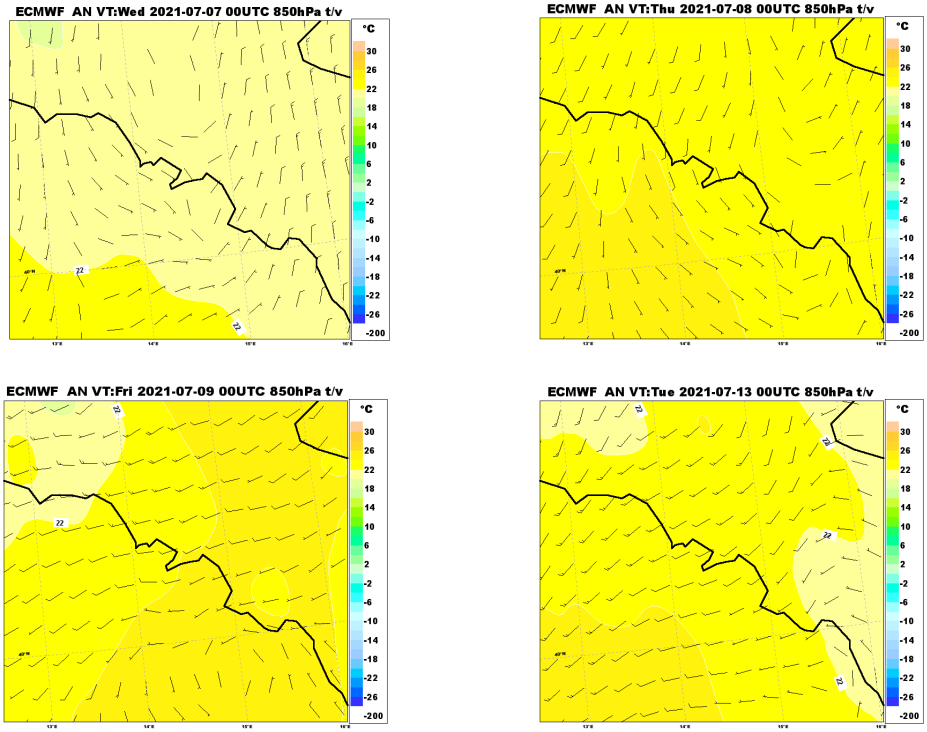
Report eventi Sahariani nel periodo Luglio ed Agosto 2021

Nel bimestre Luglio-Agosto 2021 è stato riscontrato un notevole afflusso di polveri sahariane che ha raggiunto l'intera penisola con ripercussioni anche sulla regione Campania. Grazie al recente potenziamento della rete di monitoraggio della qualità dell'aria e degli strumenti di misura e modellistica meteo ambientale, l'ARPAC ha seguito tempestivamente, ora per ora, gli eventi, sia naturali che antropici, che hanno comportato una significativa alterazione delle condizioni ambientali.

L'afflusso di polveri naturali determina un incremento delle concentrazioni di PM10. Difatti gli strumenti di misura del PM10 al suolo gestiti dall'ARPAC hanno misurato nel corso delle mensilità di Luglio ed Agosto 2021 concentrazioni orarie in aumento, favorite dalle condizioni meteoclimatiche caratterizzate dalla presenza di un persistente vento dai quadranti sudoccidentali. Dai dati complessivi misurati e pubblicati sul bollettino quotidiano qualità aria sono stati osservati superamenti del limite di 50 microgrammi/metro cubo e si è assistito comunque ad un incremento delle concentrazioni orarie in tutta la Regione, che, pur non essendosi tradotto ovunque in una media giornaliera che ecceda i limiti di legge, è risultato particolarmente significativo.

Di seguito sono riportate le previsioni modellistiche, i dati misurati al suolo e in quota, le immagini da satellite a testimonianza dell'evento.

- Campo di analisi dei giorni più significativi del periodo Luglio Agosto 2021 alle ore 00.00 UTC



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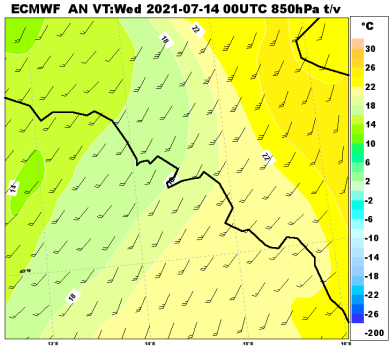

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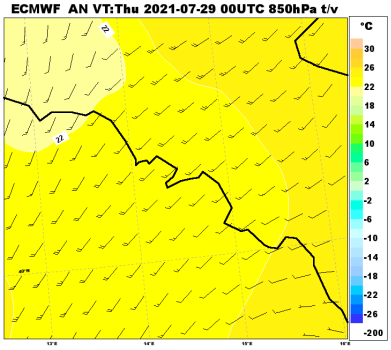

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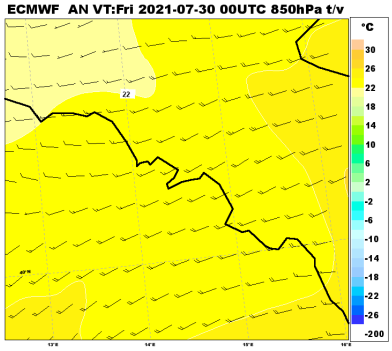

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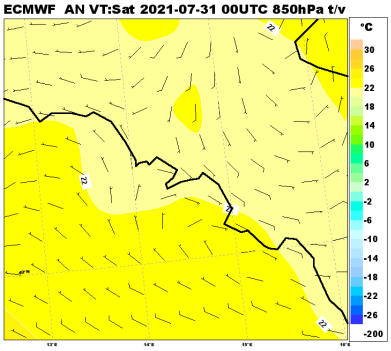

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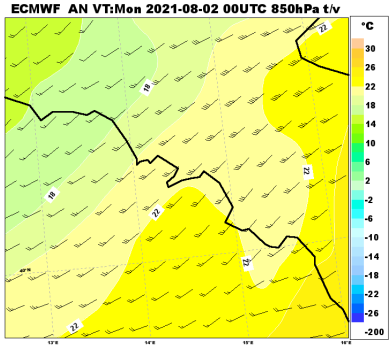

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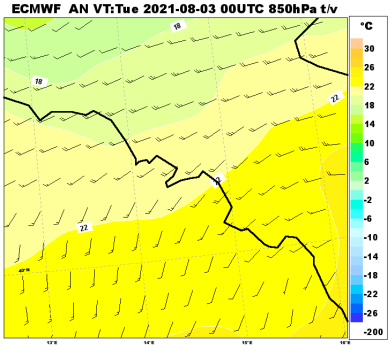

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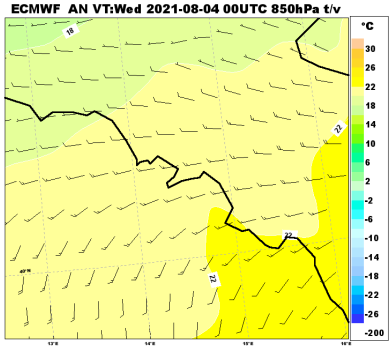

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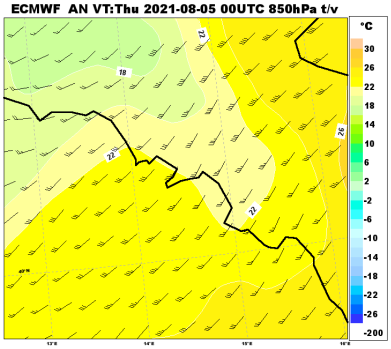


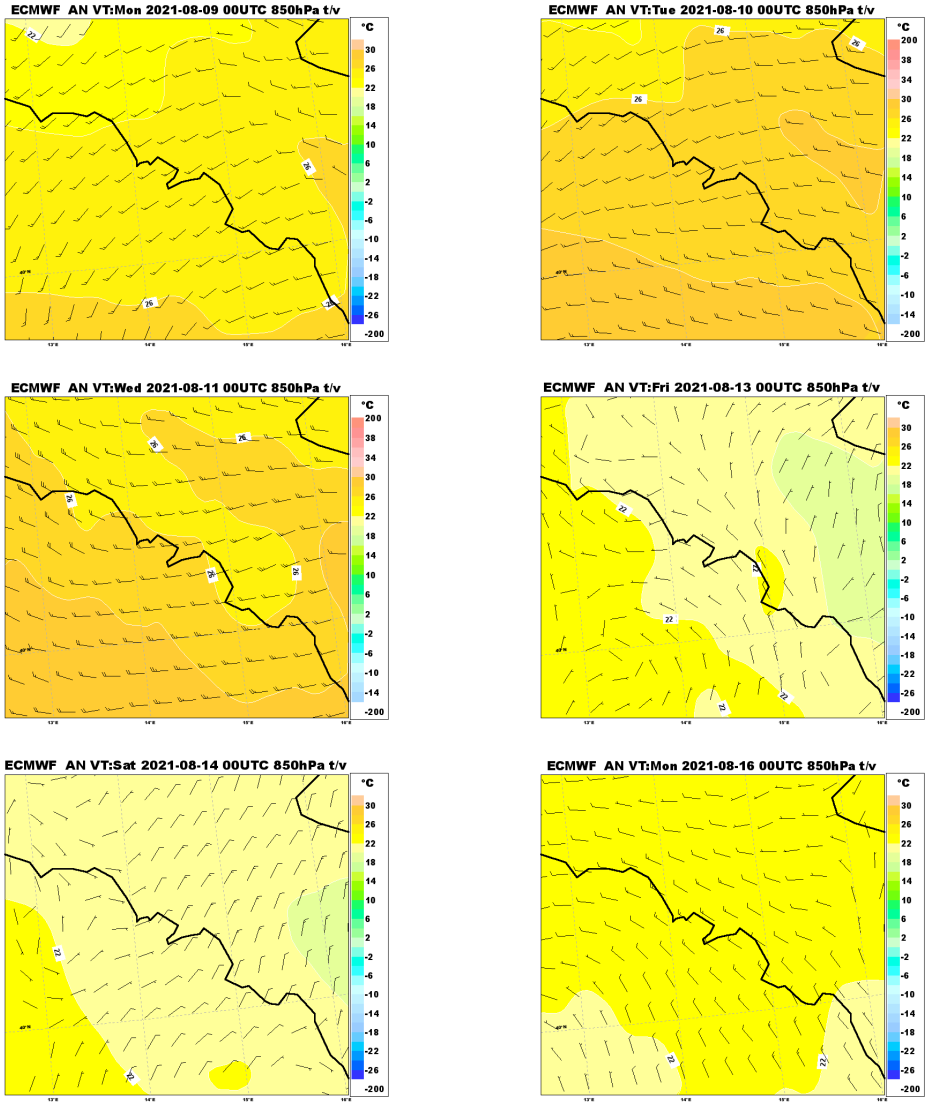
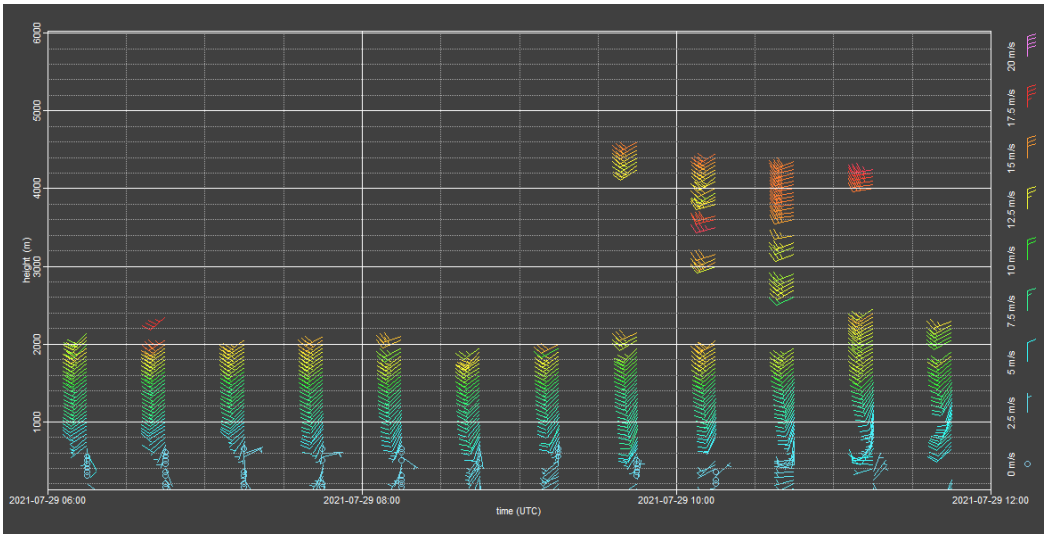
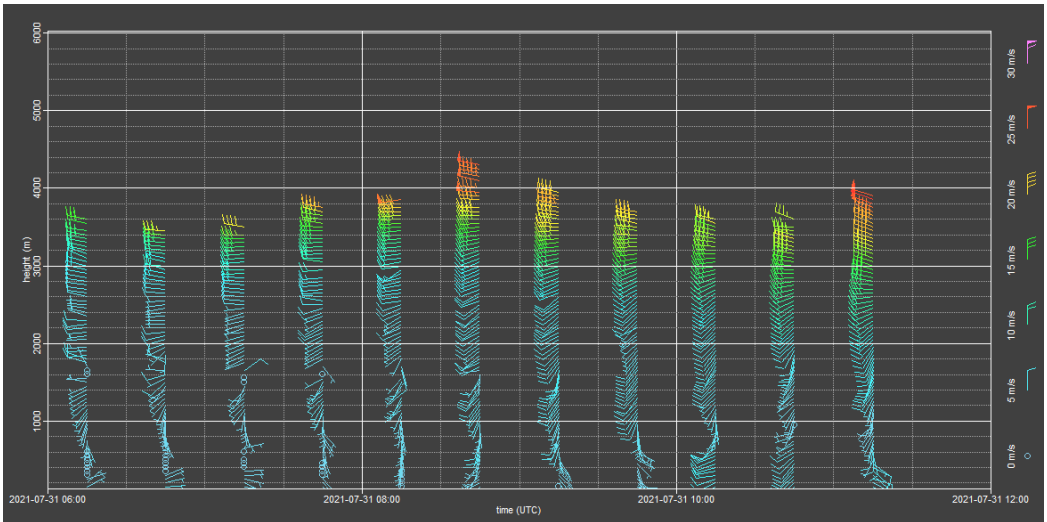
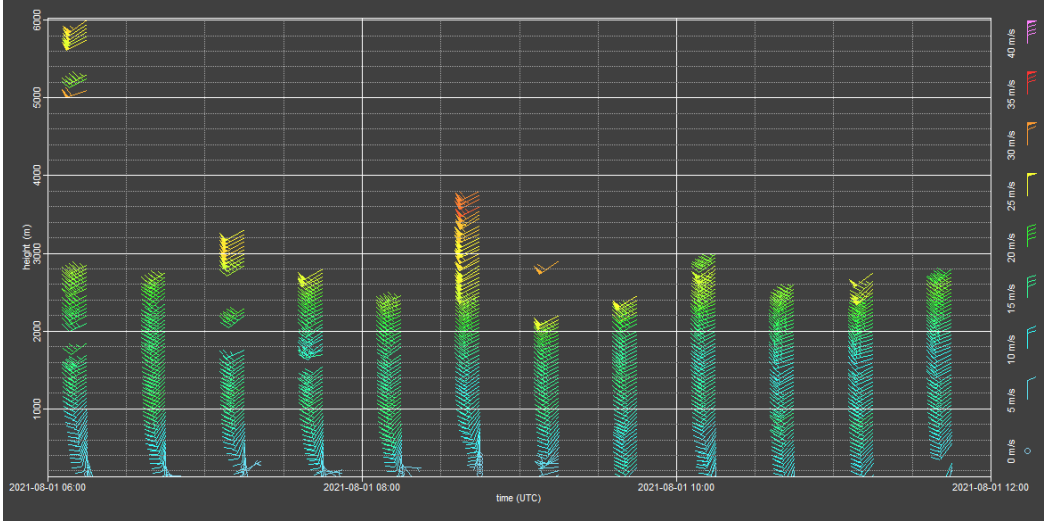


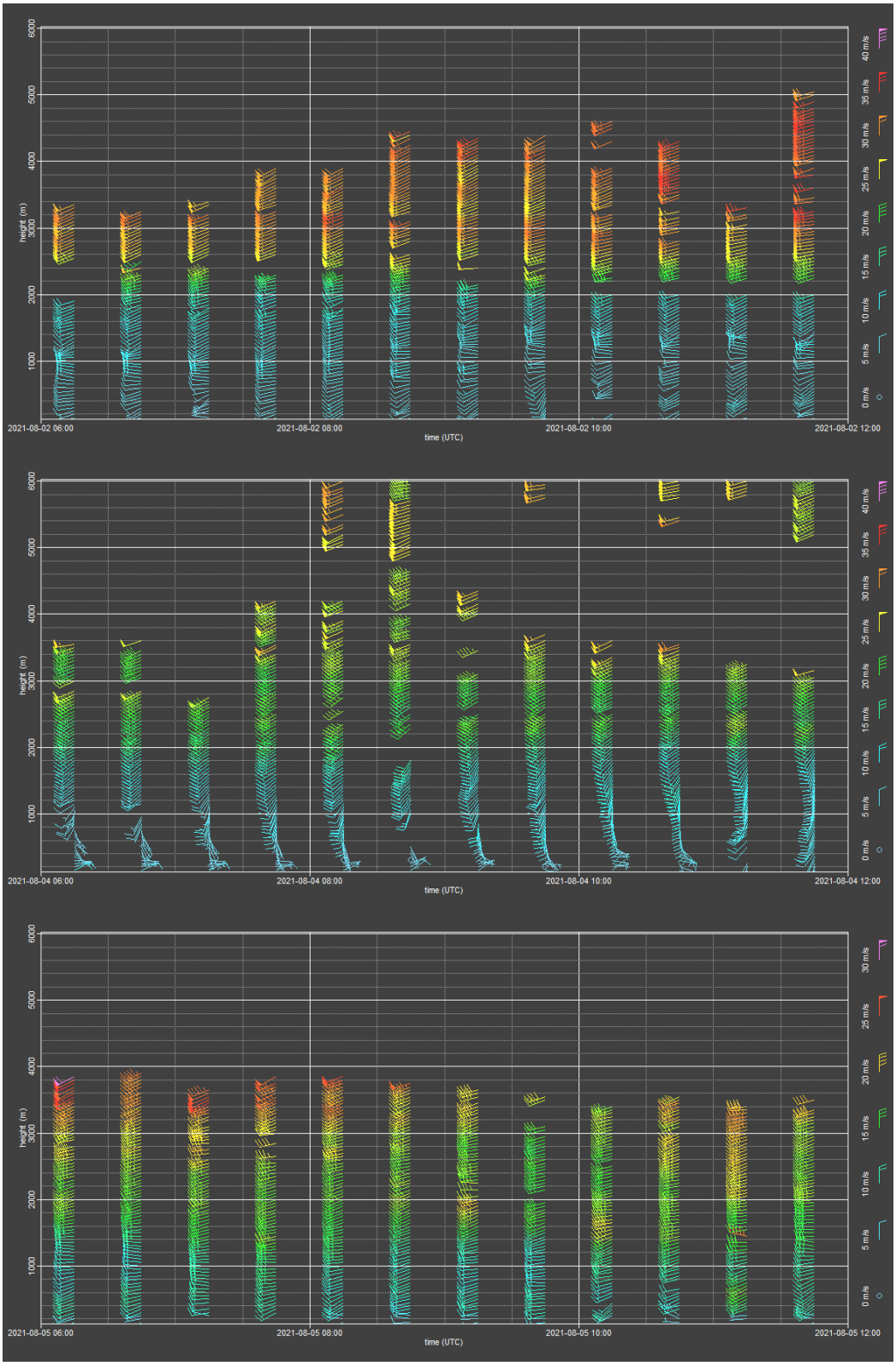
Fig. 1a- 1t: Campo analisi vento e temperature CEMEC del modello COSMO LAMI. Elaborazioni del campo di analisi temperature e vento a 850 hPa, visibile come per l'intero periodo compreso tra Luglio ed Agosto 2021 il vento provenisse prevalentemente dai quadranti sudoccidentali.

- Profilo verticale vento dal suolo e fino a quota massima di 5000m - Windprofiler ARPAC



- 

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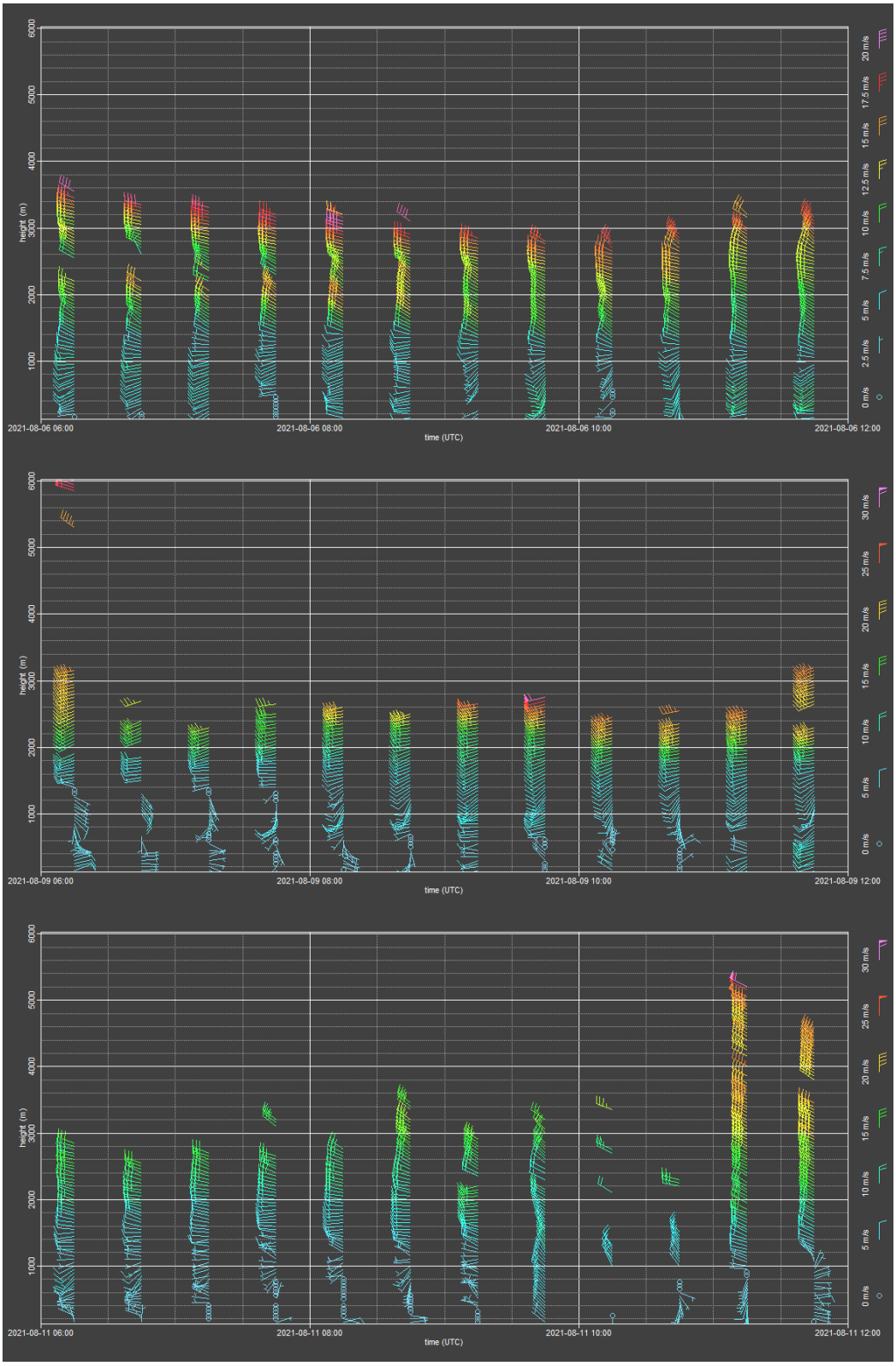
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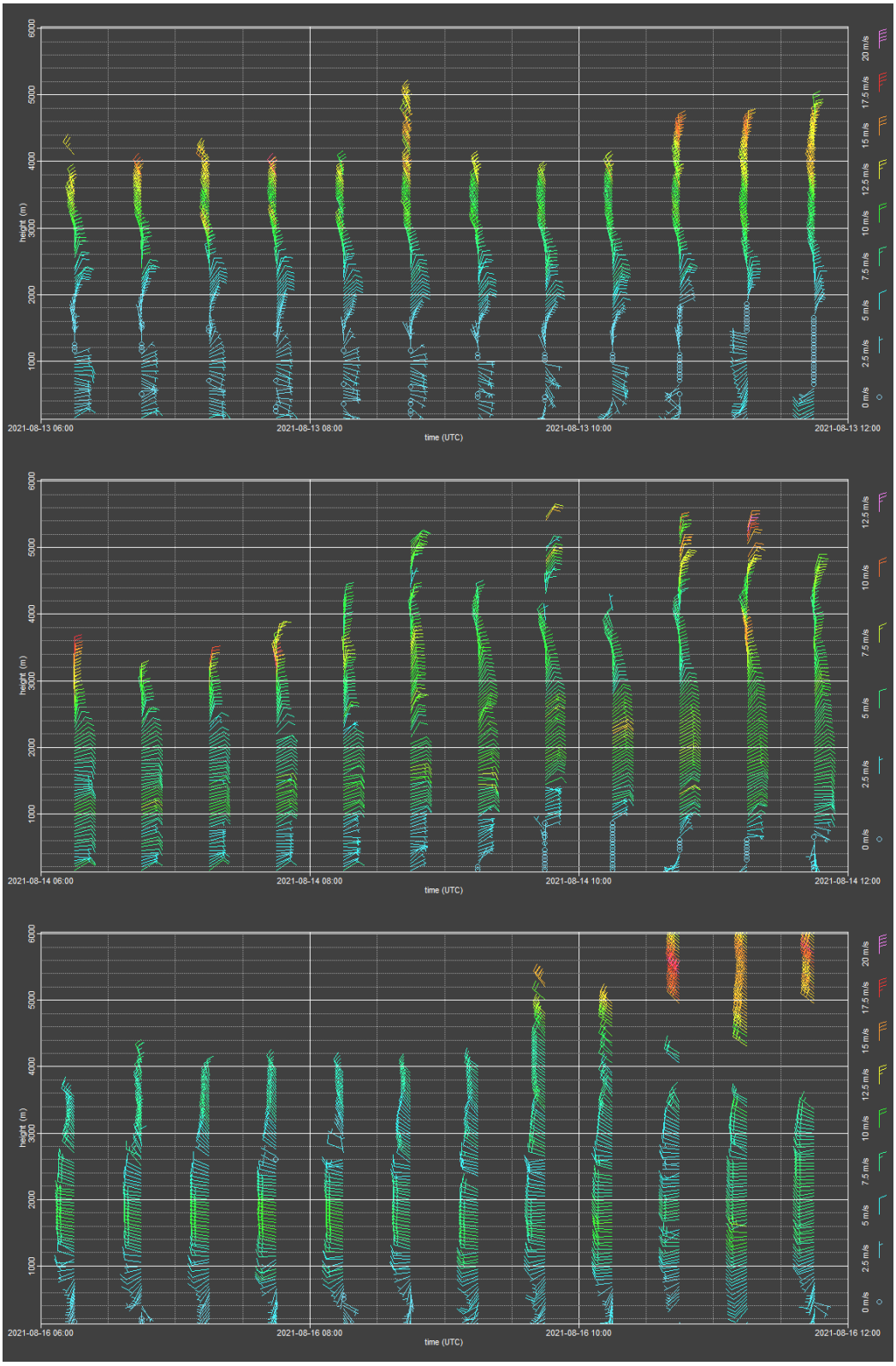
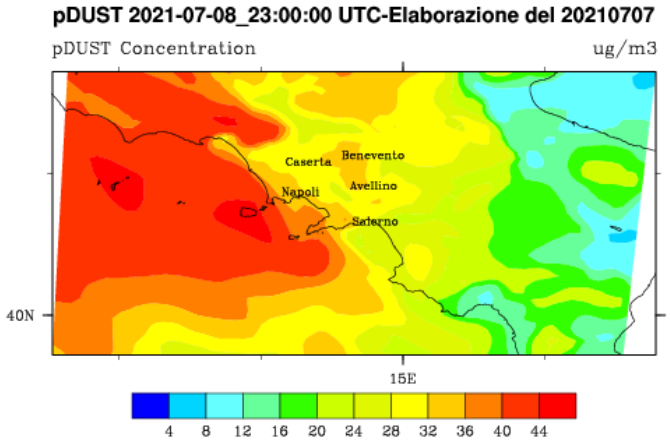
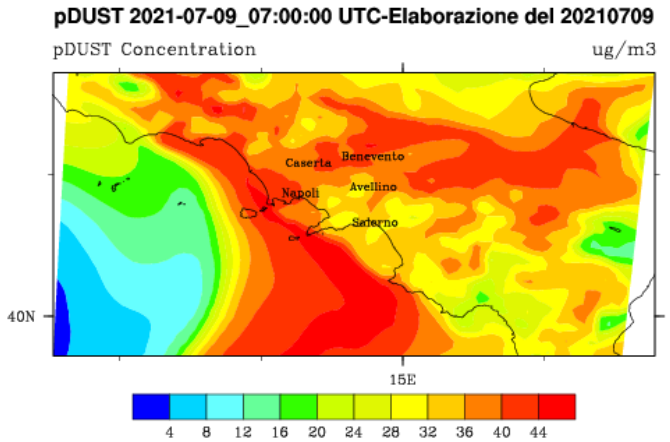


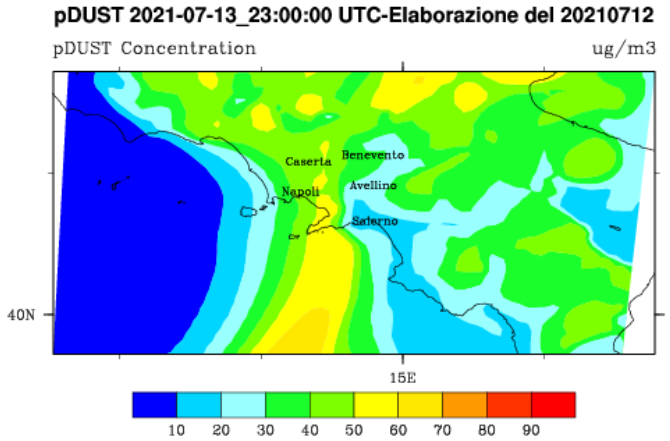
Fig. 2a – 2n Rappresentazione vento in quota misurato dal windprofiler gestito dall'ARPAC e collocato presso la sede di Capua del CIRA. Si nota il flusso più debole al suolo dove non supera i 15 m/s e più

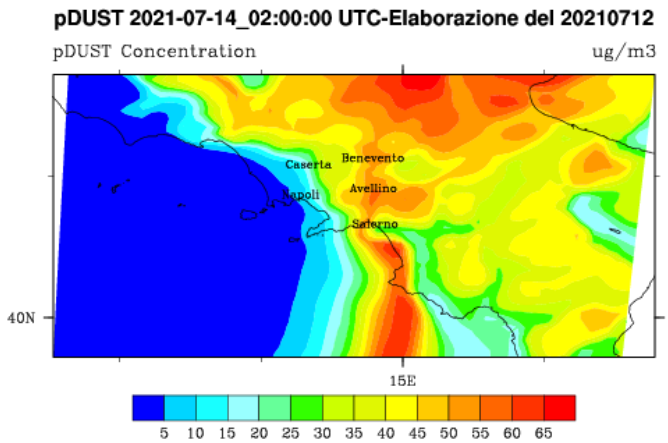
significativo in quota. Visibile la prevalente provenienza dai quadranti sudoccidentali e come nello strato al di sopra dei 1000 metri il vento sia comunque più significativo fino a raggiungere picchi di 35m/s.

- I modelli di previsione delle polveri sahariane hanno stimato l'entità dell'afflusso di polveri naturali sia a scala regionale che a scala continentale a risoluzione temporale oraria.



- 

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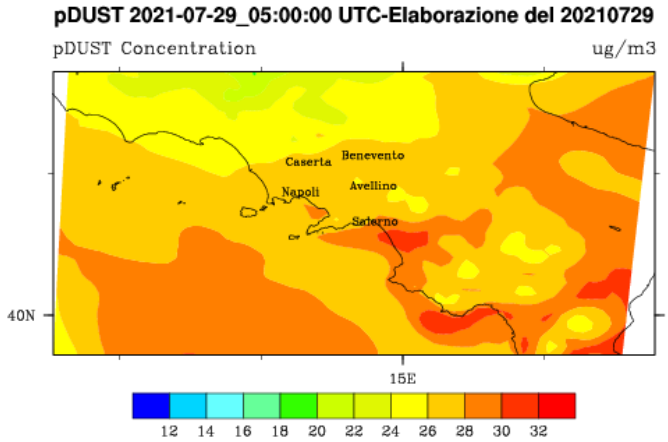
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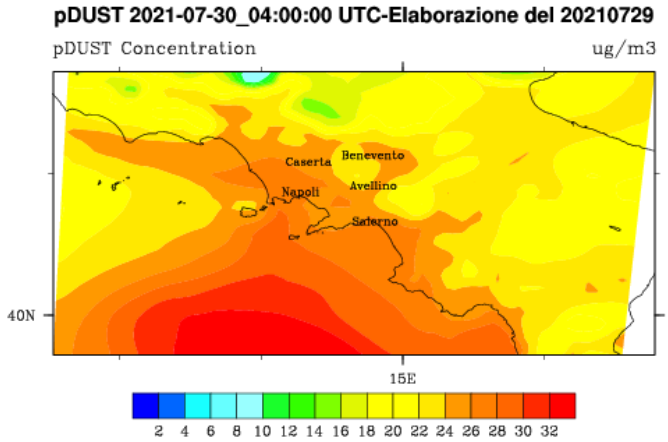
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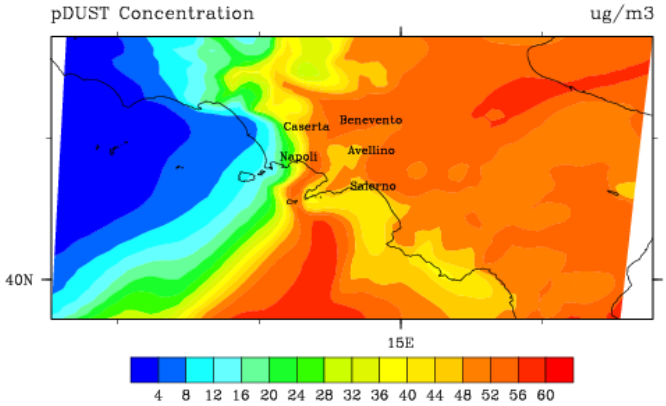

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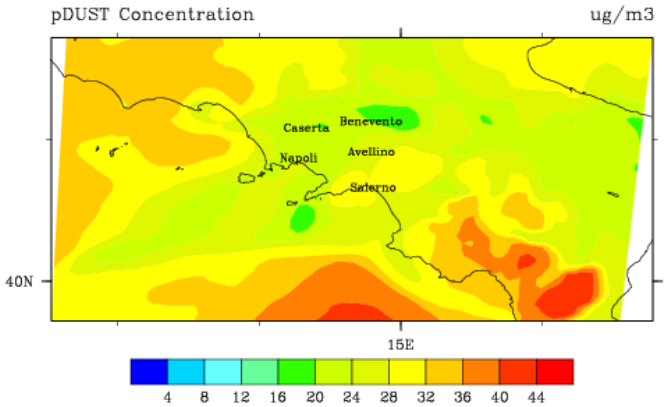

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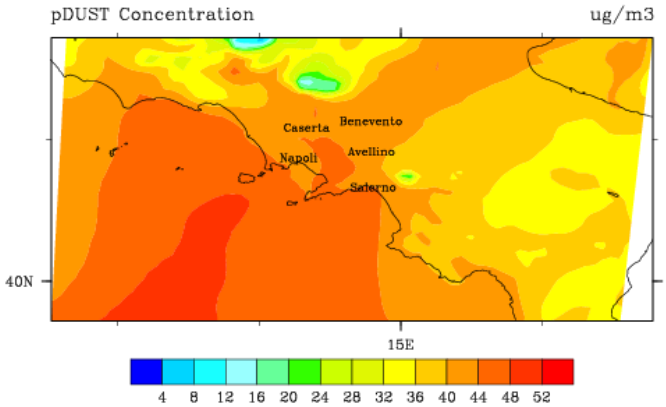

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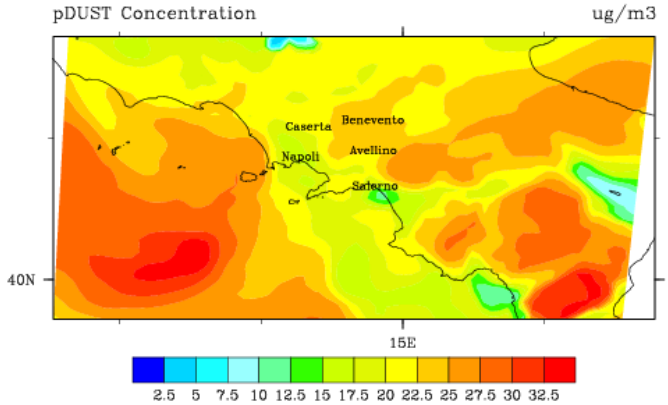

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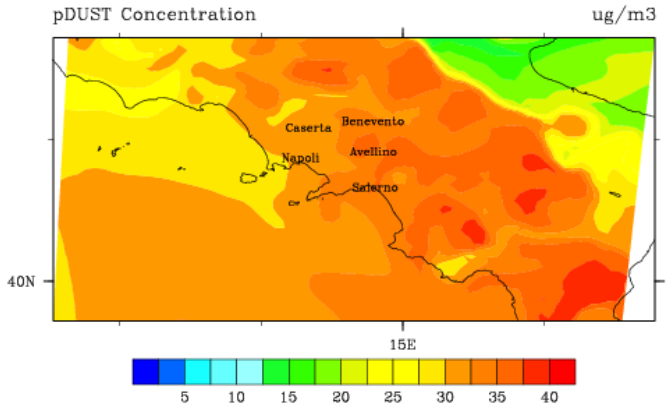

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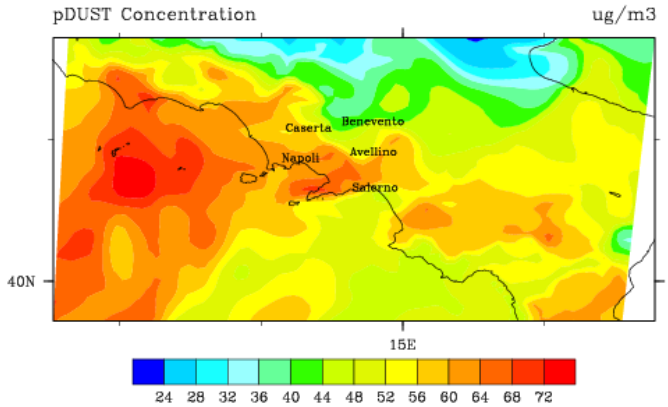


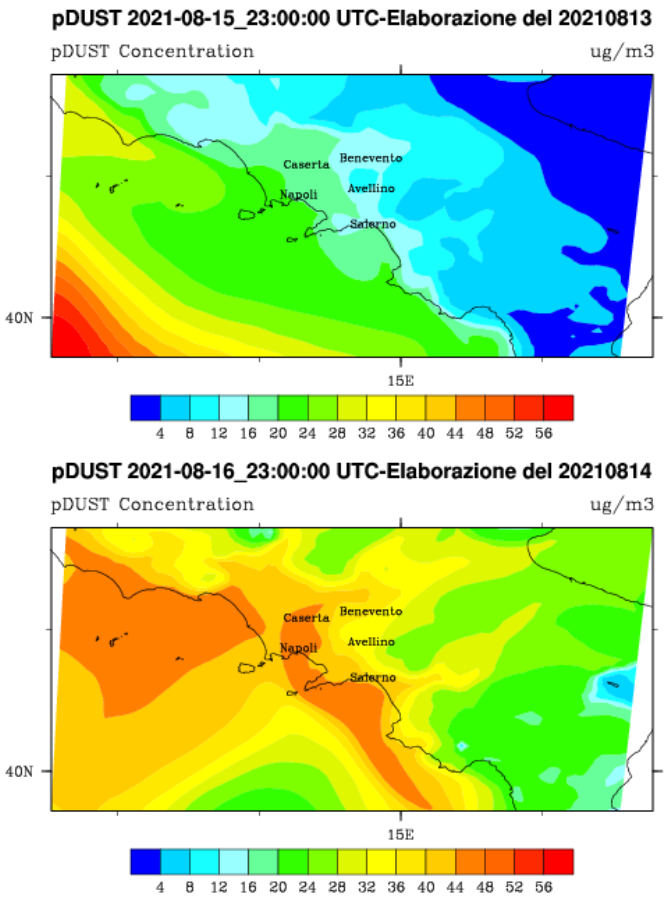
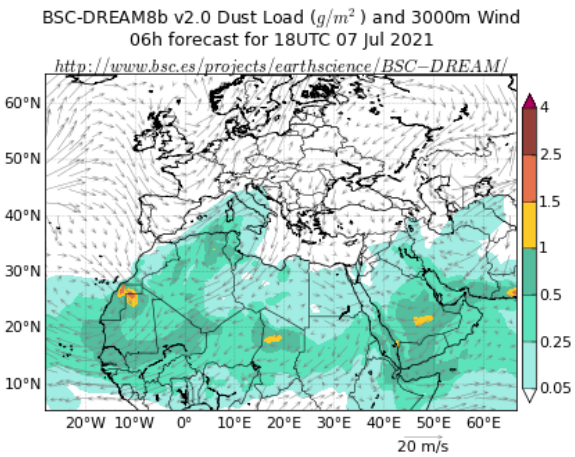
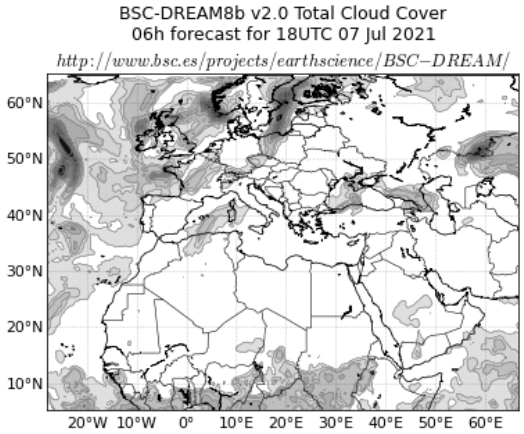


Fig. 3a - 3pElaborazione tramite il modello CHIMERE della previsione di dust più significative del periodo Luglio-Agosto2021- fonte CEMEC-ARPAC.

- Elaborazioni previsionali dell’apporto di polveri di origine naturale - Barcelona Dust Forecast Center





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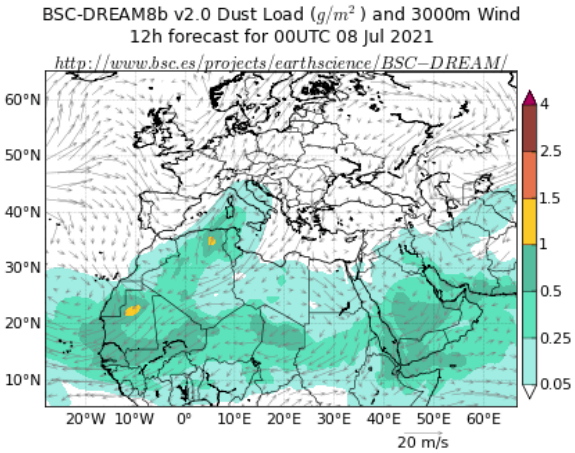
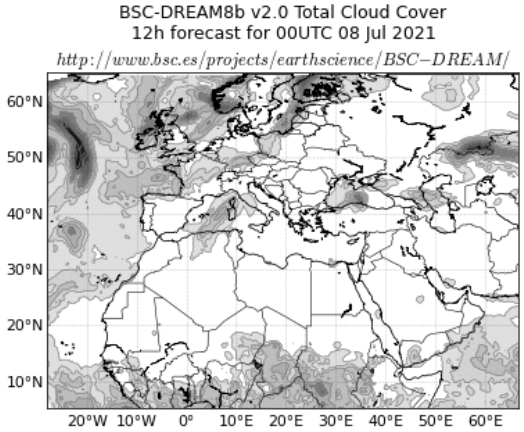
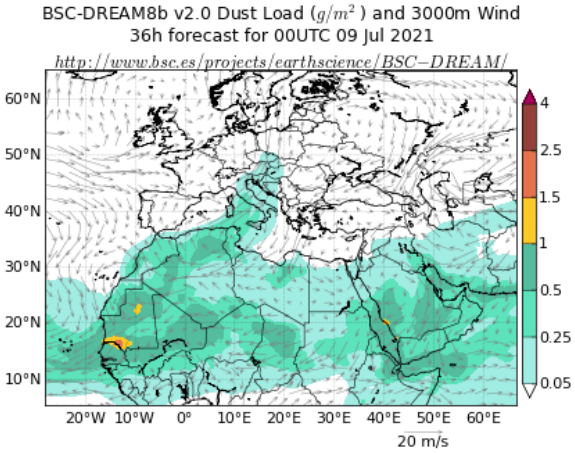
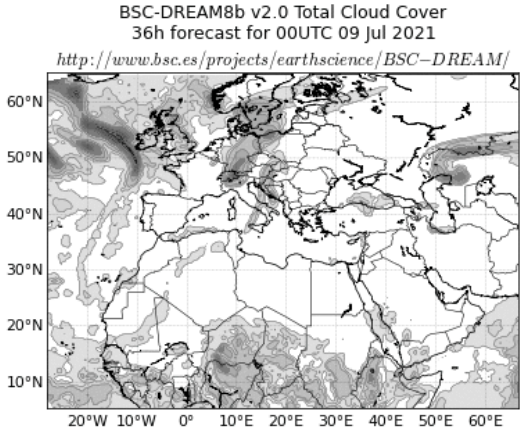
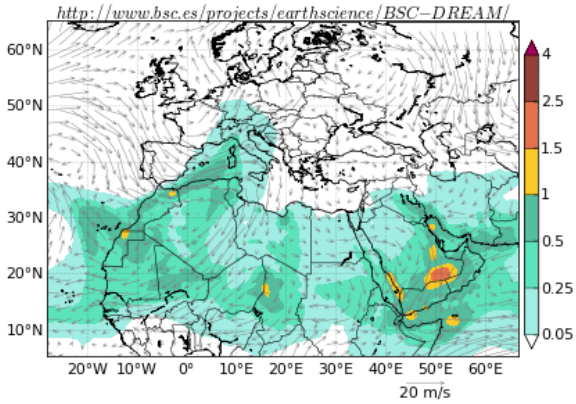








BSC-DREAM8b v2.0 Dust Load (g/m^2) and 3000m Wind
06h forecast for 18UTC 12 Jul 2021



BSC-DREAM8b v2.0 Total Cloud Cover
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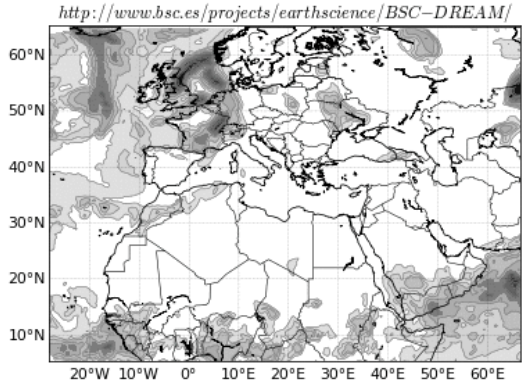

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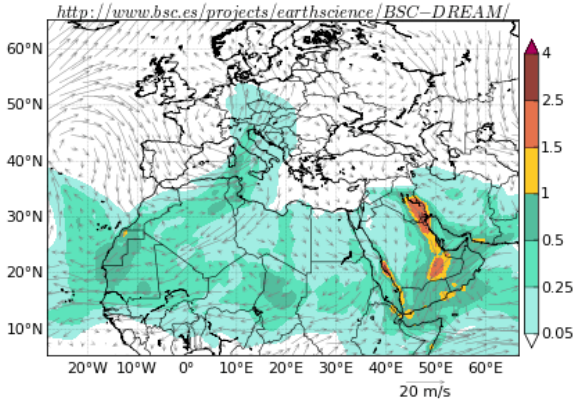

BSC-DREAM8b v2.0 Total Cloud Cover
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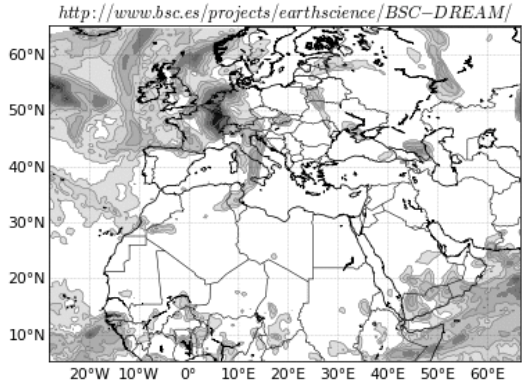

BSC-DREAM8b v2.0 Dust Load (g/m^2) and 3000m Wind
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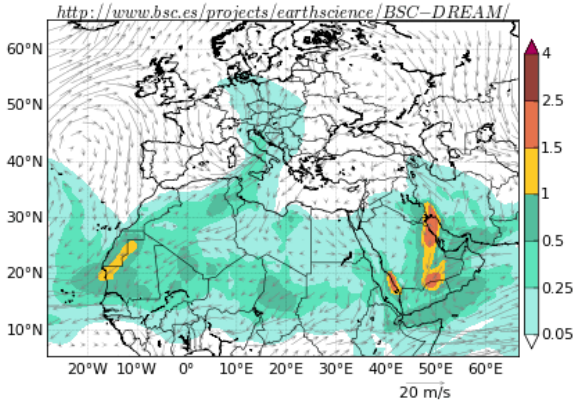
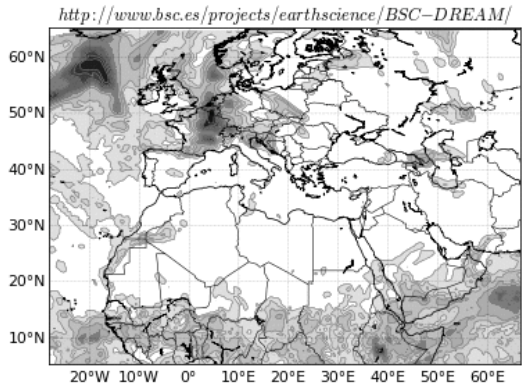
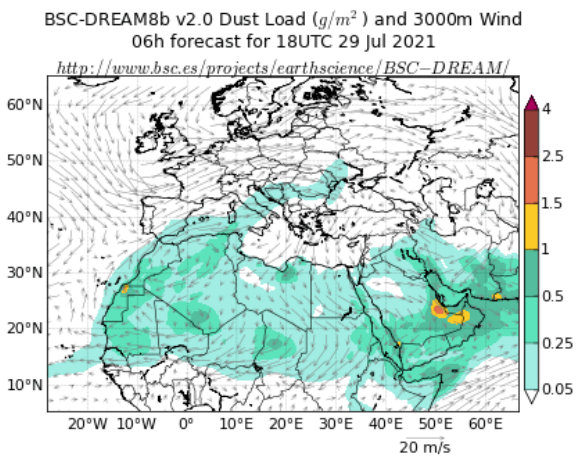
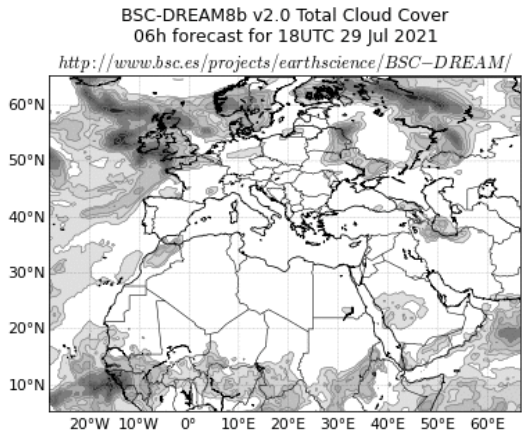


BSC-DREAM8b v2.0 Total Cloud Cover
36h forecast for 00UTC 14 Jul 2021




BSC-DREAM8b v2.0 Dust Load (g/m^2) and 3000m Wind
06h forecast for 18UTC 29 Jul 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
60°N
50°N
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E
4
2.5
1.5
1
0.5
0.25
0.05
20 m/s


BSC-DREAM8b v2.0 Total Cloud Cover
06h forecast for 18UTC 29 Jul 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
60°N
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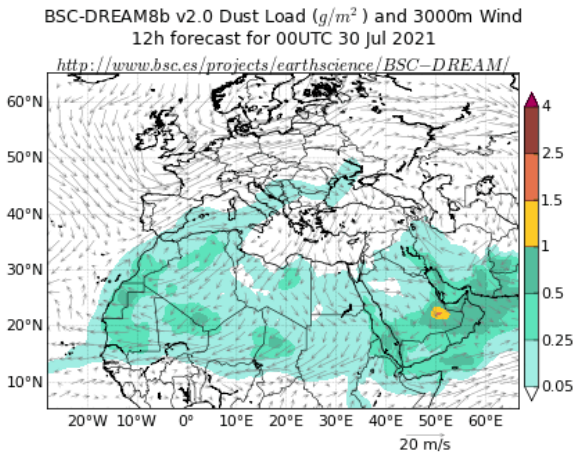
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E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12h forecast for 00UTC 30 Jul 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
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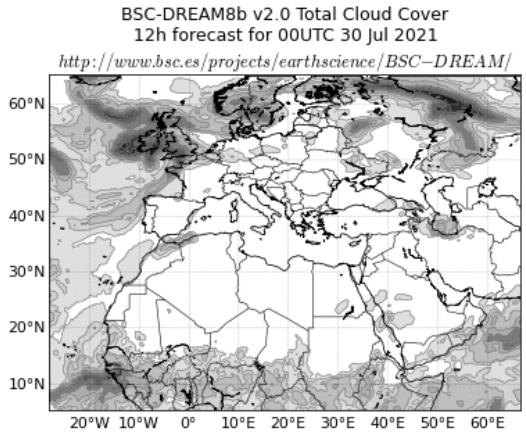
50°N
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E
4
2.5
1.5
1
0.5
0.25
0.05
20 m/s


BSC-DREAM8b v2.0 Total Cloud Cover
12h forecast for 00UTC 30 Jul 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
60°N
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40°N
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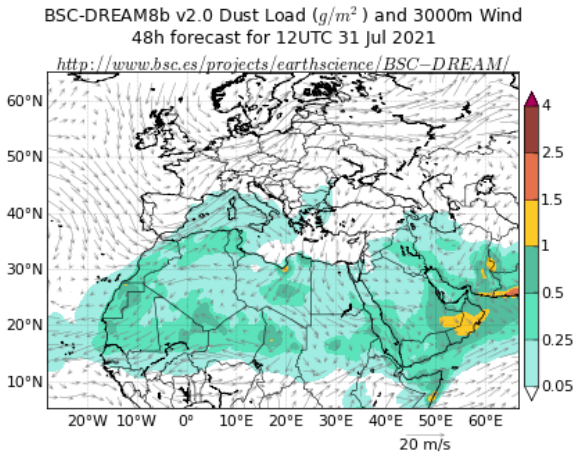
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E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48h forecast for 12UTC 31 Jul 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
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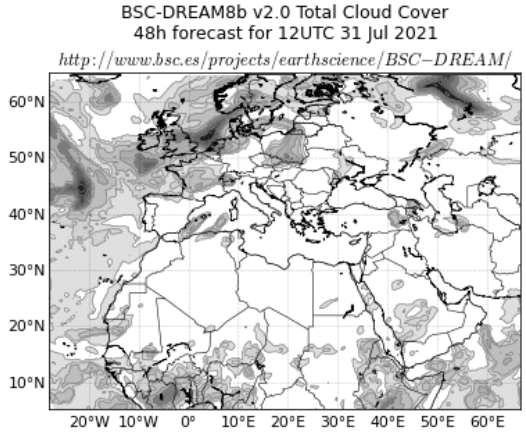
50°N
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E
4
2.5
1.5
1
0.5
0.25
0.05
20 m/s


BSC-DREAM8b v2.0 Total Cloud Cover
48h forecast for 12UTC 31 Jul 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
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20°N
10°N
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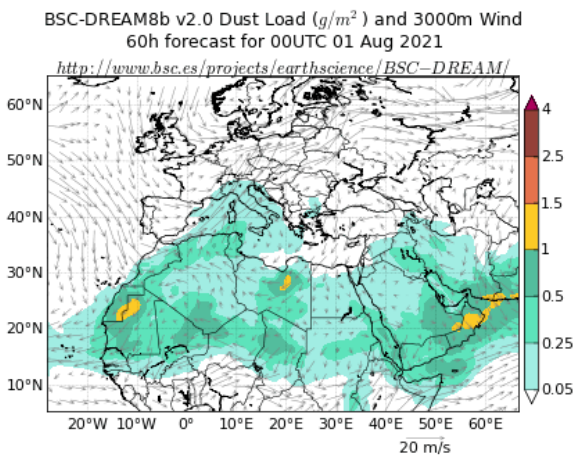
BSC-DREAM8b v2.0 Dust Load (g/m^2) and 3000m Wind
60h forecast for 00UTC 01 Aug 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
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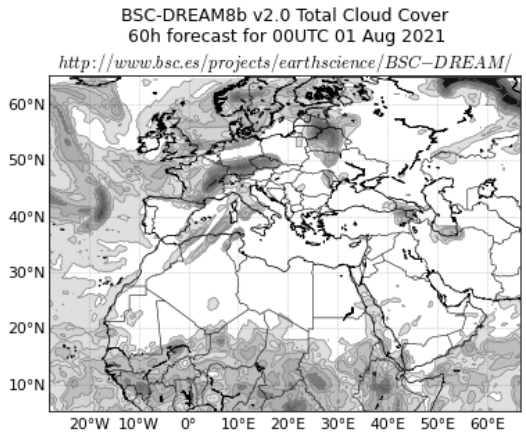
50°N
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E
4
2.5
1.5
1
0.5
0.25
0.05
20 m/s


BSC-DREAM8b v2.0 Total Cloud Cover
60h forecast for 00UTC 01 Aug 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
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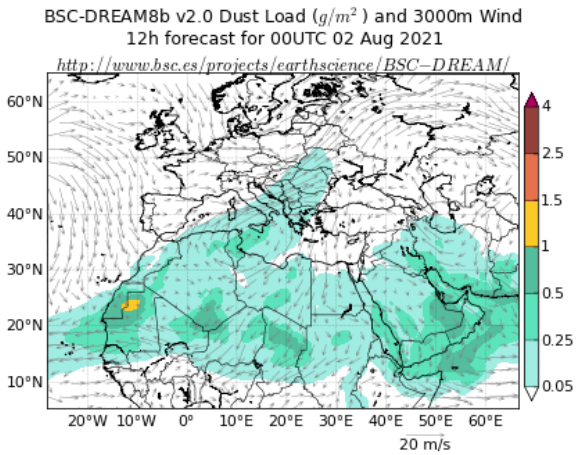
50°N
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E


BSC-DREAM8b v2.0 Dust Load (g/m^2) and 3000m Wind
12h forecast for 00UTC 02 Aug 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
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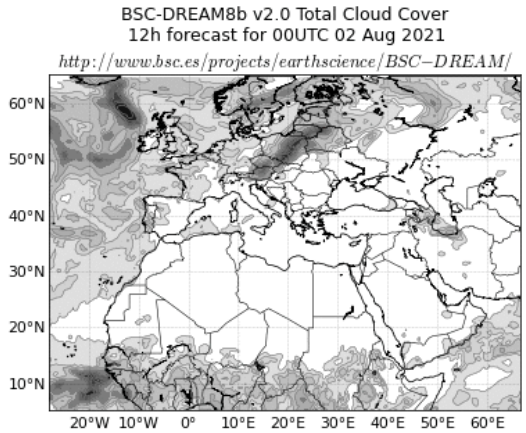
50°N
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E
4
2.5
1.5
1
0.5
0.25
0.05
20 m/s


BSC-DREAM8b v2.0 Total Cloud Cover
12h forecast for 00UTC 02 Aug 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
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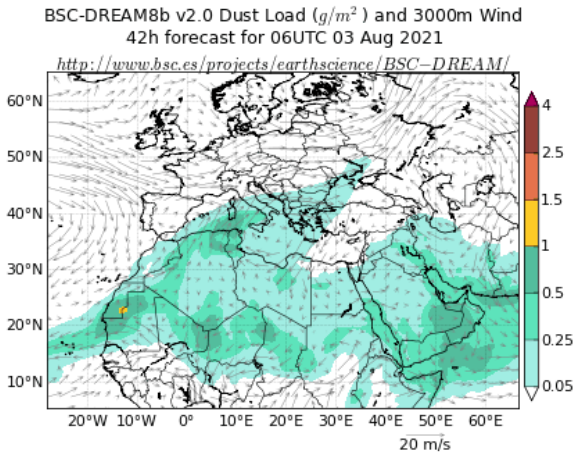
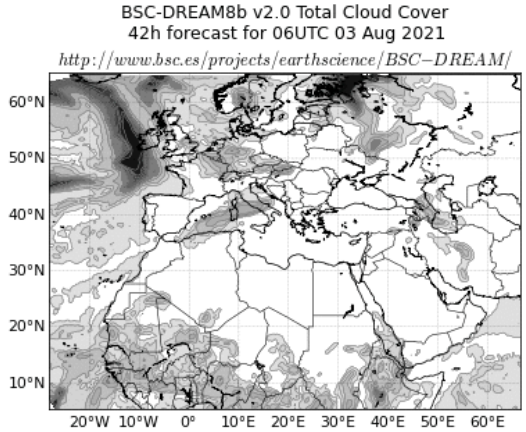
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E


BSC-DREAM8b v2.0 Dust Load (g/m^2) and 3000m Wind
42h forecast for 06UTC 03 Aug 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
60°N
50°N
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E
4
2.5
1.5
1
0.5
0.25
0.05
20 m/s


BSC-DREAM8b v2.0 Total Cloud Cover
42h forecast for 06UTC 03 Aug 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
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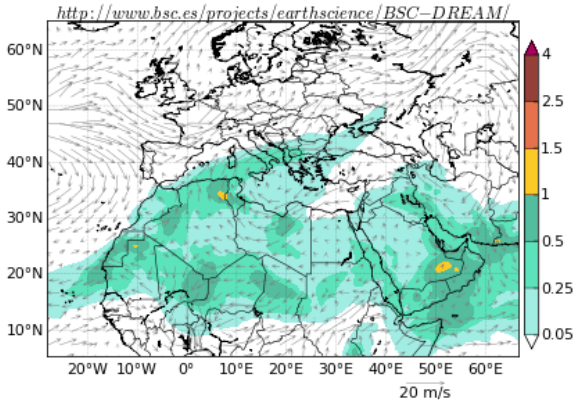
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E

BSC-DREAM8b v2.0 Dust Load (g/m^2) and 3000m Wind
60h forecast for 00UTC 04 Aug 2021



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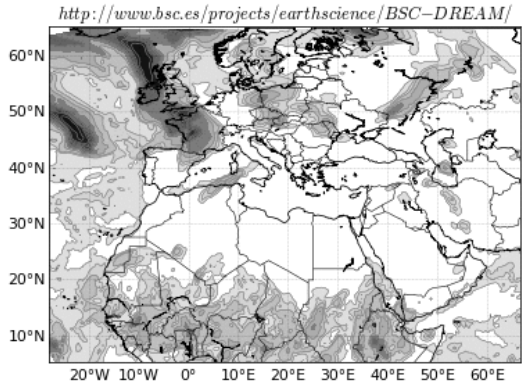
60h forecast for 00UTC 04 Aug 2021



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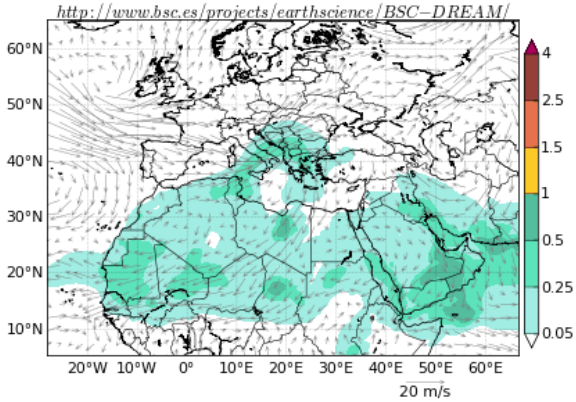
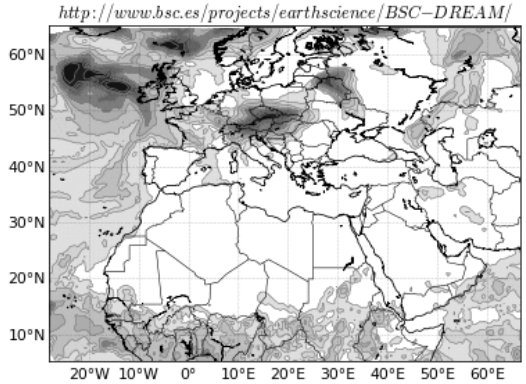
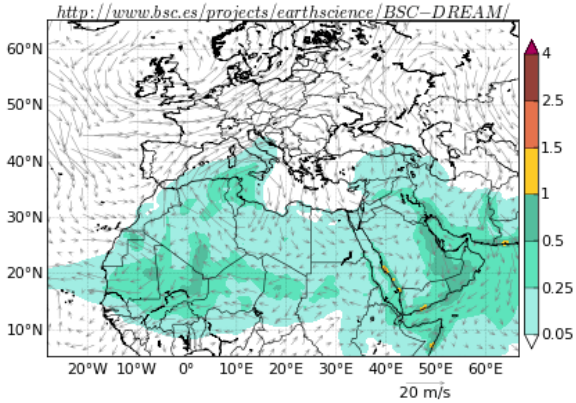
12h forecast for 00UTC 05 Aug 2021



BSC-DREAM8b v2.0 Total Cloud Cover
12h forecast for 00UTC 05 Aug 2021



BSC-DREAM8b v2.0 Dust Load (g/m^2) and 3000m Wind
00h forecast for 12UTC 08 Aug 2021



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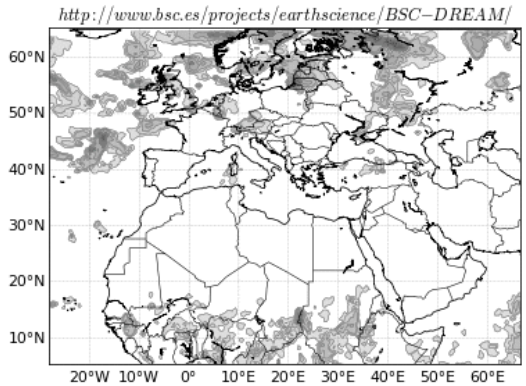
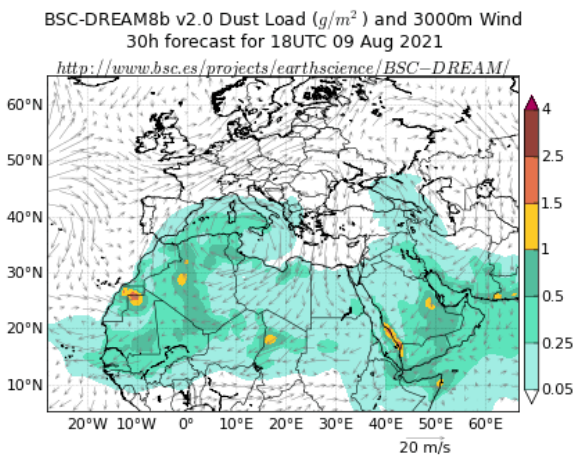
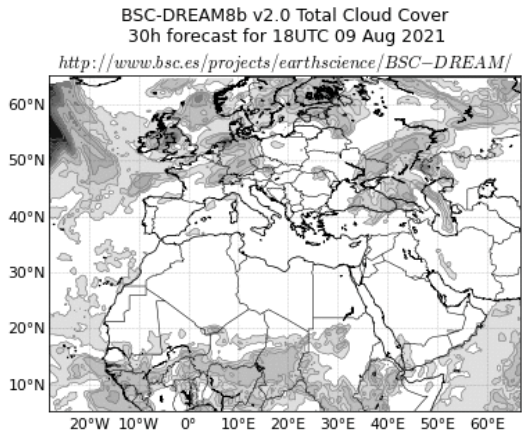
00h forecast for 12UTC 08 Aug 2021




BSC-DREAM8b v2.0 Dust Load (g/m^2) and 3000m Wind
30h forecast for 18UTC 09 Aug 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
60°N
50°N
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E
4
2.5
1.5
1
0.5
0.25
0.05
20 m/s


BSC-DREAM8b v2.0 Total Cloud Cover
30h forecast for 18UTC 09 Aug 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
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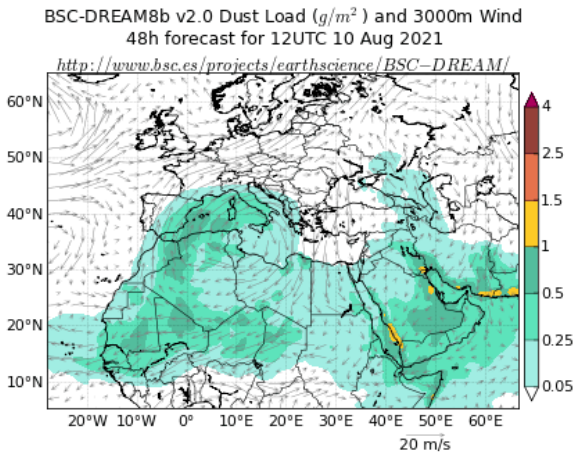
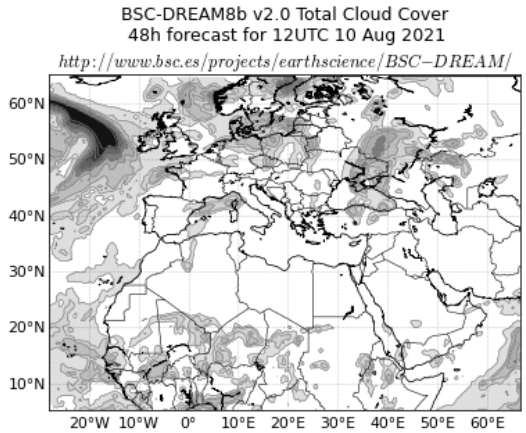
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E


BSC-DREAM8b v2.0 Dust Load (g/m^2) and 3000m Wind
48h forecast for 12UTC 10 Aug 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
60°N
50°N
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E
4
2.5
1.5
1
0.5
0.25
0.05
20 m/s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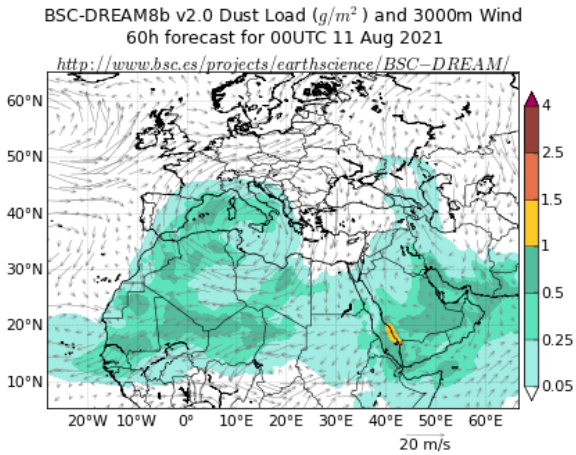
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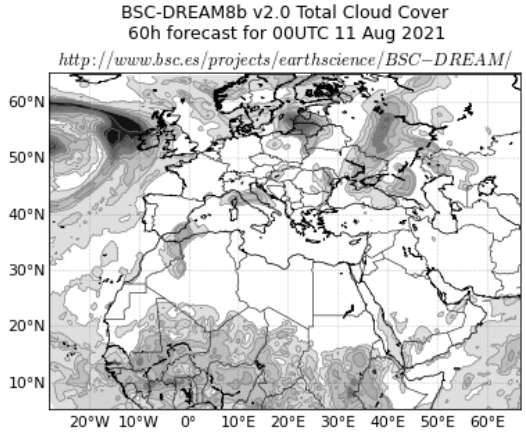
60h forecast for 00UTC 11 Aug 2021
http://www.bsc.es/projects/earthscience/BSC−DREAM/
60°N
50°N
40°N
30°N
20°N
10°N
20°W 10°W 0° 10°E 20°E 30°E 40°E 50°E 60°E
4
2.5
1.5
1
0.5
0.25
0.05
20 m/s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60h forecast for 00UTC 11 Aug 2021
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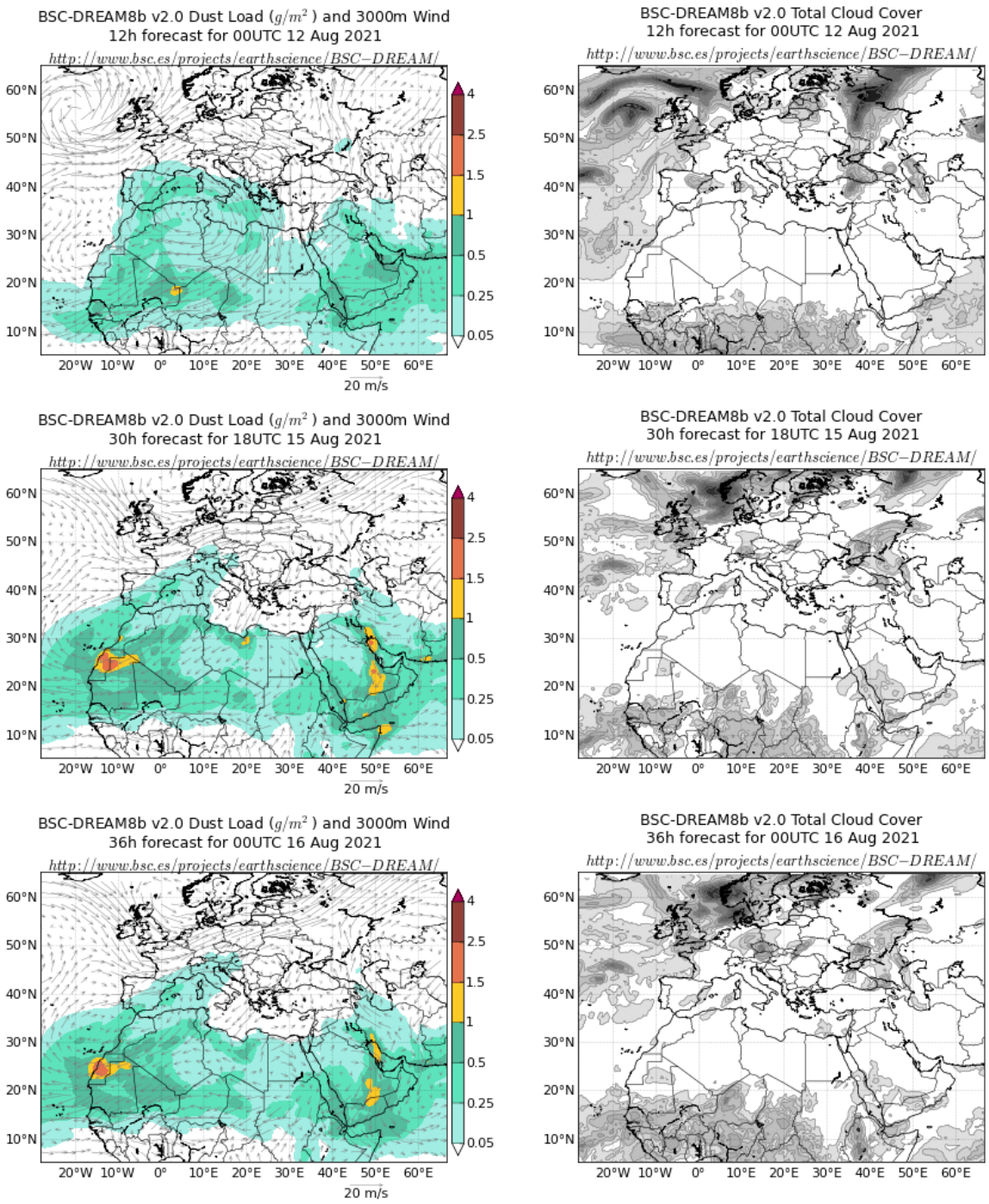
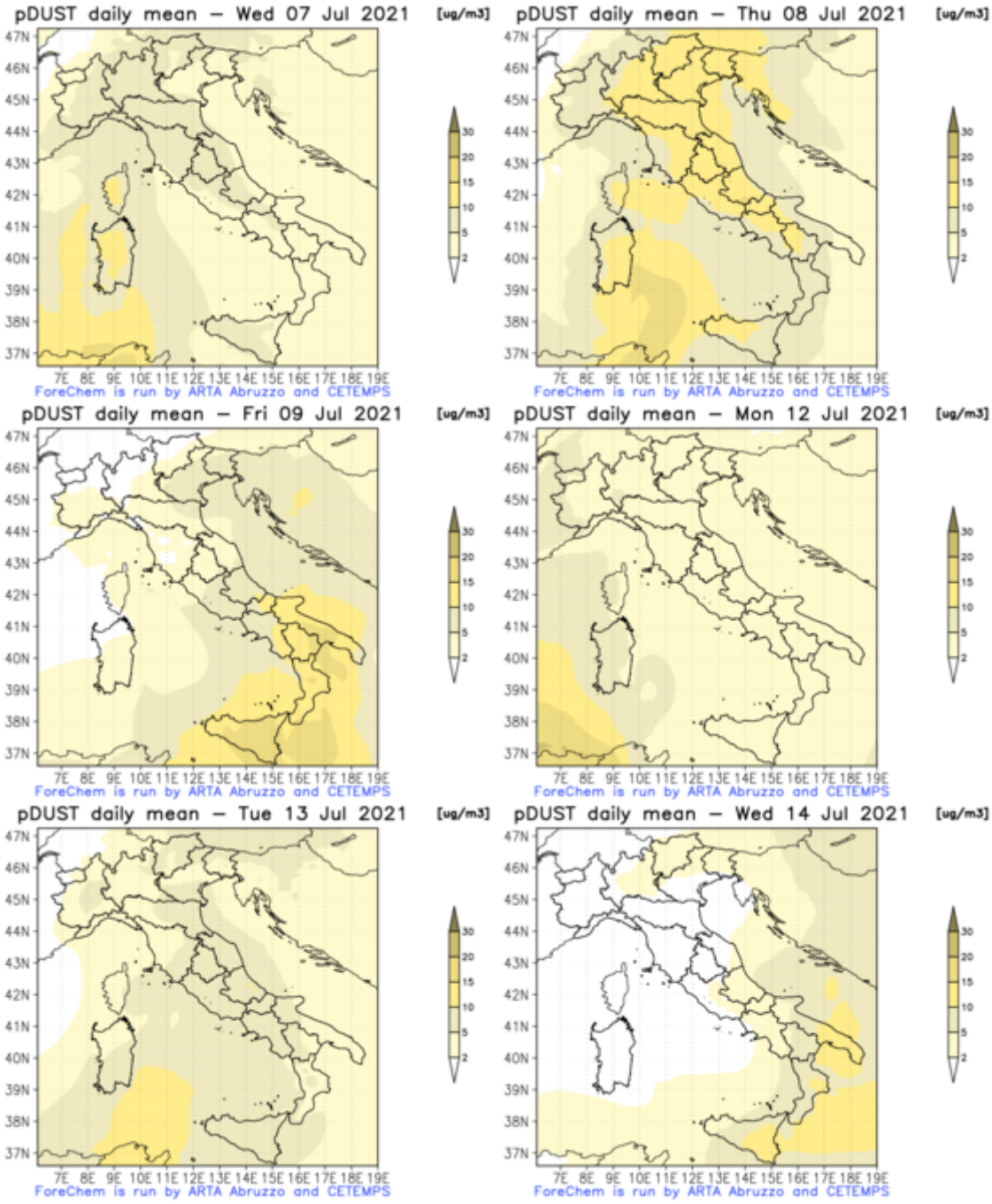
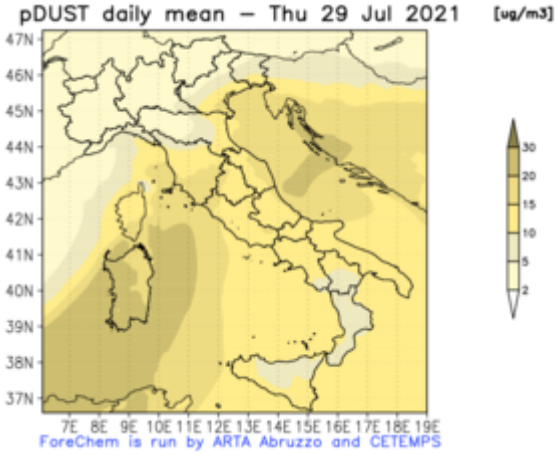
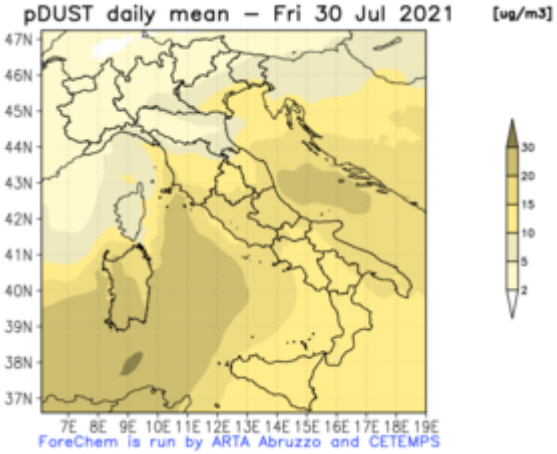


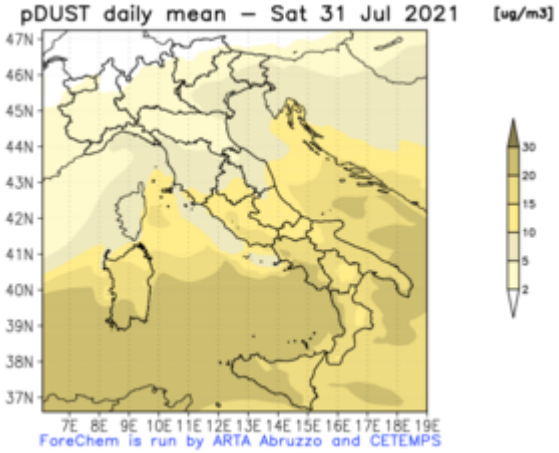
Fig. 4a,4z Elaborazione del Barcelona Dust Forecast Center relativa alla concentrazione di polveri naturali prevista per i giorni più significativi del bimestre Luglio Agosto 2021.

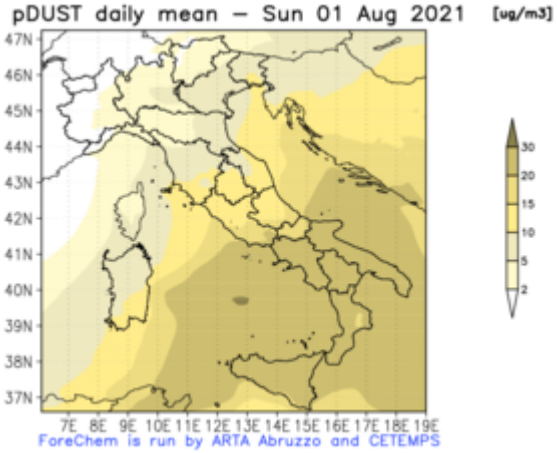
- Elaborazioni previsionali dell’apporto di polveri di origine naturale – Forechem Università dell’Aquila

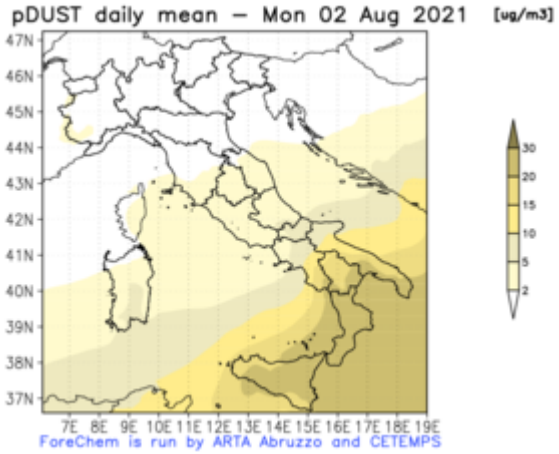


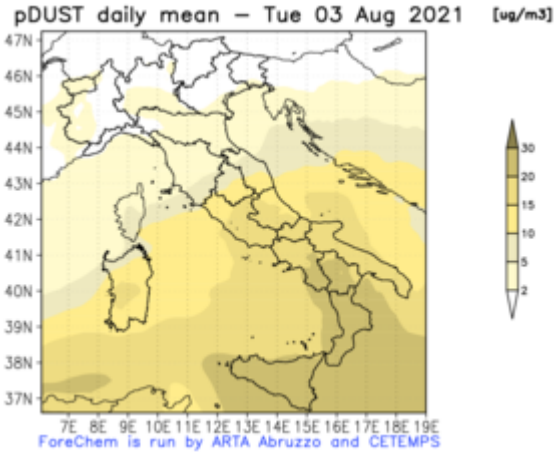

pDUST daily mean – Thu 29 Jul 2021
[ug/m3]
47N 46N 45N 44N 43N 42N 41N 40N 39N 38N 37N
7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E 19E
30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS

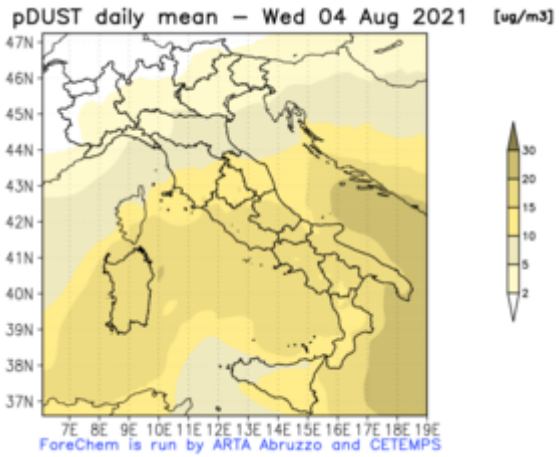

pDUST daily mean – Fri 30 Jul 2021
[ug/m3]
47N 46N 45N 44N 43N 42N 41N 40N 39N 38N 37N
7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E 19E
30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS

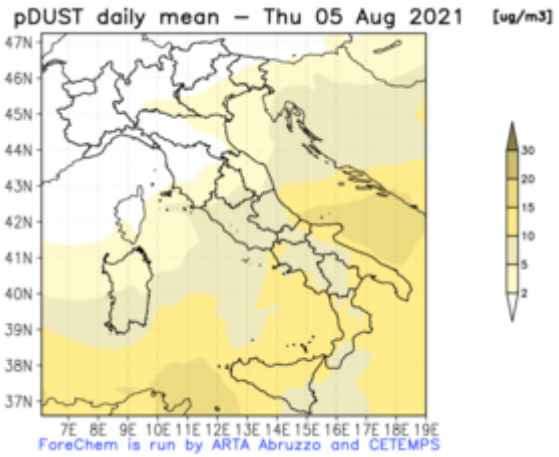

pDUST daily mean – Sat 31 Jul 2021
[ug/m3]
47N 46N 45N 44N 43N 42N 41N 40N 39N 38N 37N
7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E 19E
30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS

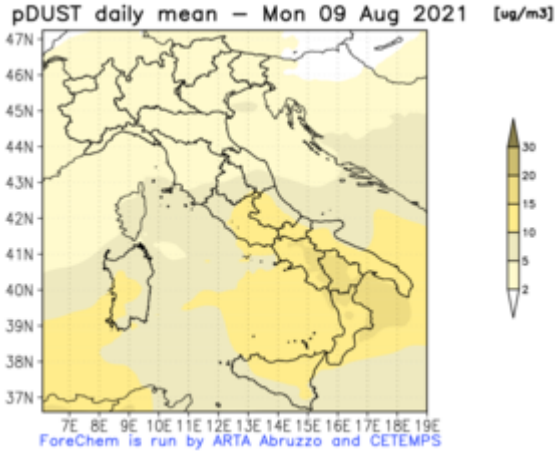

pDUST daily mean – Sun 01 Aug 2021
[ug/m3]
47N 46N 45N 44N 43N 42N 41N 40N 39N 38N 37N
7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E 19E
30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS


pDUST daily mean – Mon 02 Aug 2021
[ug/m3]
47N 46N 45N 44N 43N 42N 41N 40N 39N 38N 37N
7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E 19E
30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS


pDUST daily mean – Tue 03 Aug 2021
[ug/m3]
47N 46N 45N 44N 43N 42N 41N 40N 39N 38N 37N
7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E 19E
30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS


pDUST daily mean – Wed 04 Aug 2021
[ug/m3]
47N 46N 45N 44N 43N 42N 41N 40N 39N 38N 37N
7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E 19E
30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS


pDUST daily mean – Thu 05 Aug 2021
[ug/m3]
47N 46N 45N 44N 43N 42N 41N 40N 39N 38N 37N
7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E 19E
30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS


pDUST daily mean – Mon 09 Aug 2021
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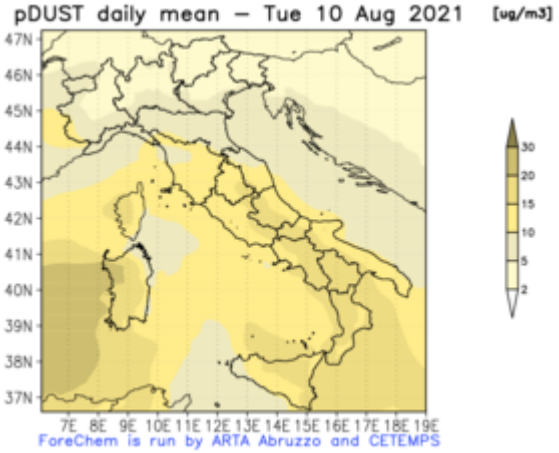
30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS


pDUST daily mean – Tue 10 Aug 2021
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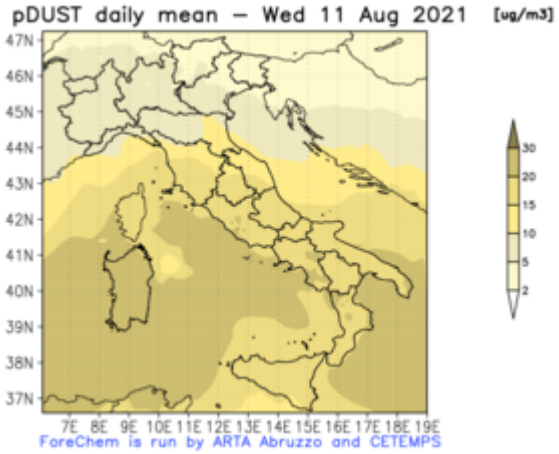
7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E 19E
30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS


pDUST daily mean – Wed 11 Aug 2021
[ug/m3]
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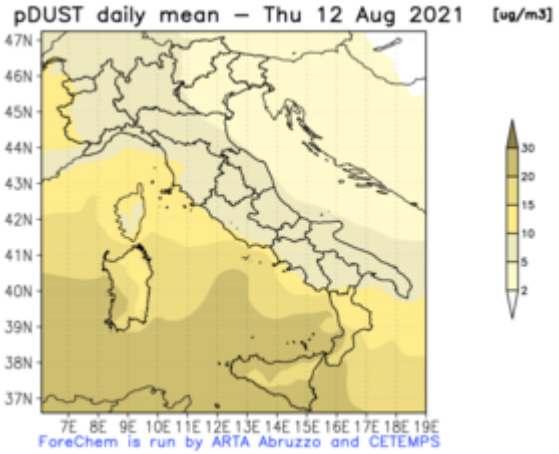
7E 8E 9E 10E 11E 12E 13E 14E 15E 16E 17E 18E 19E
30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS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30 20 15 10 5 2
ForeChem is run by ARTA Abruzzo and CETEMPS

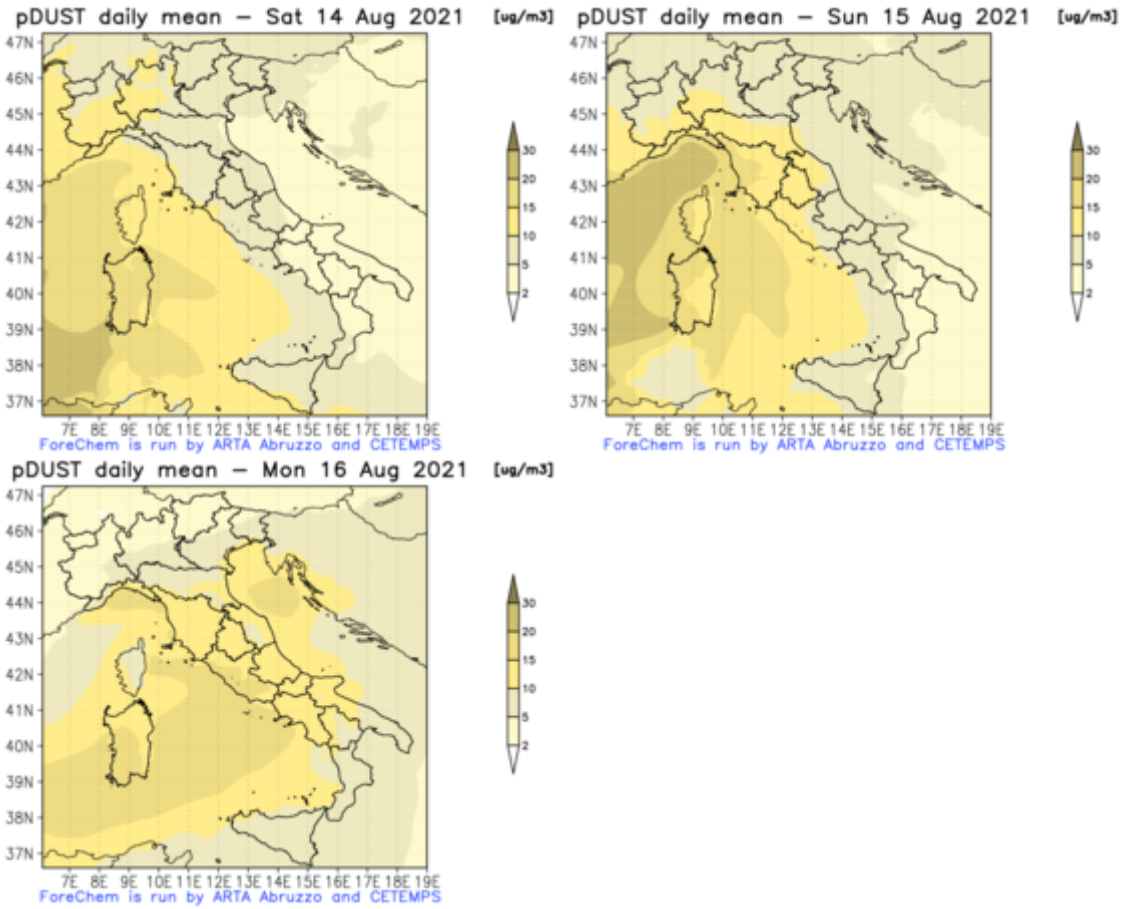
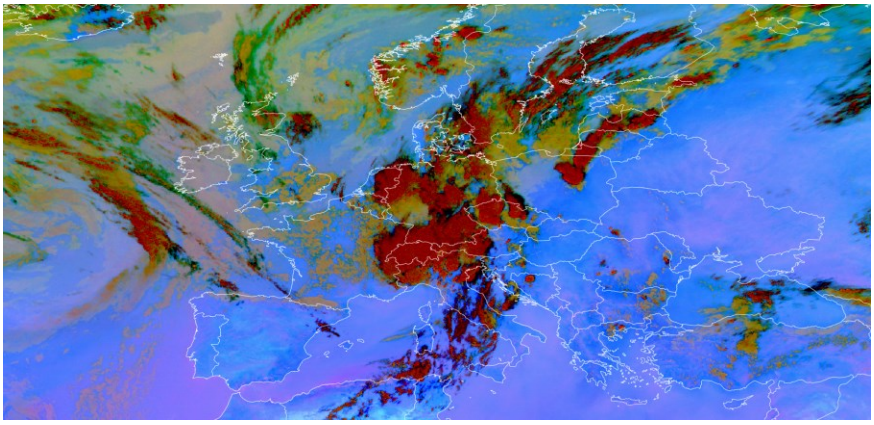
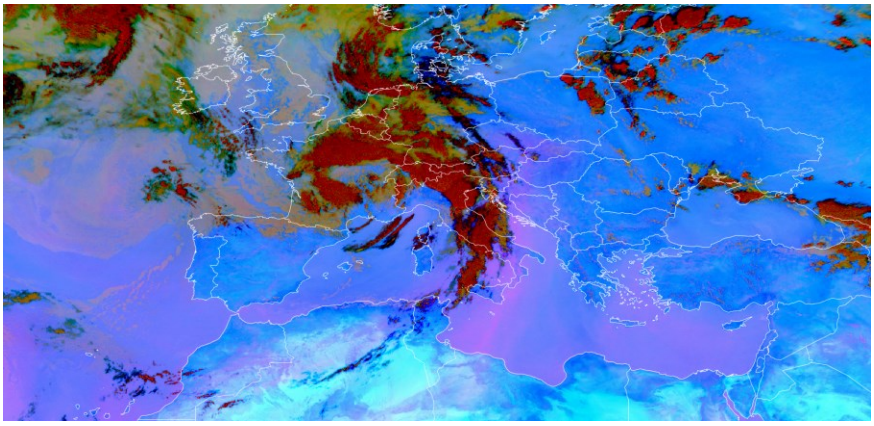
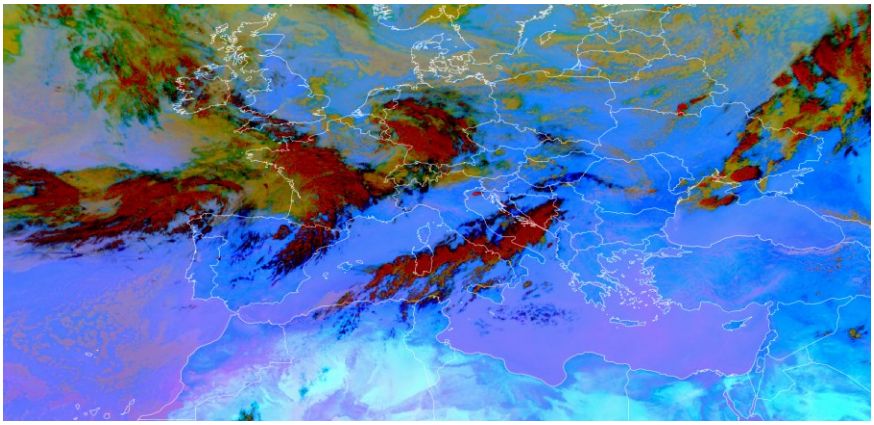


Fig. 5a – 5z - Elaborazioni del sistema dell'Università dell'Aquila tramite il modello forechem per i giorni più significativi del periodo Luglio Agosto 2021. Visibile il contributo di polveri naturali previsto sulla Campania .

- Misure satellitari – EUMETSAT.







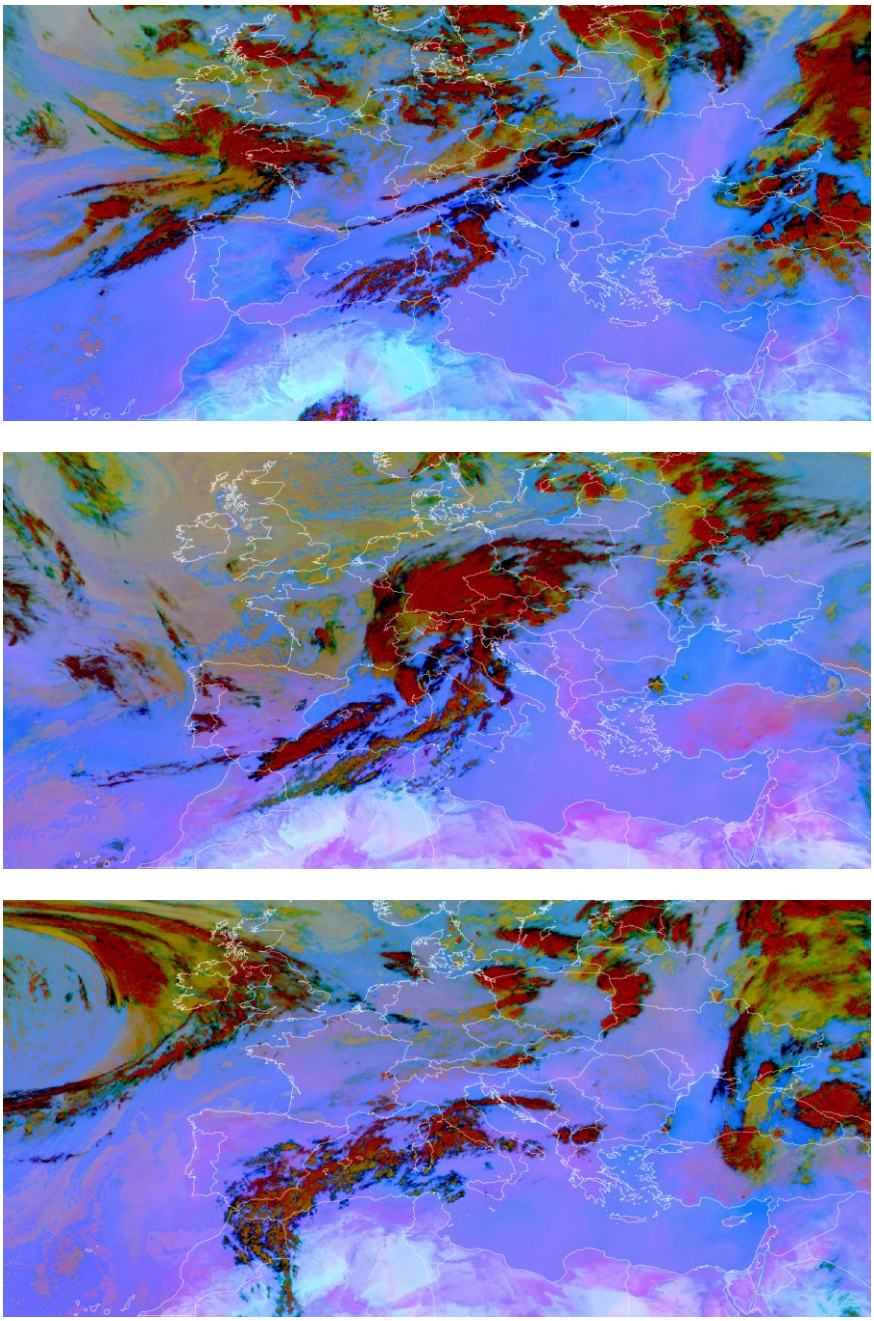
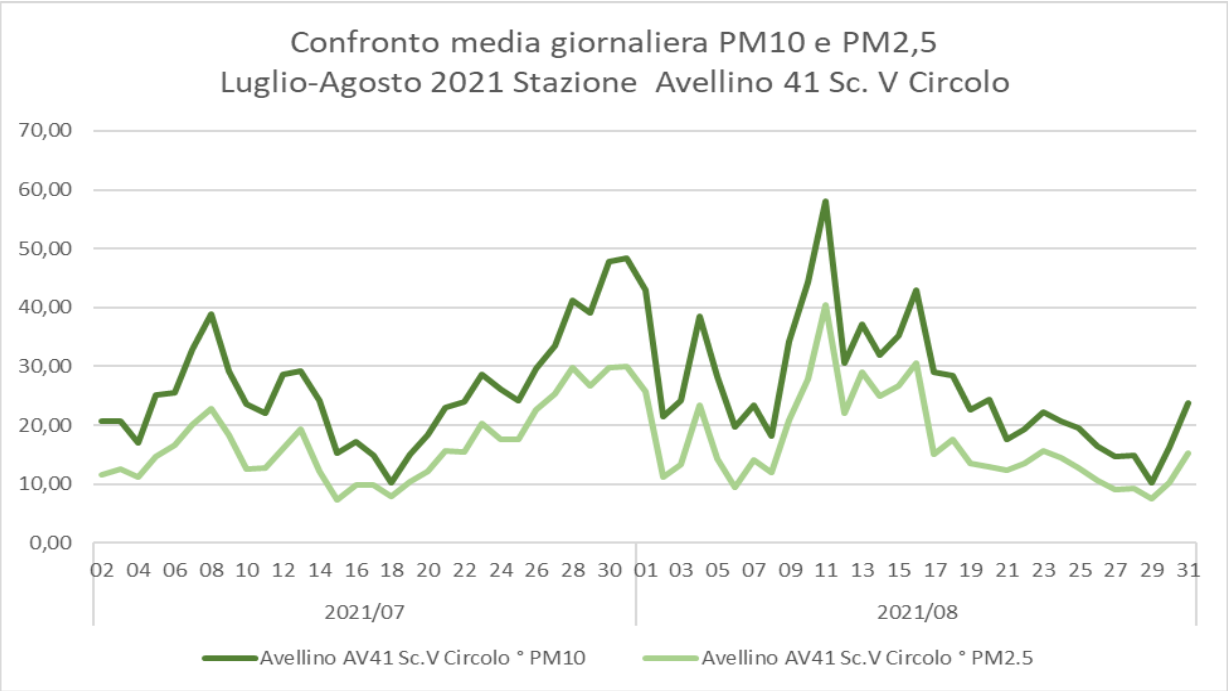
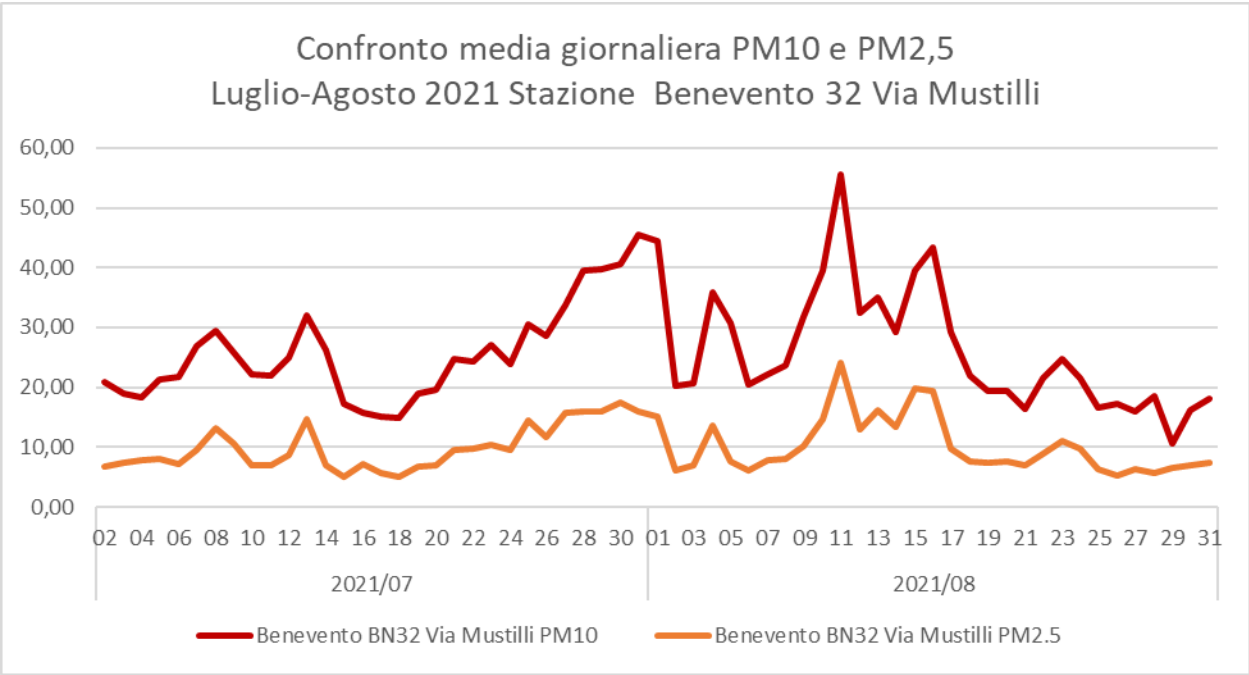
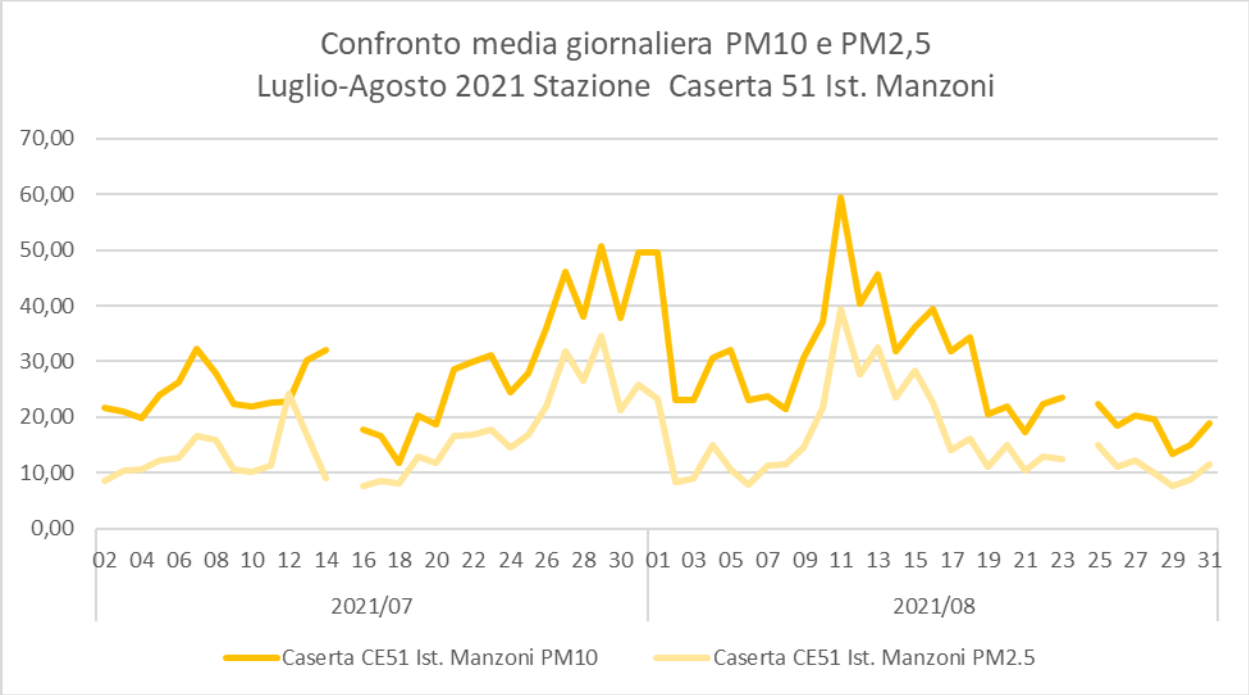


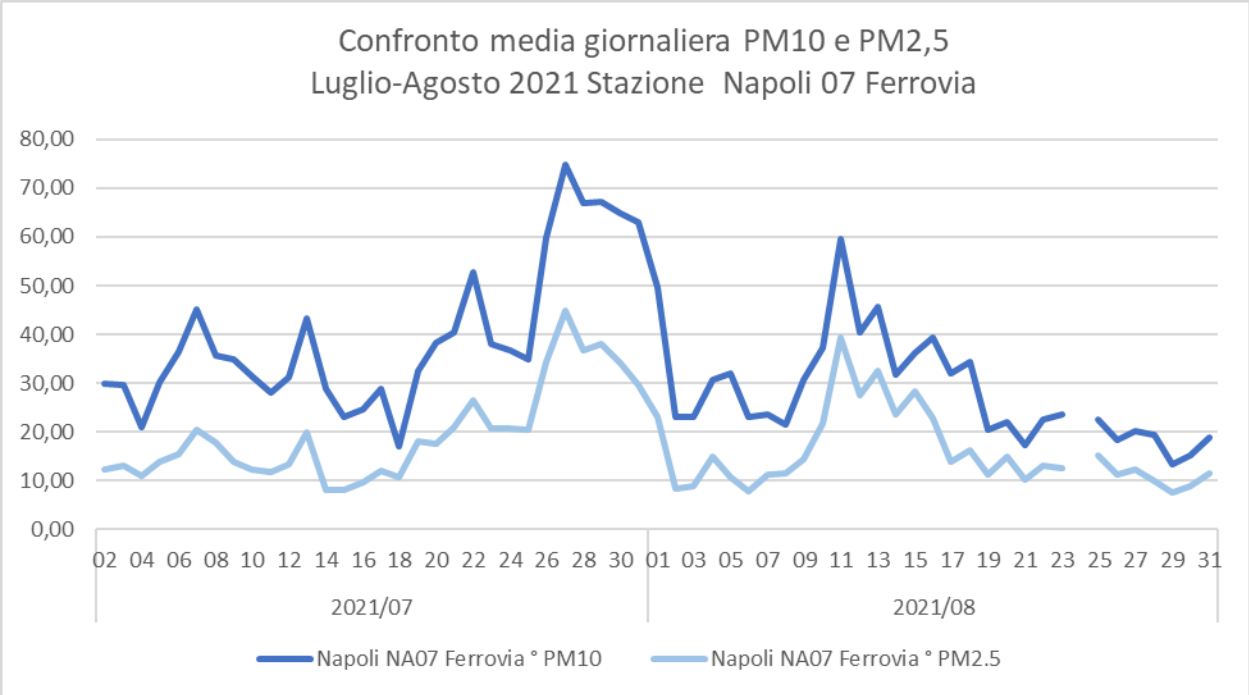
Fig. 6a – 6f Immagini dei giorni 8 e 13 Luglio 2021 ed 1,3,8 e 10 Agosto 2021. Visibile l'apporto di polveri di origine naturale.

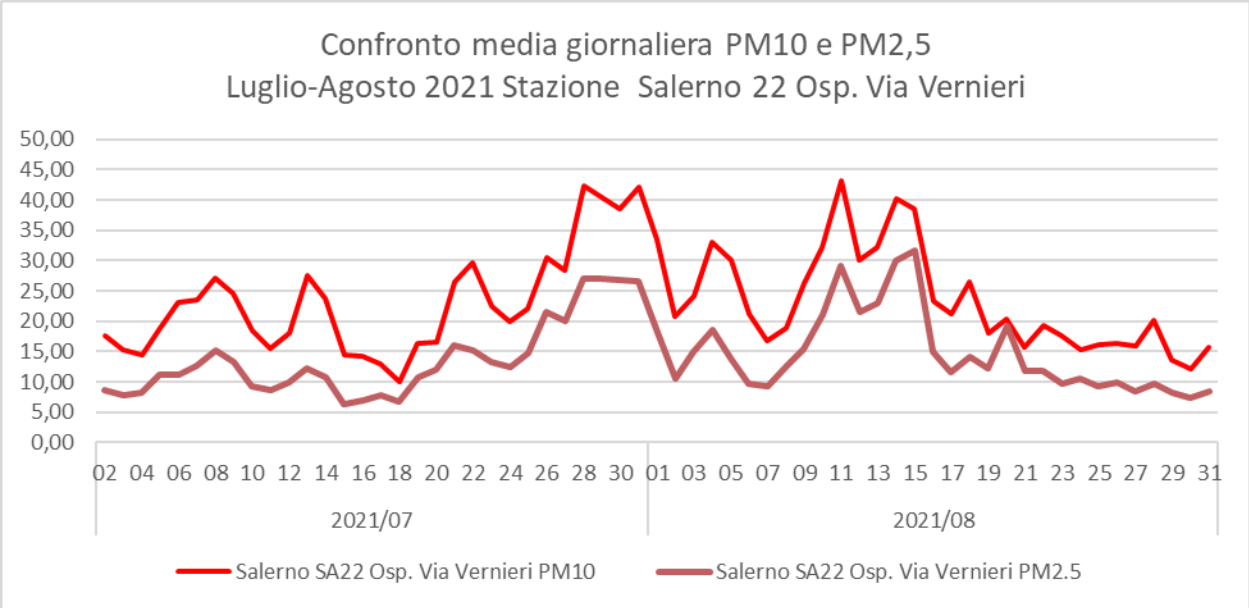
Di seguito si riportano gli andamenti più significativi delle polveri sottili nelle stazioni di Napoli, collocata presso Ferrovia, Avellino ubicata presso Scuola V Circolo , Benevento ubicata in Via Mustilli, Caserta ubicata presso Istituto Manzoni, Salerno, collocata presso Ospedale in Via Vernieri e Volla, ubicata in Via Filichito nel bimestre Luglio Agosto 2021. Si sono osservate le medie orarie del PM10 molto elevate ed il relativo confronto con le medie orarie del PM2.5, rimaste significativamente più contenute, tranne che per il comune di Avellino dove il divario si è mantenuto irrisorio (fig. 8a, 8b, 8c, 8d ed 8e)

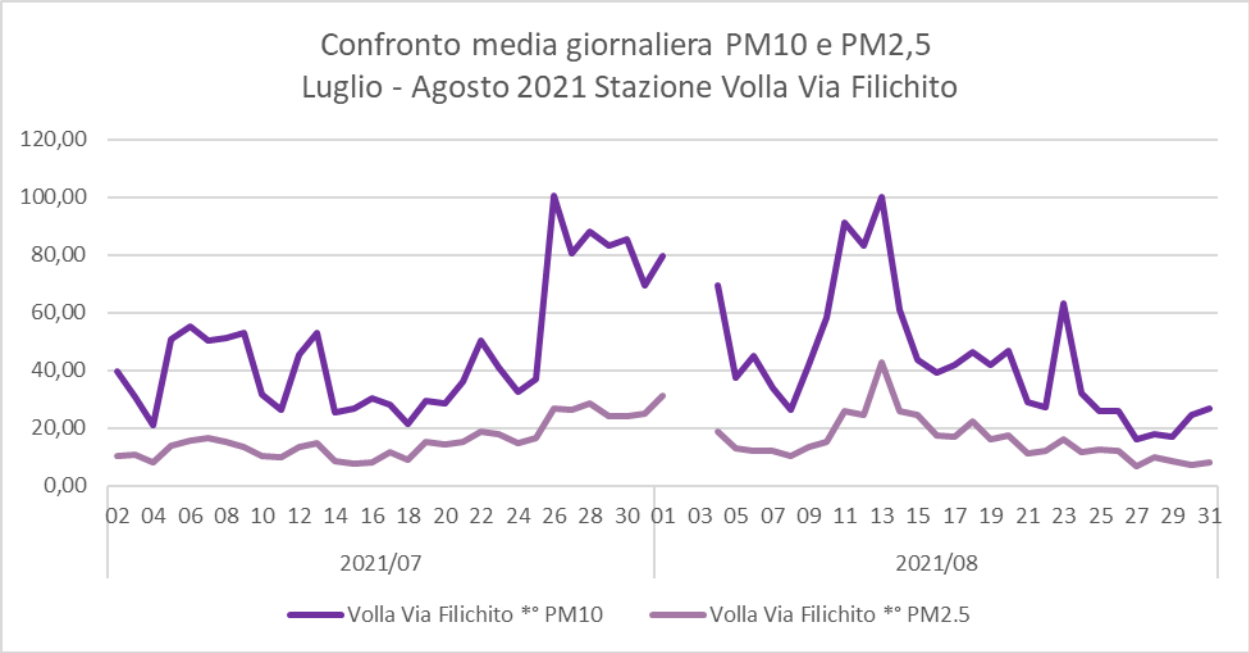





Confronto media giornaliera PM10 e PM2,5
Luglio-Agosto 2021 Stazione Caserta 51 Ist. Manzoni
70,00
60,00
50,00
40,00
30,00
20,00
10,00
0,00
02 04 06 08 10 12 14 16 18 20 22 24 26 28 30 01 03 05 07 09 11 13 15 17 19 21 23 25 27 29 31
2021/07
2021/08
Caserta CE51 Ist. Manzoni PM10
Caserta CE51 Ist. Manzoni PM2.5


Confronto media giornaliera PM10 e PM2,5
Luglio-Agosto 2021 Stazione Napoli 07 Ferrovia
80,00
70,00
60,00
50,00
40,00
30,00
20,00
10,00
0,00
02 04 06 08 10 12 14 16 18 20 22 24 26 28 30 01 03 05 07 09 11 13 15 17 19 21 23 25 27 29 31
2021/07
2021/08
Napoli NA07 Ferrovia ° PM10
Napoli NA07 Ferrovia ° PM2.5


Confronto media giornaliera PM10 e PM2,5
Luglio-Agosto 2021 Stazione Salerno 22 Osp. Via Vernieri
50,00
45,00
40,00
35,00
30,00
25,00
20,00
15,00
10,00
5,00
0,00
02 04 06 08 10 12 14 16 18 20 22 24 26 28 30 01 03 05 07 09 11 13 15 17 19 21 23 25 27 29 31
2021/07
2021/08
Salerno SA22 Osp. Via Vernieri PM10
Salerno SA22 Osp. Via Vernieri PM2.5


Confronto media giornaliera PM10 e PM2,5
Luglio - Agosto 2021 Stazione Volla Via Filichito
120,00
100,00
80,00
60,00
40,00
20,00
0,00
02 04 06 08 10 12 14 16 18 20 22 24 26 28 30 01 03 05 07 09 11 13 15 17 19 21 23 25 27 29 31
2021/07
2021/08
Volla Via Filichito *° PM10
Volla Via Filichito *° PM2.5