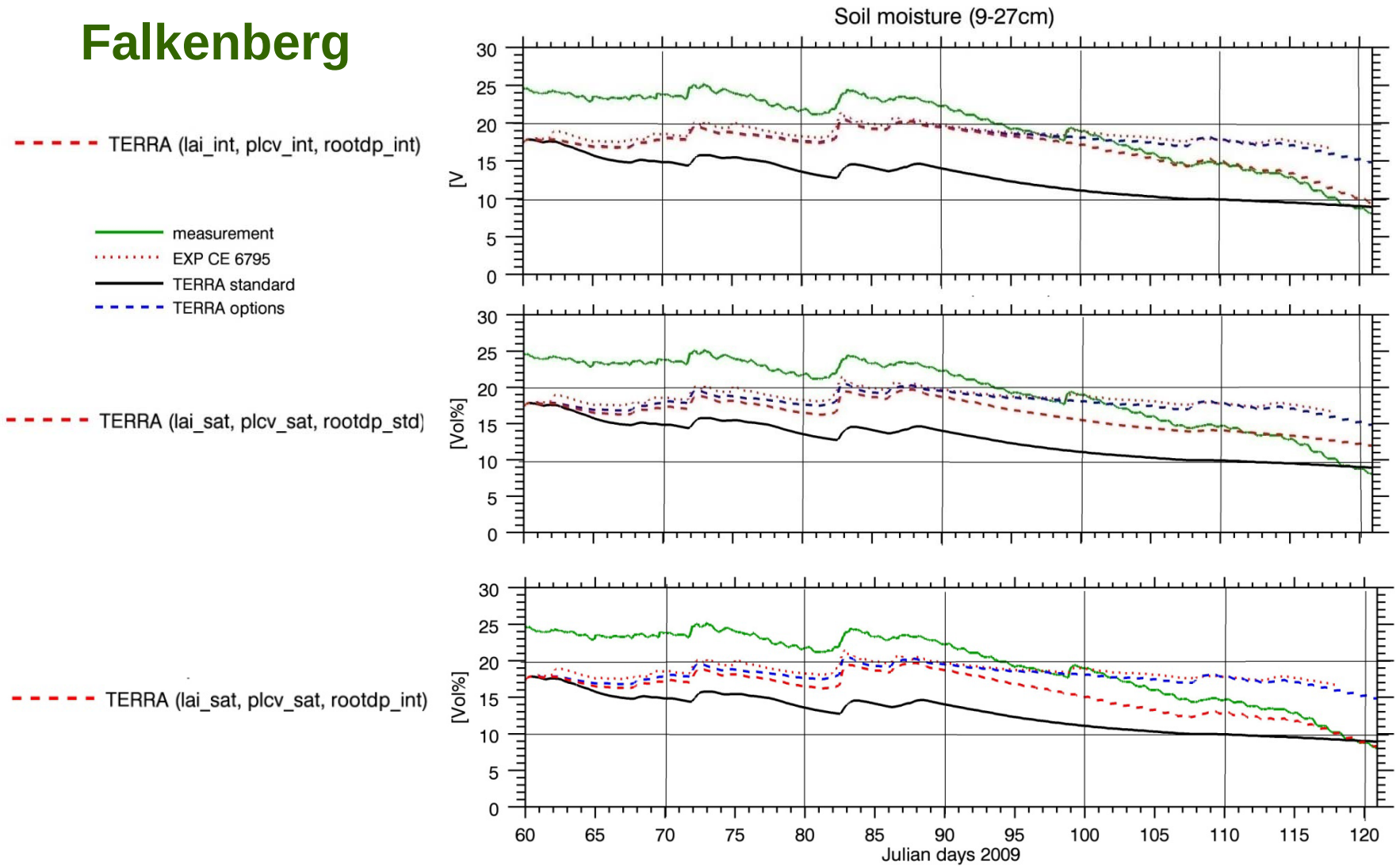
Impact of plant cover and rooting depth on temporal variation of soil moisture

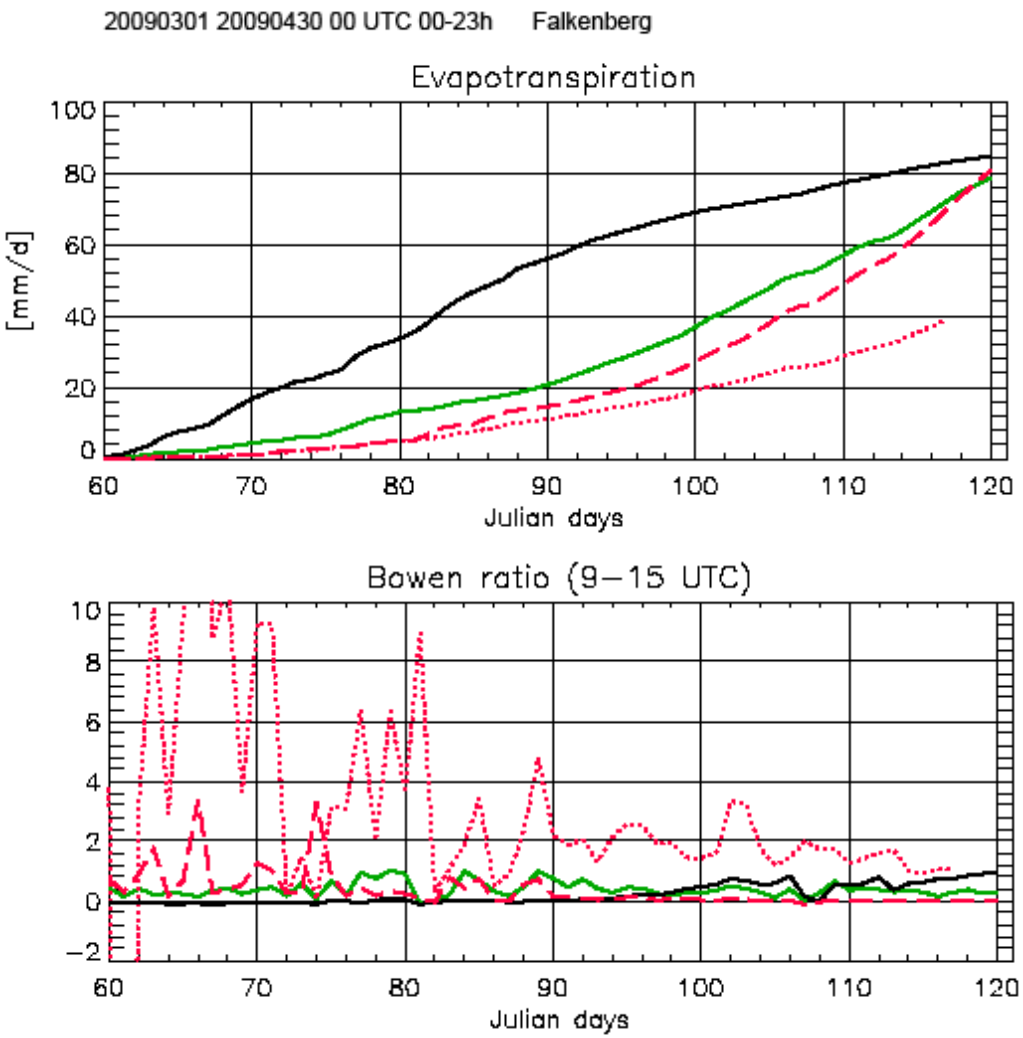


Falkenberg 2009



Falkenberg


Soil moisture (9-27cm)
TERRA (lai_int, plcv_int, rootdp_int)
measurement
EXP CE 6795
TERRA standard
TERRA options
TERRA (lai_sat, plcv_sat, rootdp_std)
TERRA (lai_sat, plcv_sat, rootdp_int)
[V
[Vol%]
[Vol%]
0
5
10
15
20
25
30
60
65
70
75
80
85
90
95
100
105
110
115
120
Julian days 2009



Accumulated evapotranspiration

crsmin=80

Bowen-ratio (9-15 UTC)

Conclusions

- **Future numerical experiments should completely cover the winter-to-summer transition to better estimate the vegetation impact on the soil and the boundary layer development.**
- **The annual cycles of the vegetation parameters should be consistent to each other.**
- **To increase the local model performance the optional set-up of the TERRA module should likewise be locally specified.**