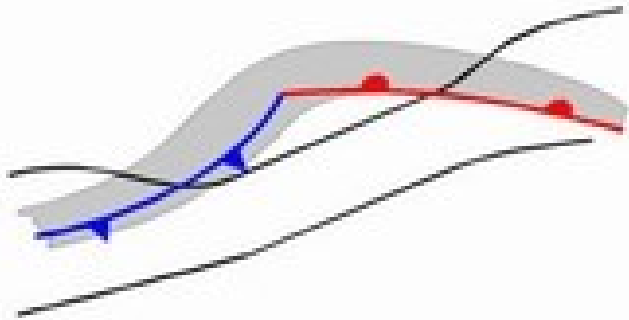
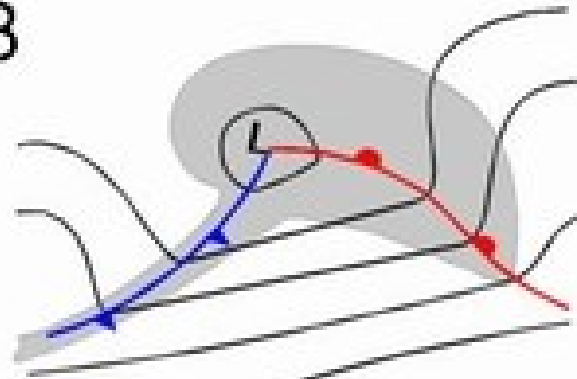


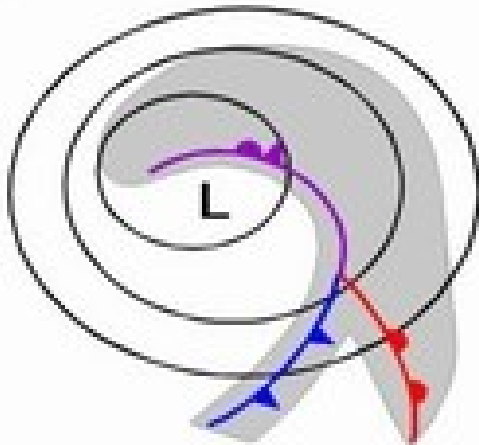
A



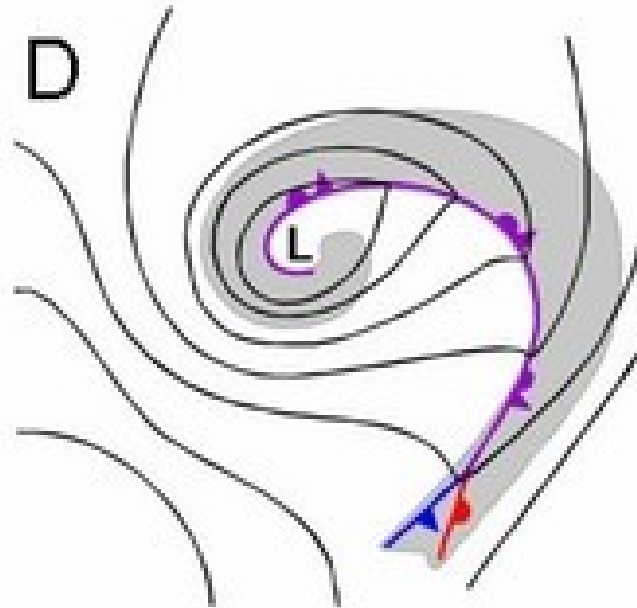
B



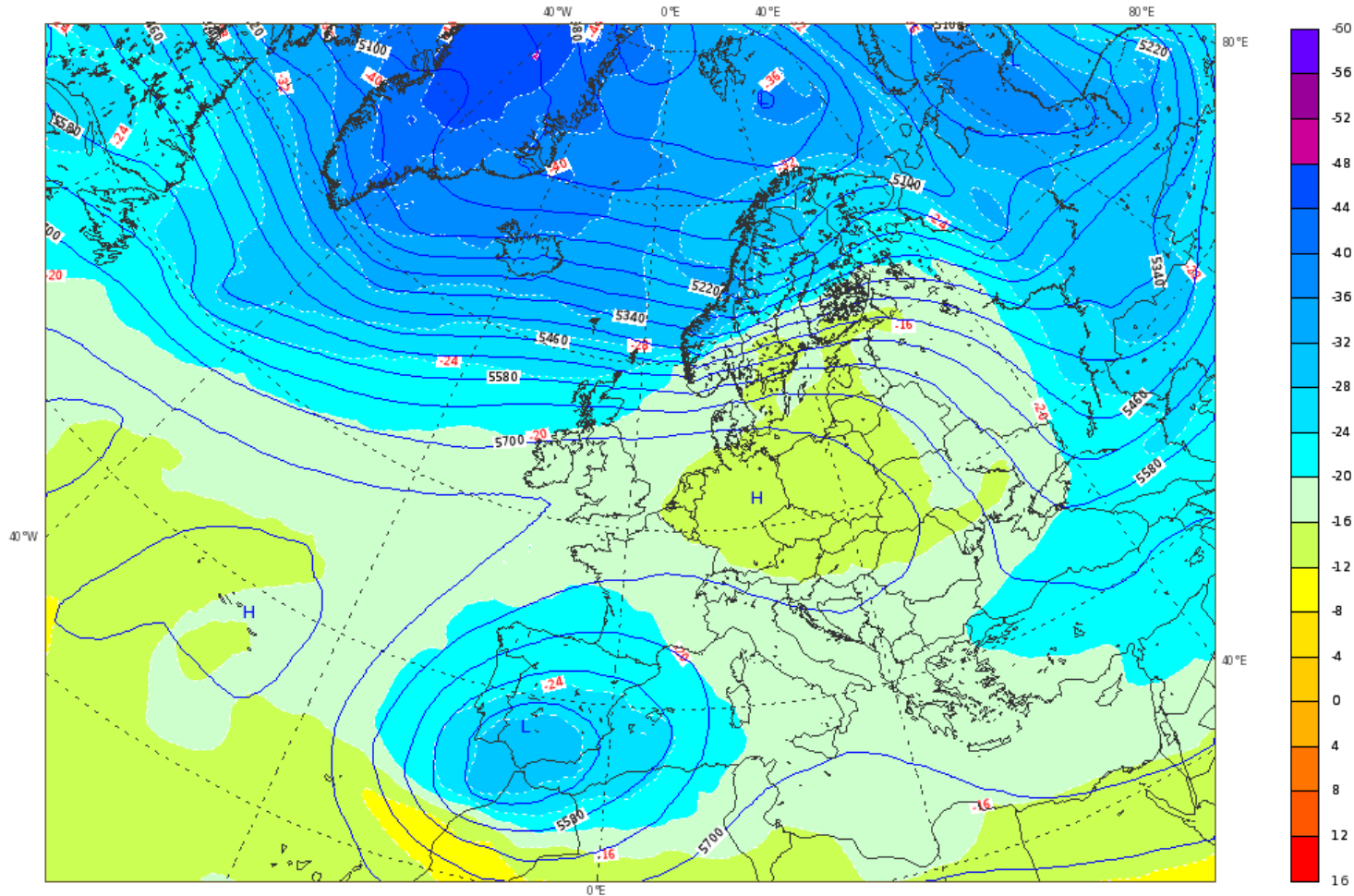
C



D



**Fig.1 Stages of development of an extra-tropical cyclone**



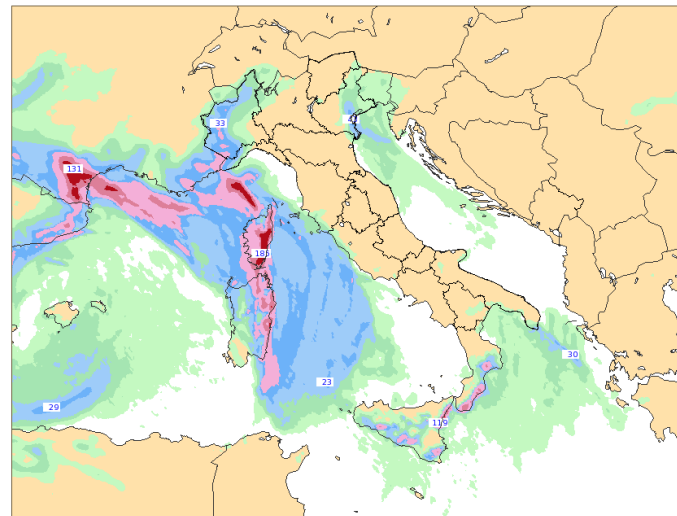
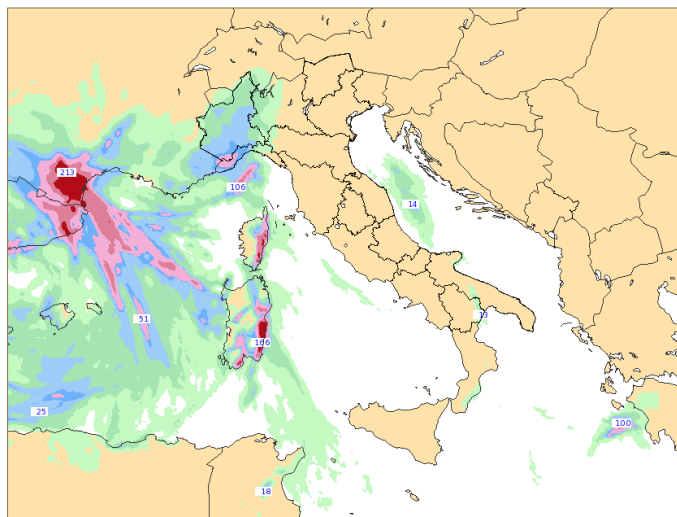
**Fig.2 Analysis at 500 hPa over the Euro-Atlantic Area**



**COSMO-ME 17 Novembre 2013 00UTC Forecast T+36 VT: Lunedì 18 Novembre 2013 12UTC**  
**ITALIA - Precipitazioni cumulate nelle 12 ore precedenti (mm)**



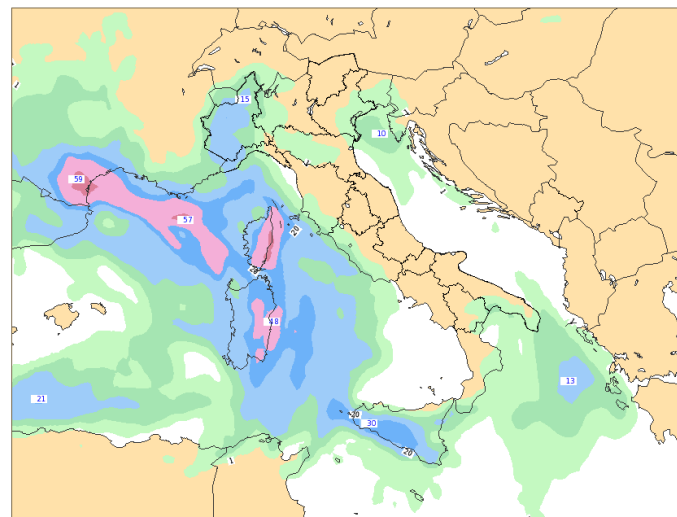
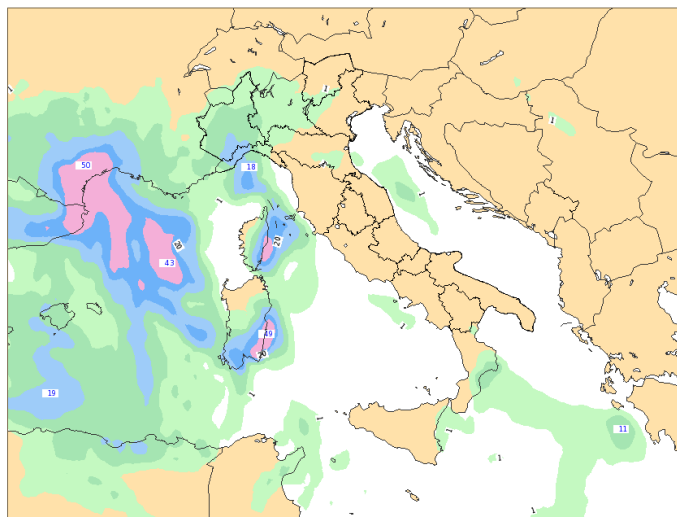
**COSMO-ME 17 Novembre 2013 00UTC Forecast T+48 VT: Martedì 19 Novembre 2013 00UTC**  
**ITALIA - Precipitazioni cumulate nelle 12 ore precedenti (mm)**



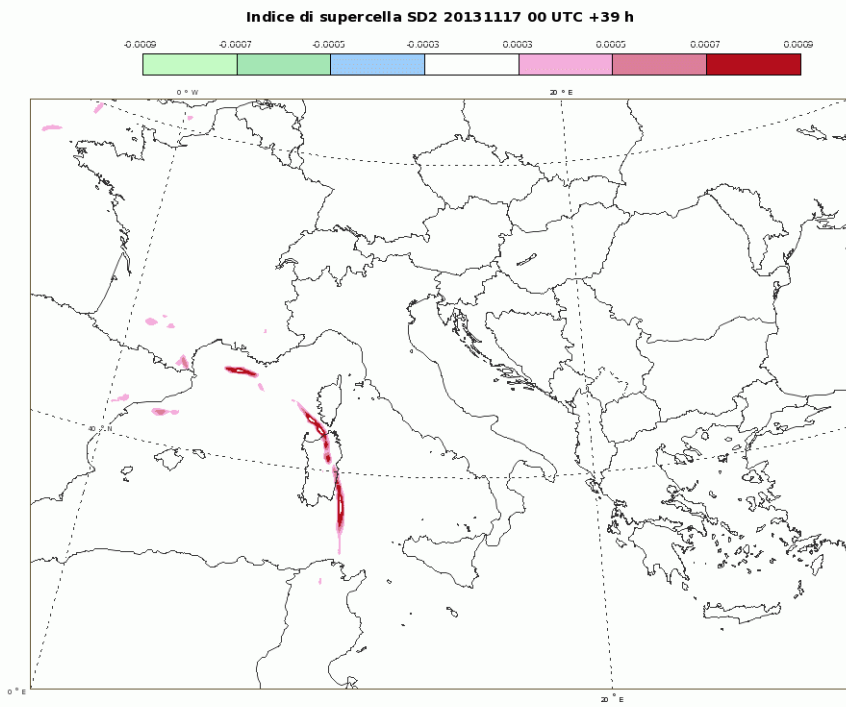
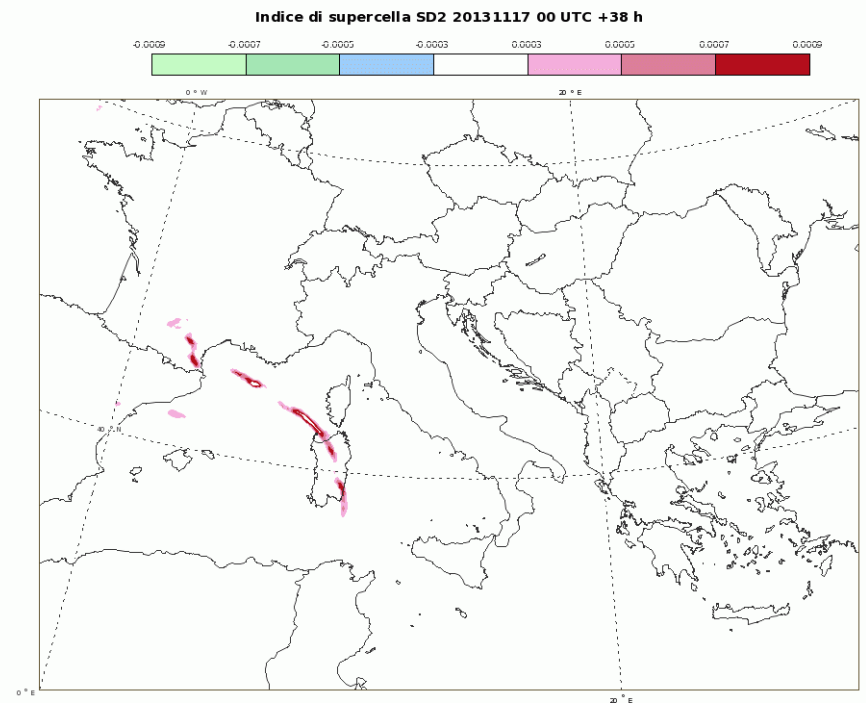
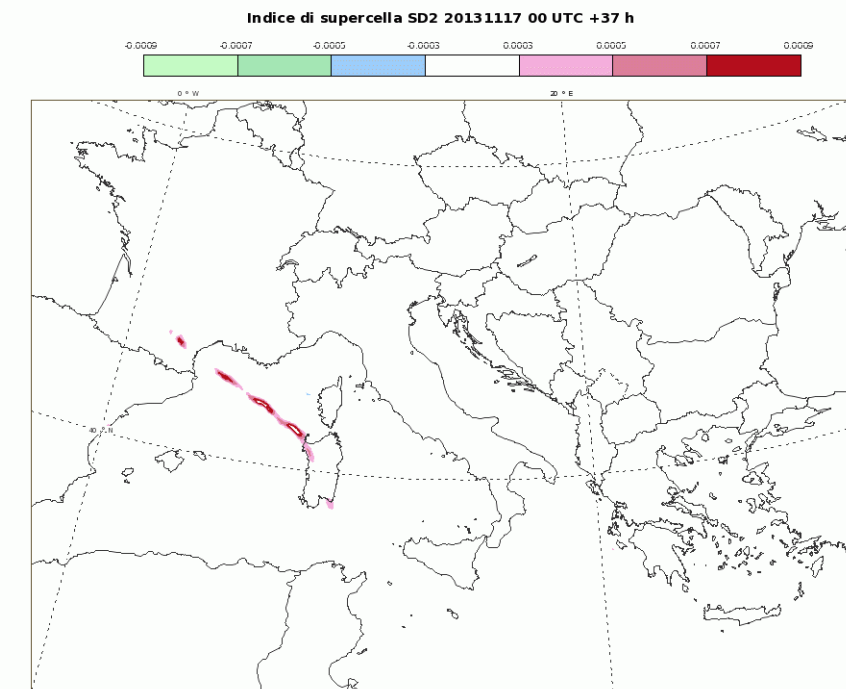
**ECMWF 17 Novembre 2013 00UTC Forecast T+36 VT: Lunedì 18 Novembre 2013 12UTC**  
**ITALIA - Precipitazioni cumulate nelle 12 ore precedenti (mm)**



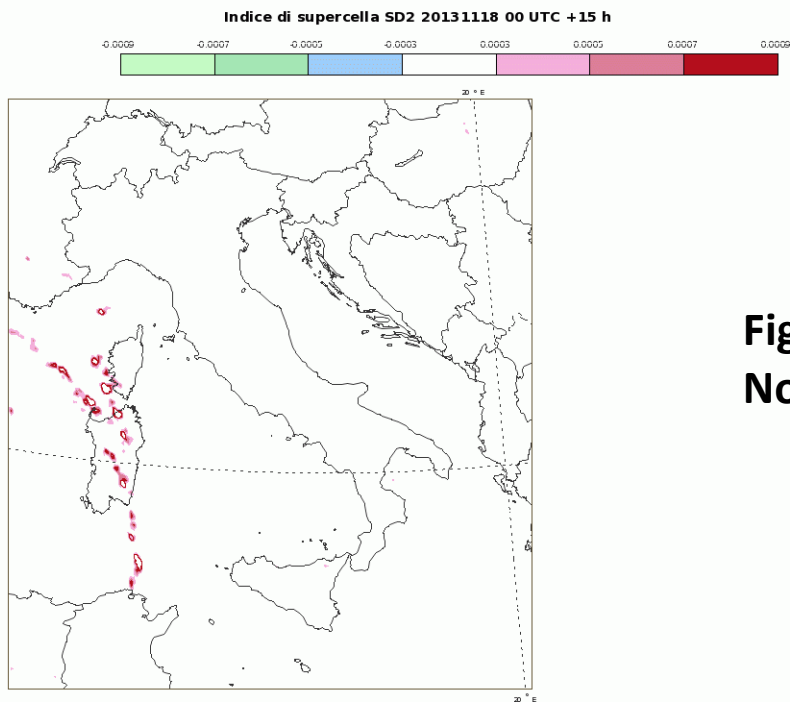
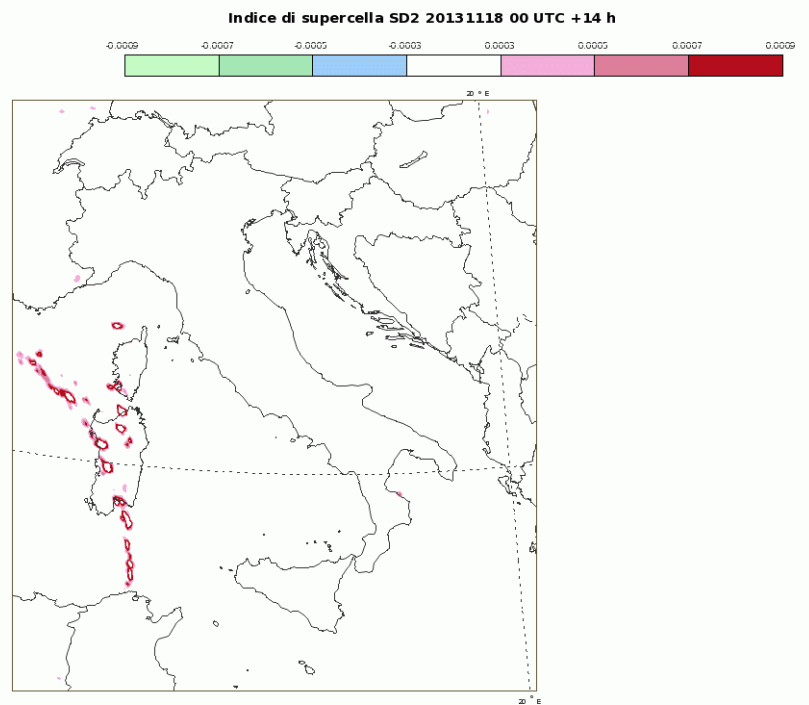
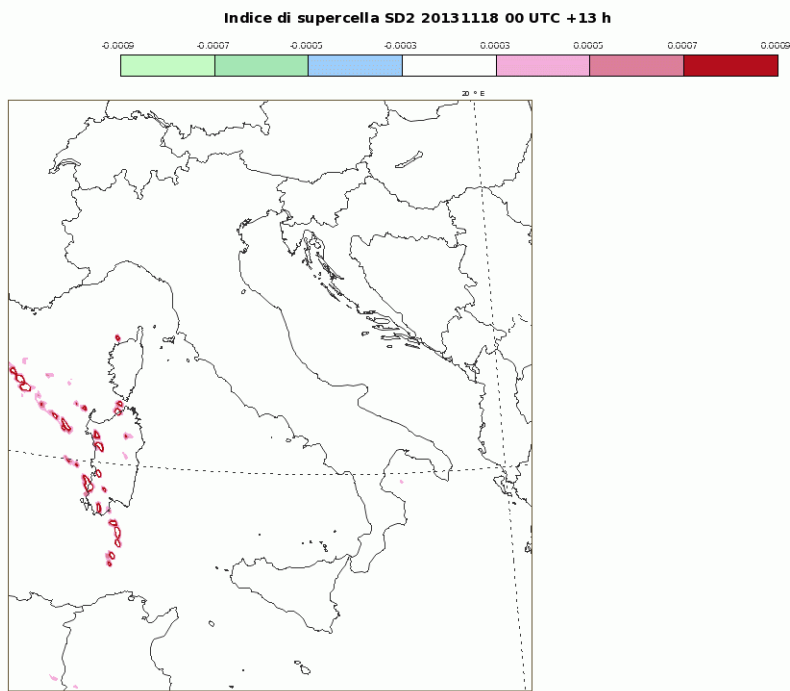
**ECMWF 17 Novembre 2013 00UTC Forecast T+48 VT: Martedì 19 Novembre 2013 00UTC**  
**ITALIA - Precipitazioni cumulate nelle 12 ore precedenti (mm)**



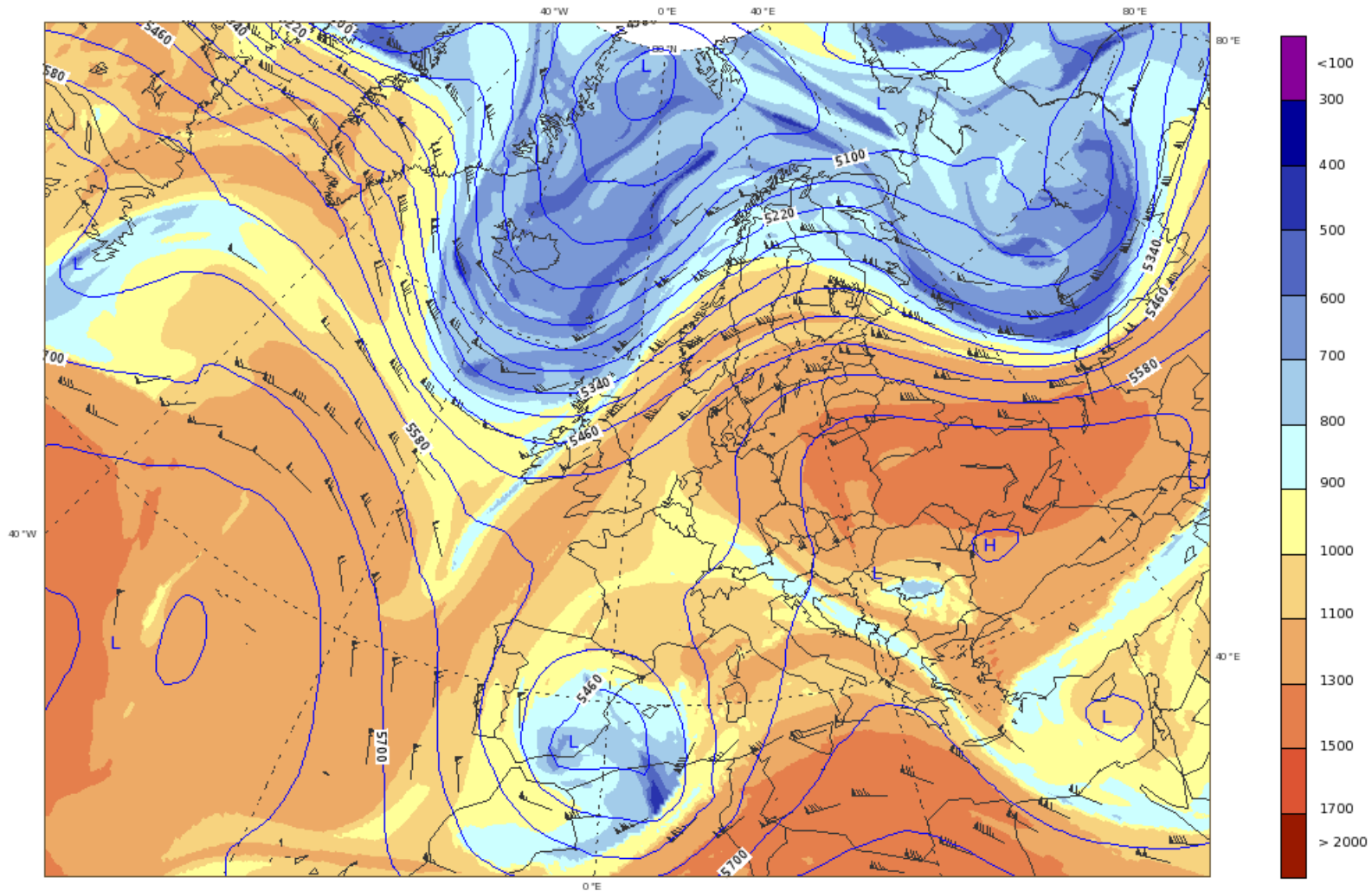
**Fig.3 Rainfall predicted by ECMWF and COSMO-ME model**



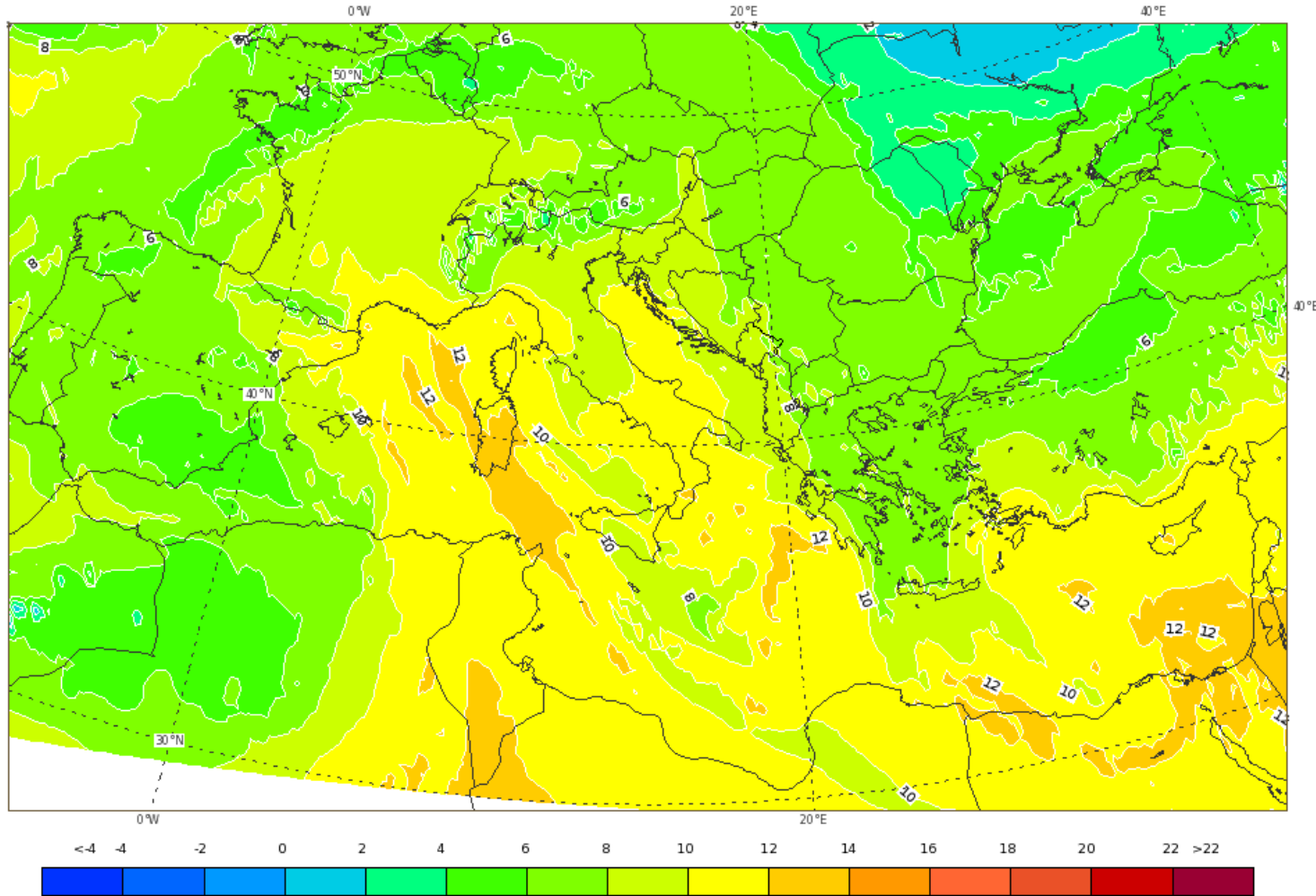
**Fig.4 SD2 Index output Cosmo IT Run  
November 18, 2013 00 UTC VT +13-15 h**



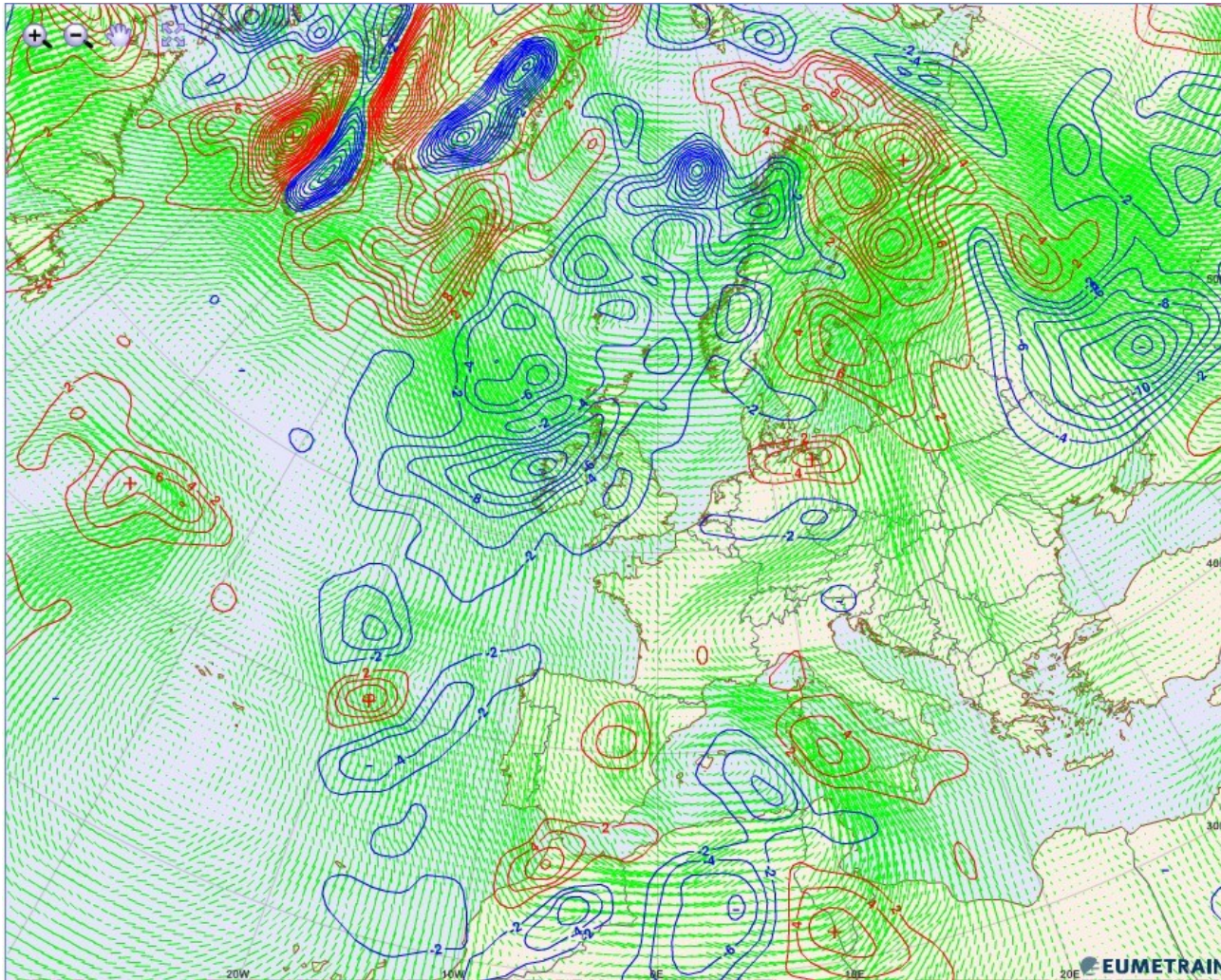
**Fig.5 SD2 Index output Cosmo Me Run  
November 17, 2013 00 UTC VT +37-39 h**



**Fig.6 Dynamic Tropopause from ECMWF  
November 18 06 UTC**

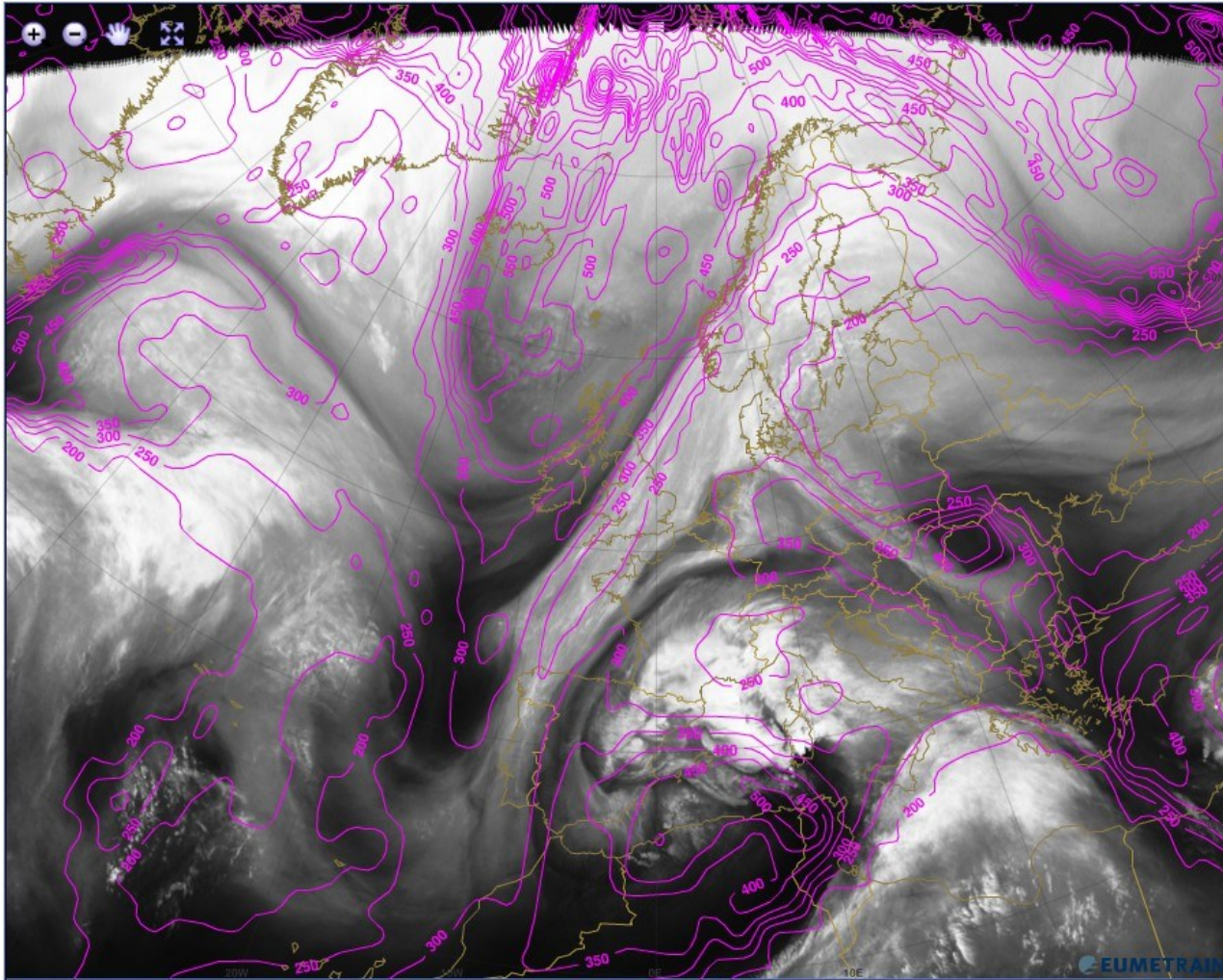


**Fig.7 Wet Bulb Potential Temperature at 850 hPa ( $\theta_{aw}$ ) November 18 at 06 UTC**

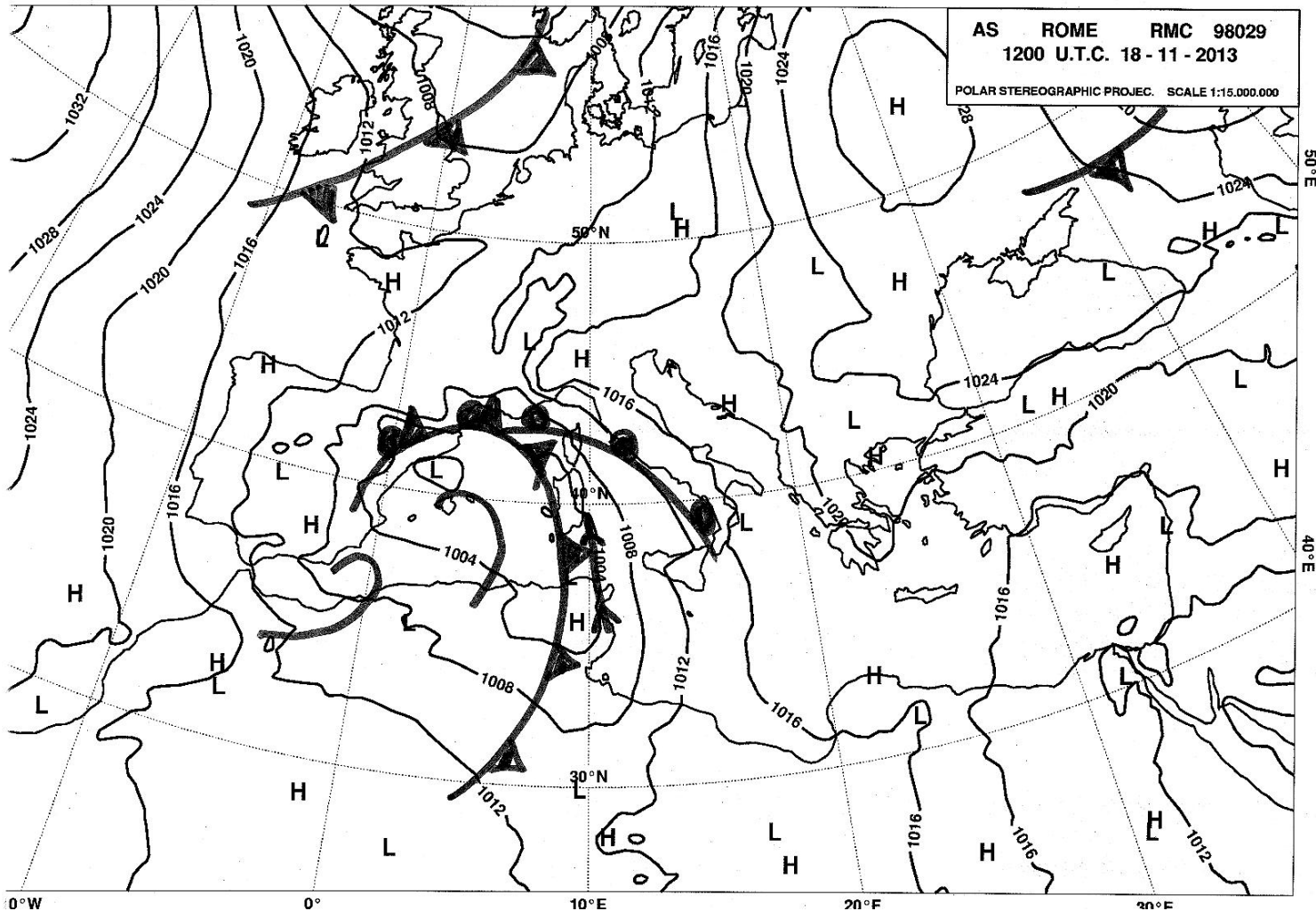


**Fig.8 850 hPa wind and 700 hPa thermal advection (cold blue, warm red) November 18 at 06 UTC**

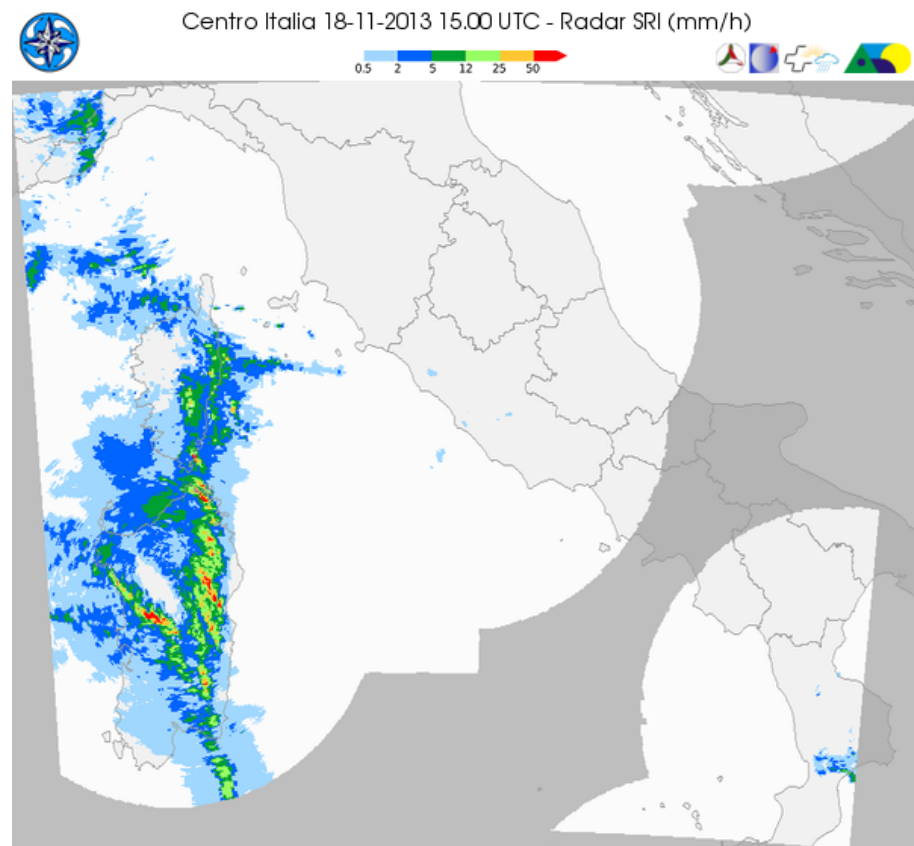
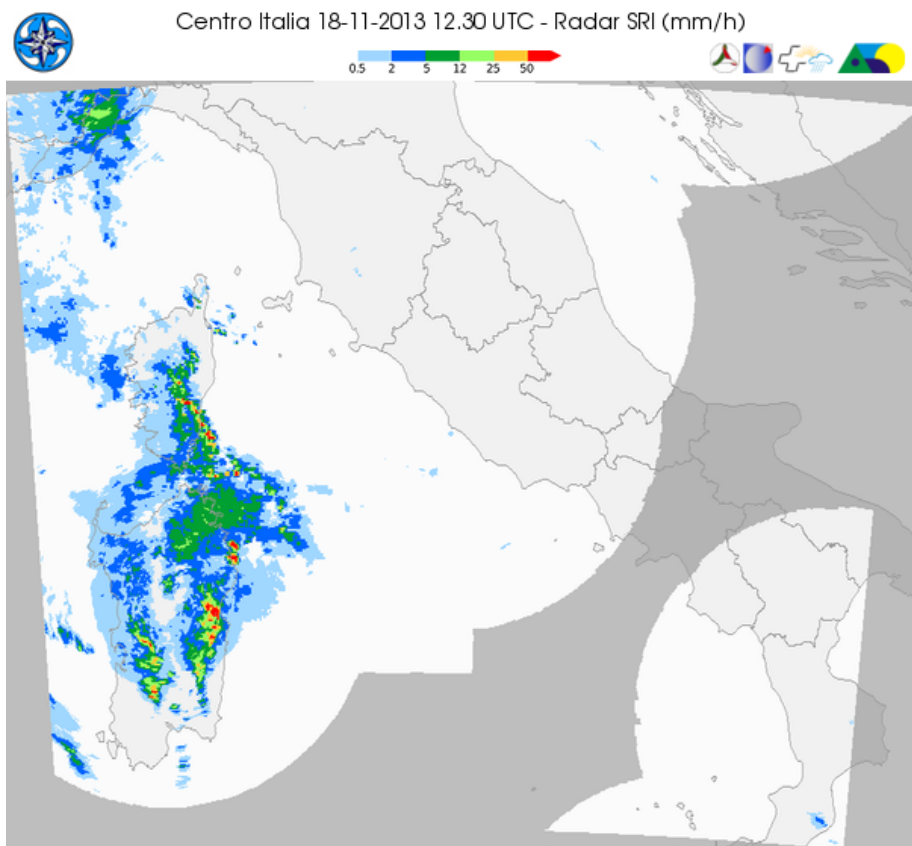




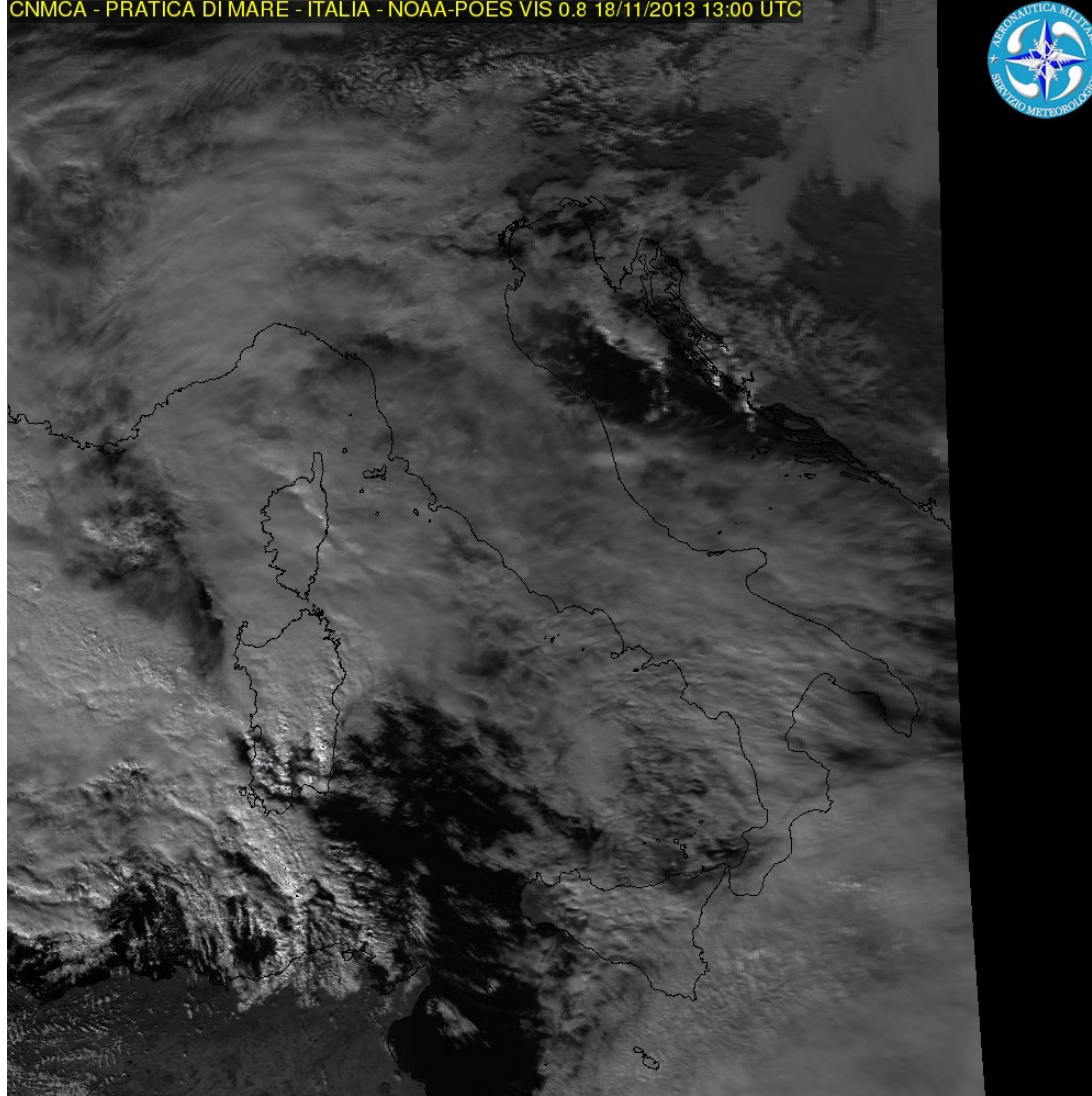
**Fig.9 MSG3 WV6.2 and Dynamic Tropopause  
November 18 at 12 UTC**



**Fig.10 Surface Analysis November 18 at 12 UTC**



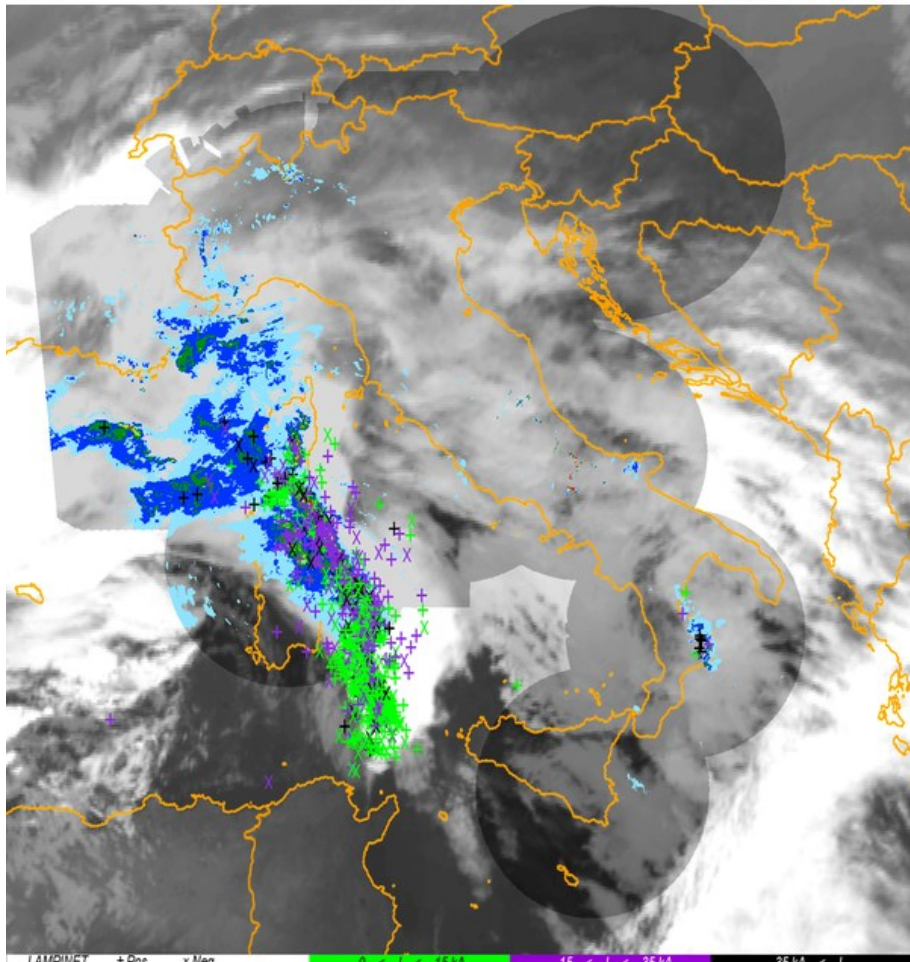
**Fig.11 Radar echoes November 18, 2013 at 12.30 (A) and at 15.00 (B)**



**Fig12 NOAA POES VIS 0.8  $\mu\text{m}$  18<sup>th</sup> november  
2013 at 13.00 UTC**



ITALIA 18-11-2013 17:00 UTC - Radar SRI mm/h + IR 10.8 $\mu$  + Lampinet

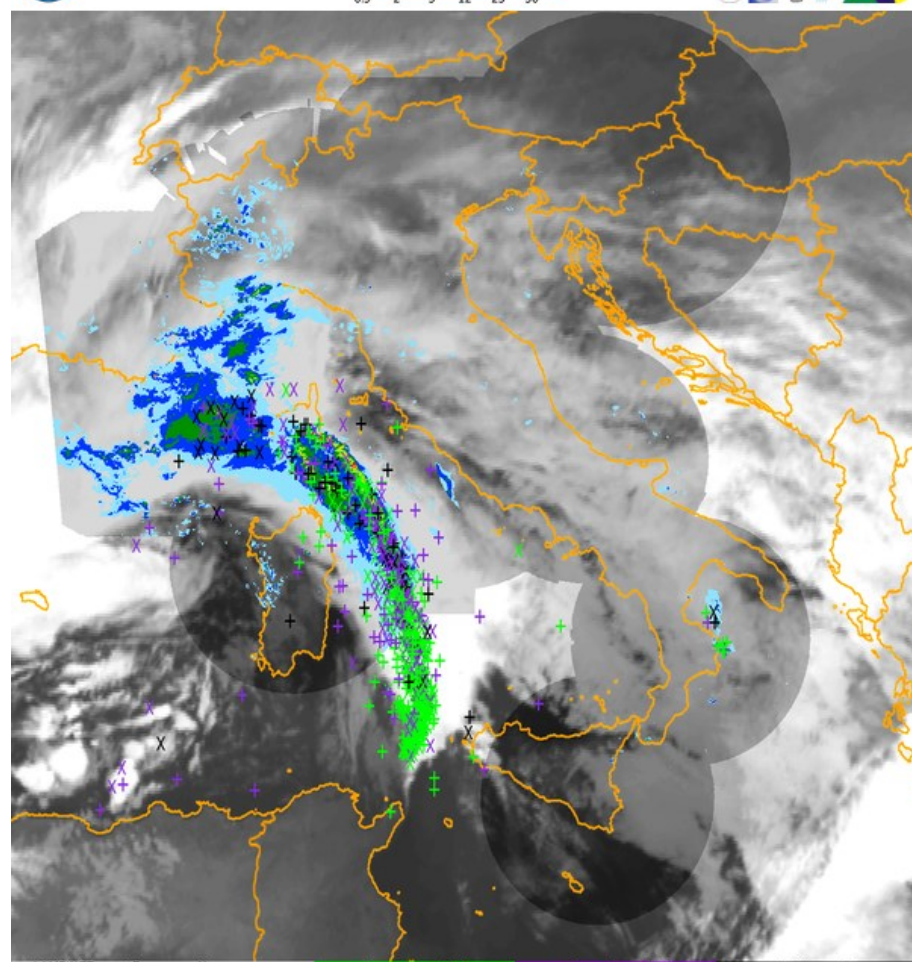


LAMPINET +Pos. x Neg.

0 < I < 15 kA 15 < I < 35 kA 35 kA < I



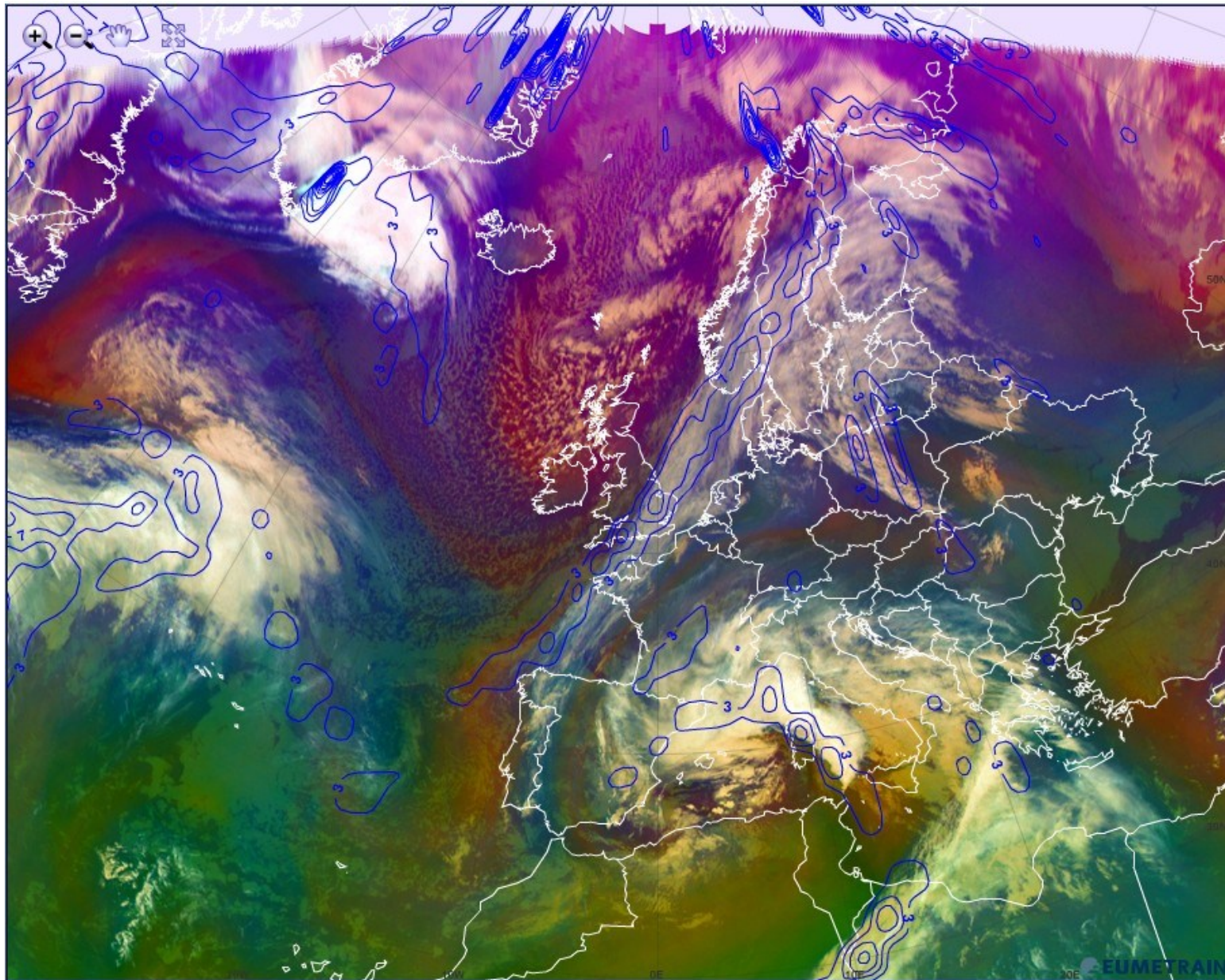
ITALIA 18-11-2013 19:00 UTC - Radar SRI mm/h + IR 10.8 $\mu$  + Lampinet



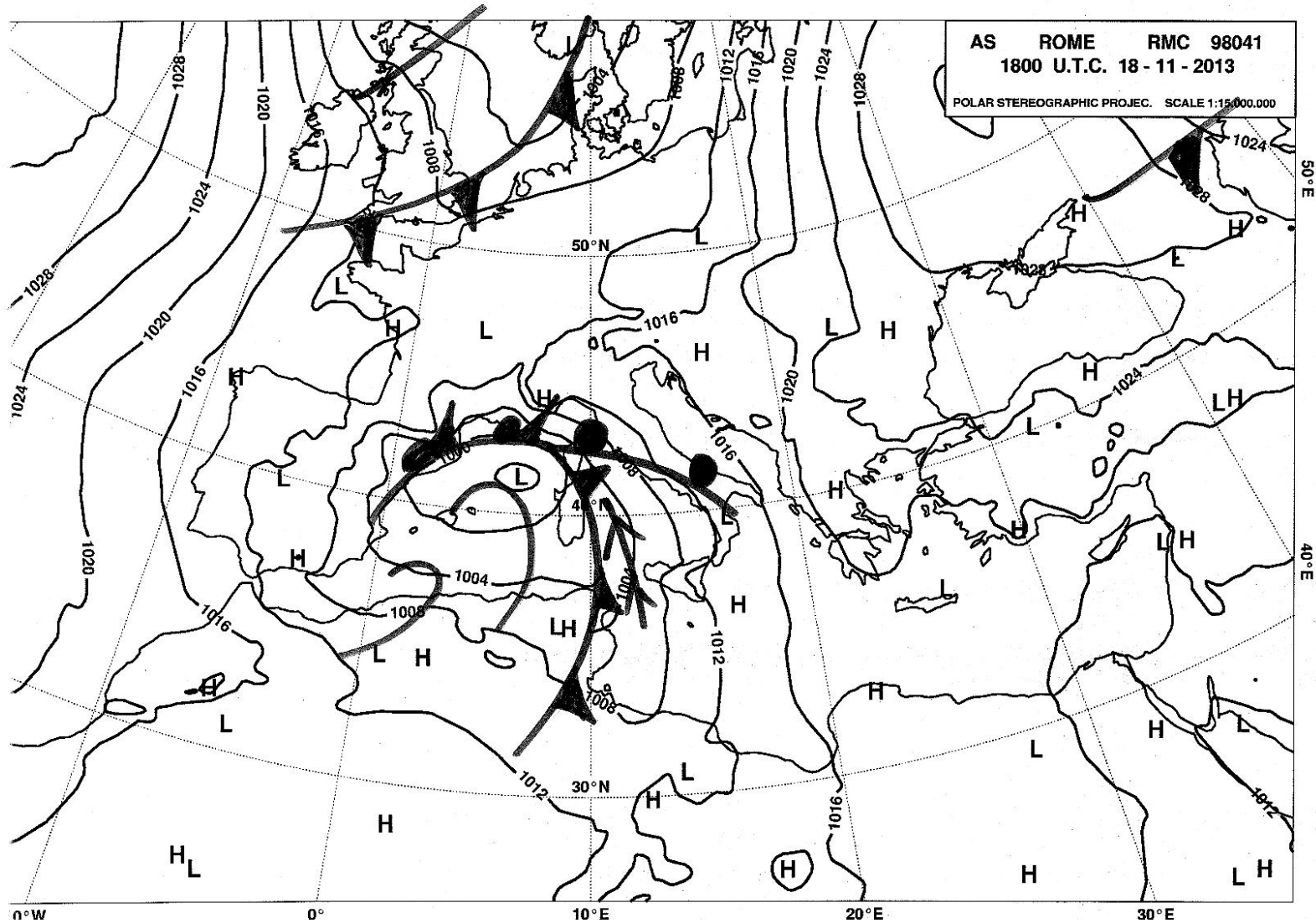
LAMPINET +Pos. x Neg.

0 < I < 15 kA 15 < I < 35 kA 35 kA < I

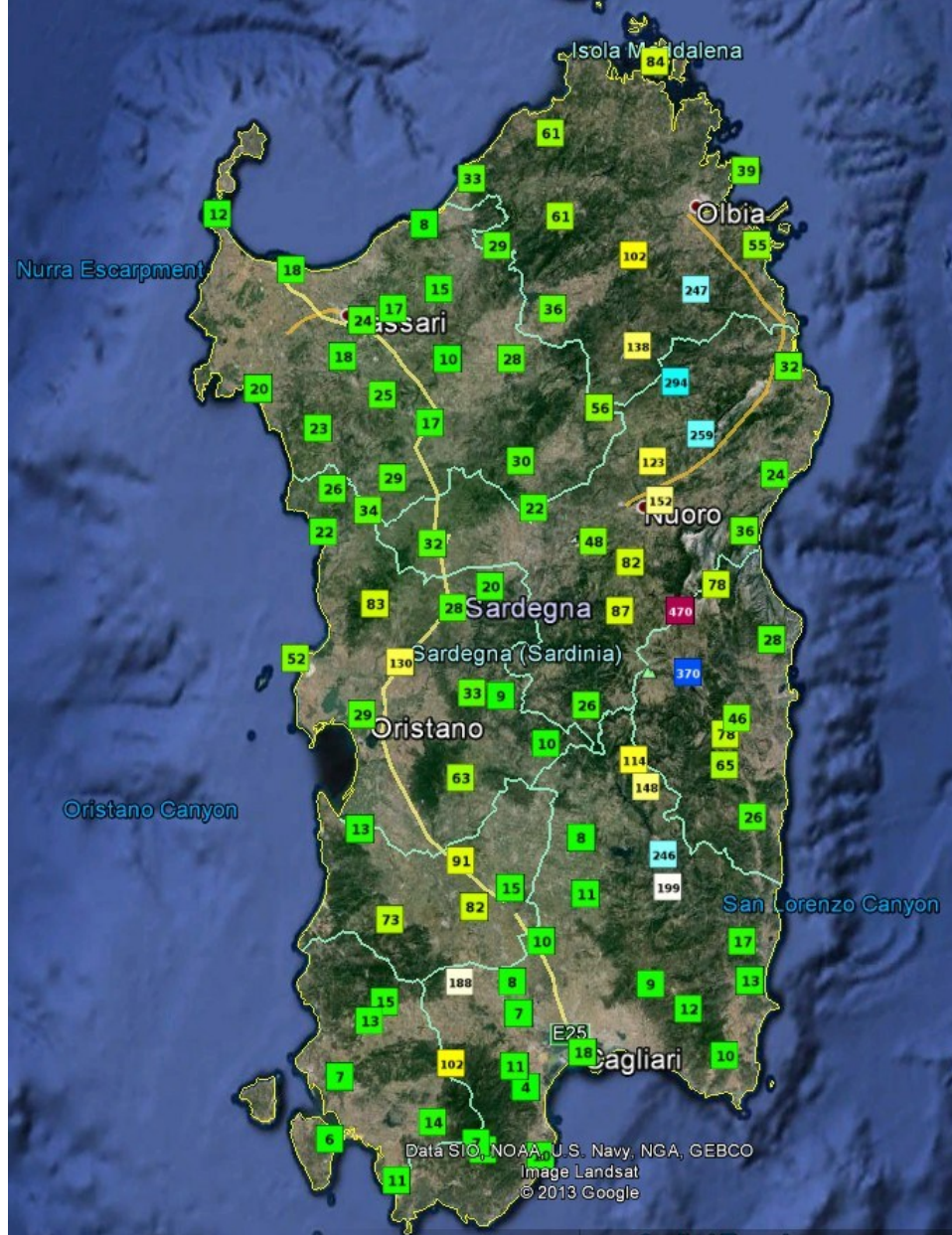
**Fig.13 Radar-Lightning-IR 10.8  $\mu$ m November 18, 2013 at 17.00 UTC (a) 19.00 UTC (b)**



**Fig.14 MSG3 RGB airmass and TFP November 18, 2013 at 18.00 UTC**



**Fig.15 Surface Analysis November 18, 2013 at  
18.00 UTC**



**Fig. 16 Total Cumulated Rainfall on November 18, 2013 over Sardinia from Civil Protection Obs Network**



# DAILY EXTREME PRECIPITATION

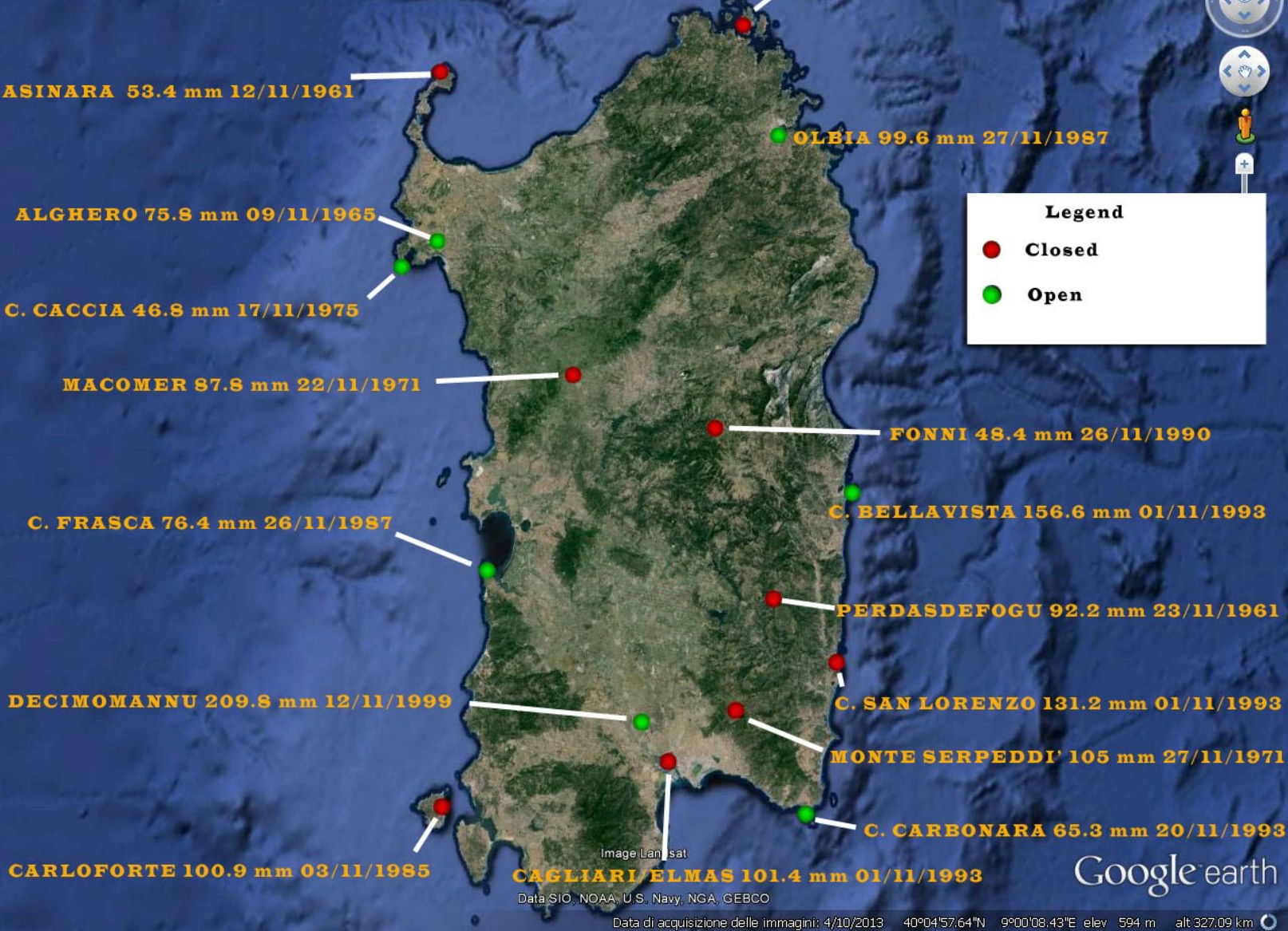
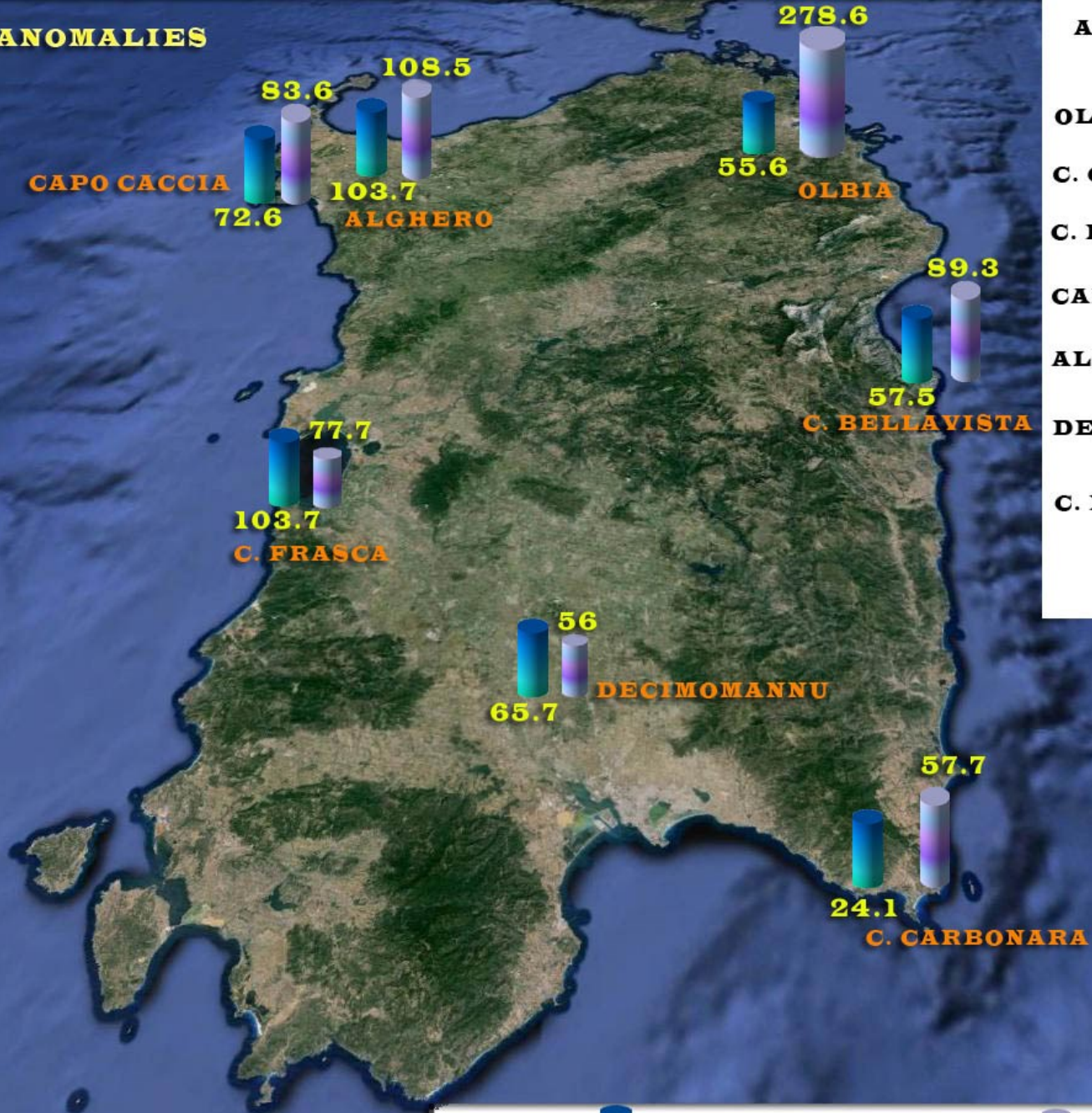


Fig. 17 Daily extreme rainfall from Italian NWS climatological archive.

# MONTHLY ANOMALIES



## ANOMALIES (mm)

- OLBIA 223
- C. CARBONARA 33.1
- C. BELLAVISTA 31.8
- CAPO CACCIA II 11
- ALGHERO 4.8
- DECIMOMANNU -9.7
- C. FRASCA -26.7

**Legend**  Monthly Mean of November  November 2013  
Values in millimeters