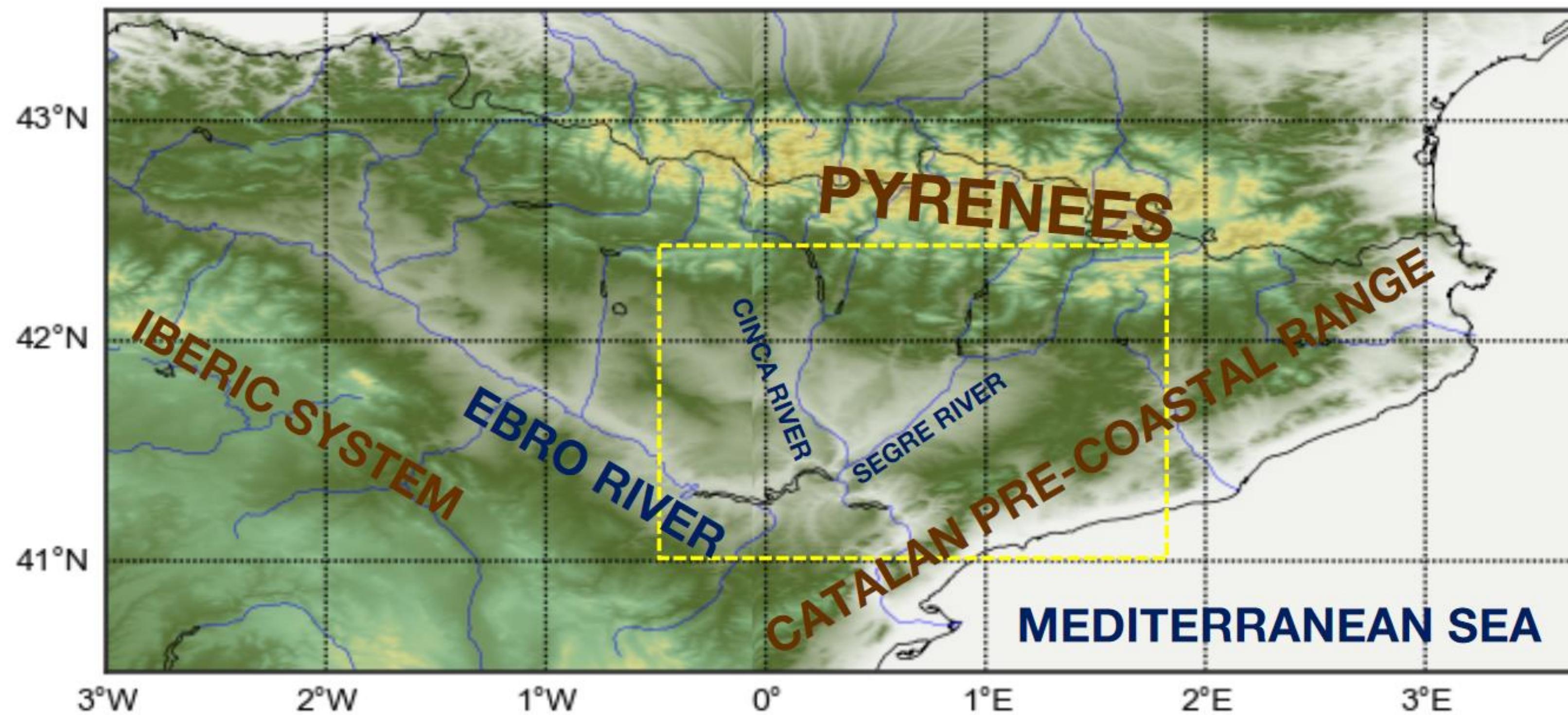


Characterisation of the marine-air intrusion *Marinada* in the eastern Ebro subbasin

M. A. Jiménez, A. Grau, D. Martínez-Villagrassa and J. Cuxart



Universitat
de les Illes Balears

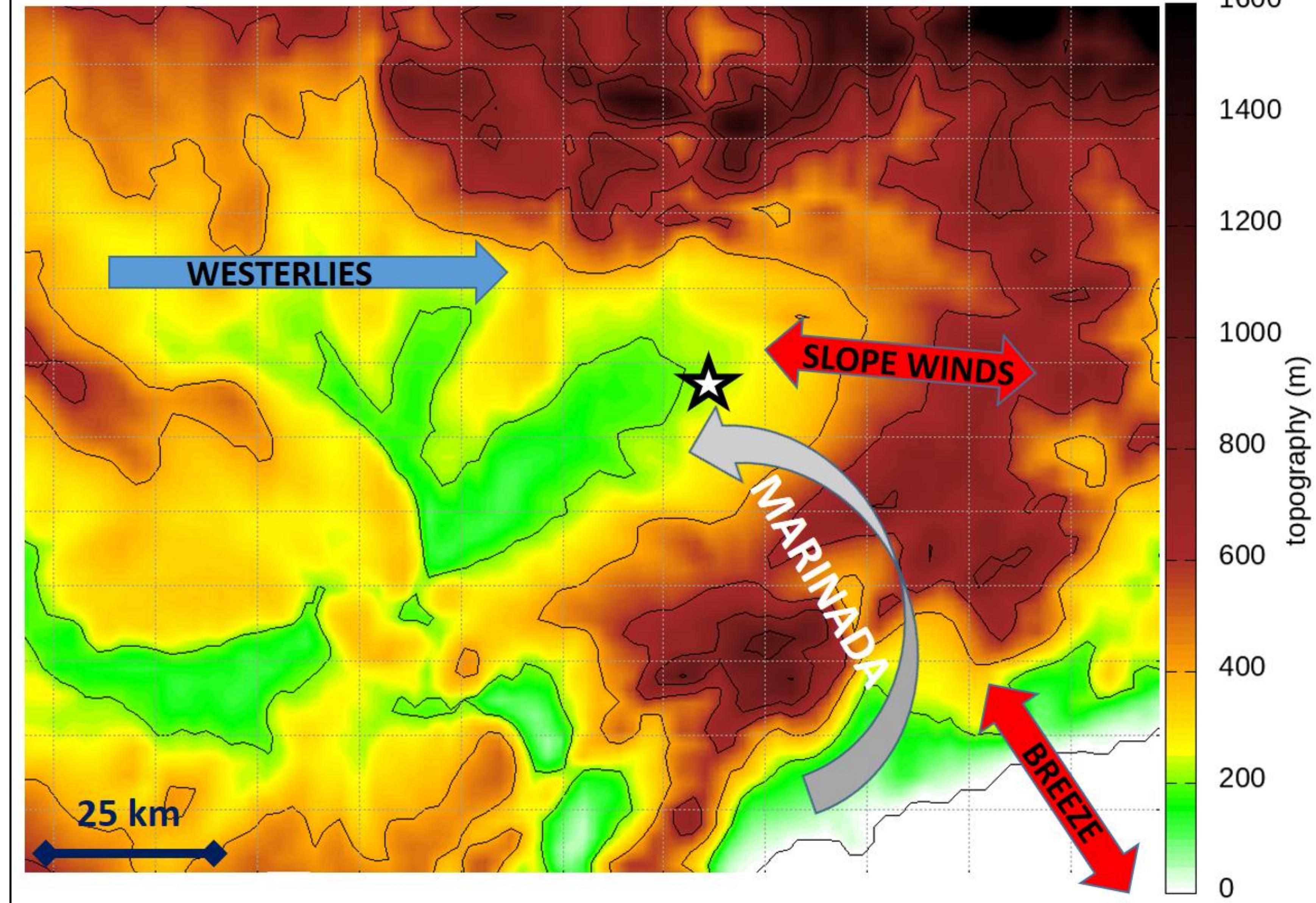
PREVIOUS WORKS

Westerlies and locally-generated winds
Martínez et al. (2008)

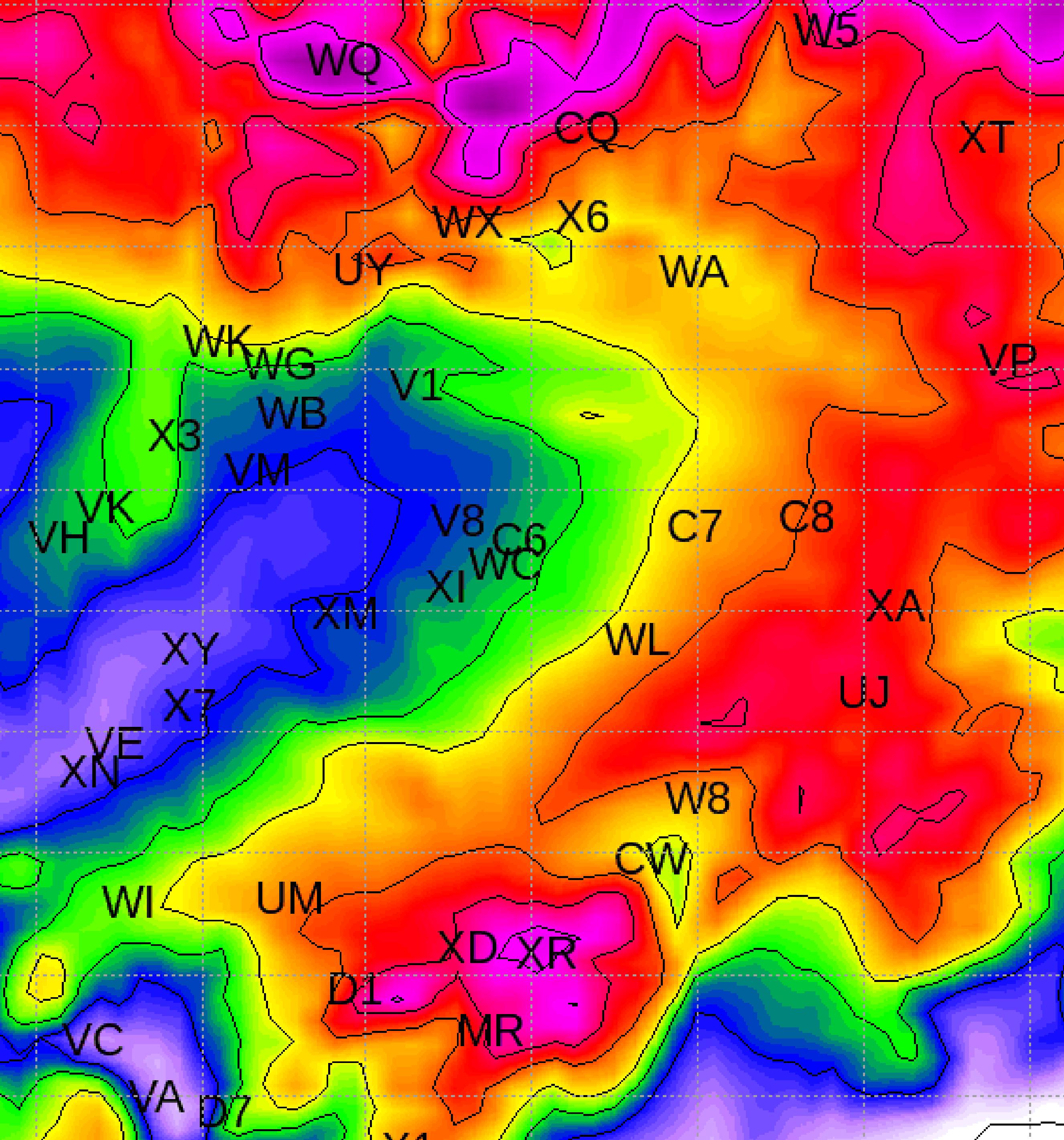
Thermally-driven local winds
Cuxart et al. (2012)

Fog in the bottom parts
Cuxart & Jiménez (2012)

Representativeness of the observed SEB in ECMWF model
Cuxart et al. (2015)



Marinada
Jiménez et al. (2023)



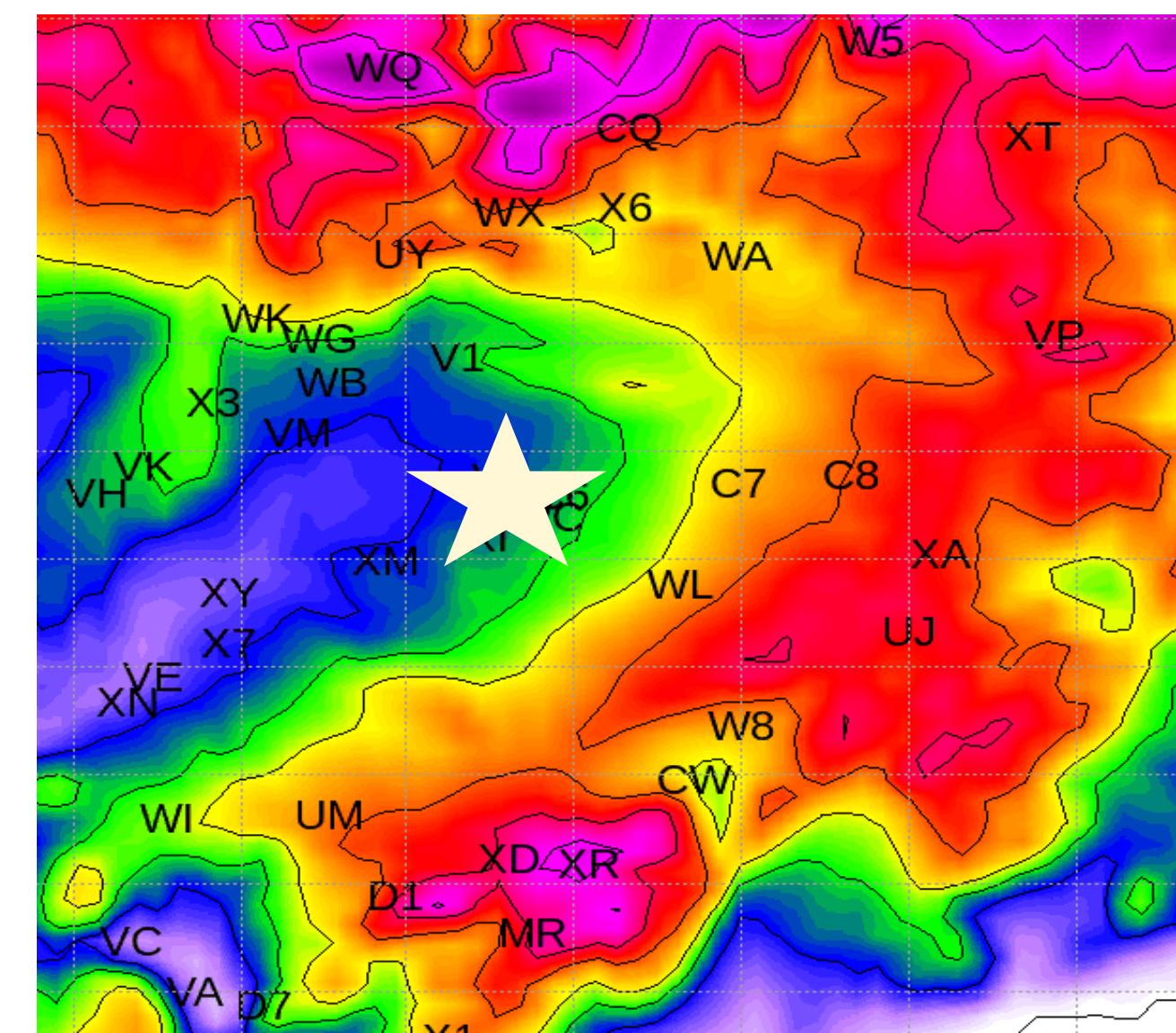
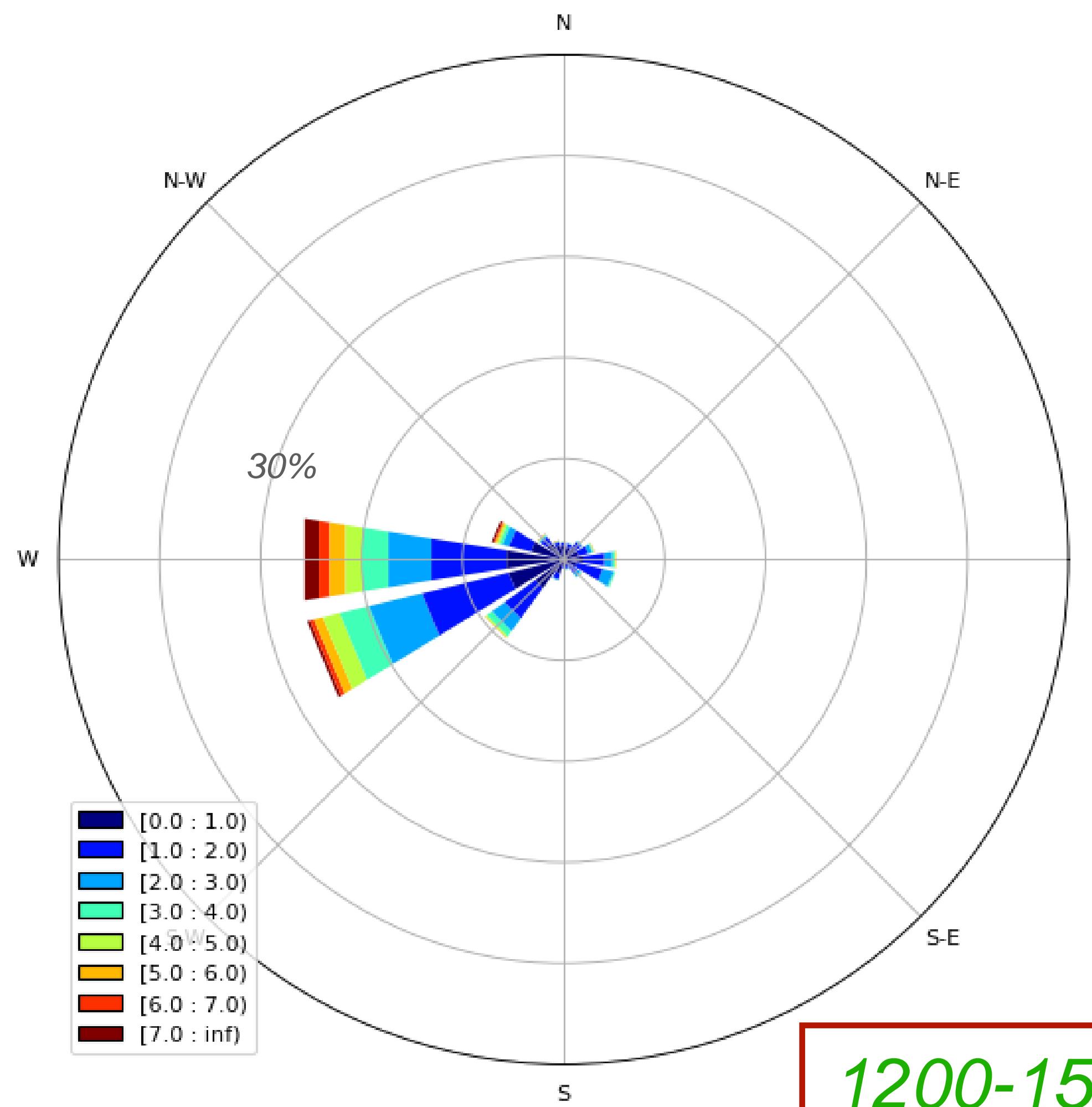
MARINADA, A WELL-KNOWN WIND

- ✓ Wind from S,SE during the afternoon
- ✓ Warm months

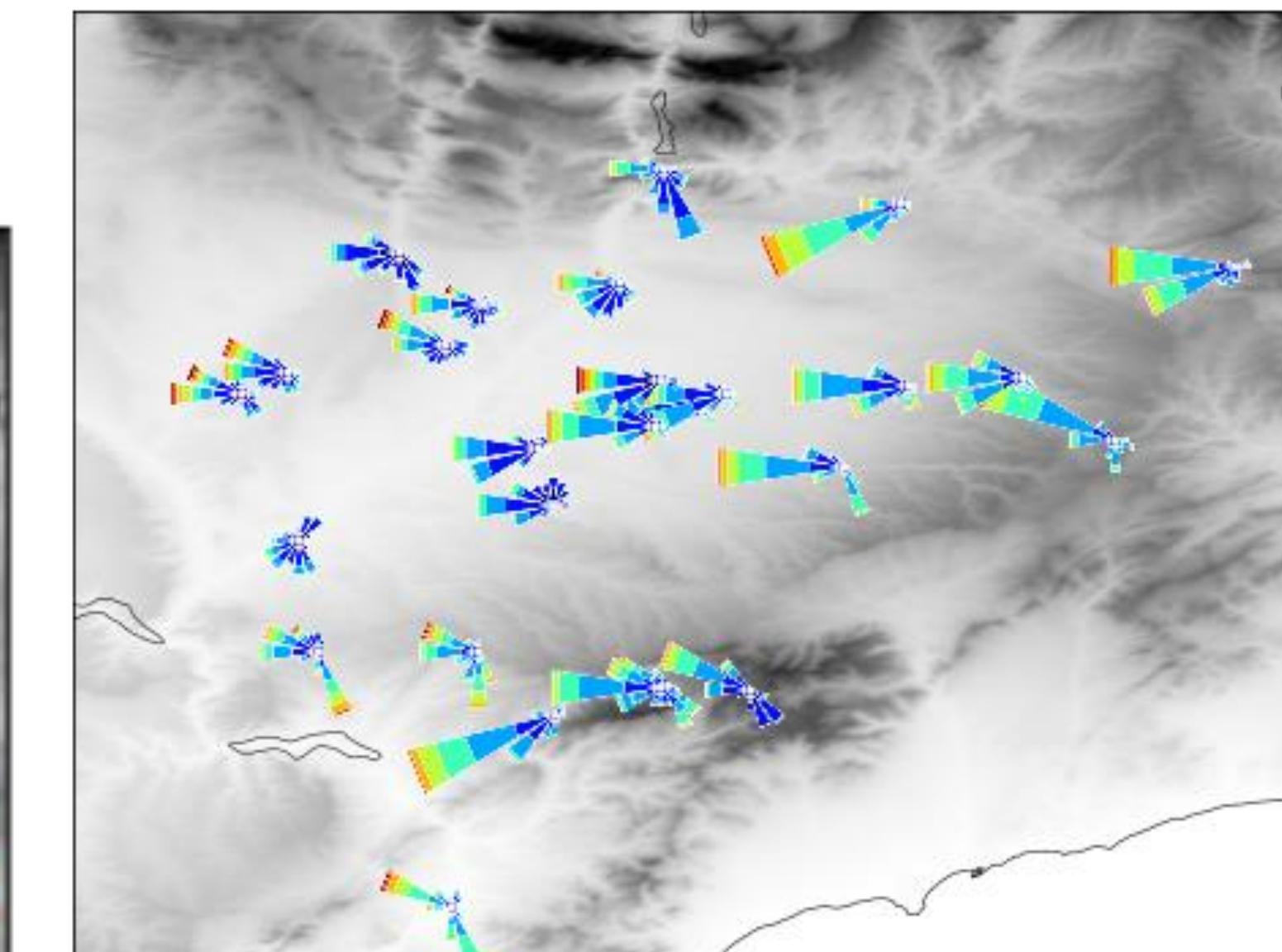
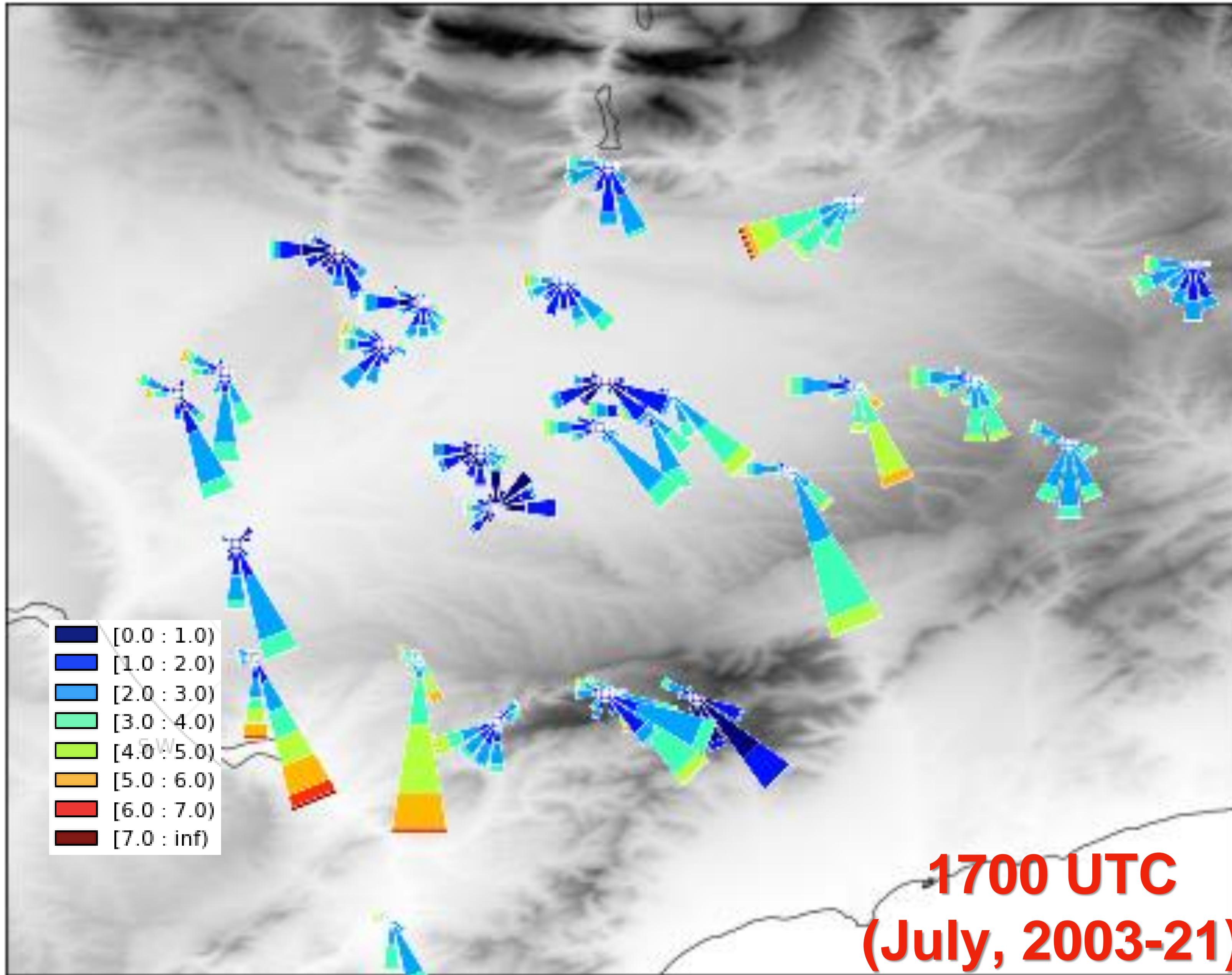
METHODOLOGY

- ✓ Use data from Servei Meteorològic de Catalunya network
 - ✓ Wind speed at 2m, 6m and 10m agl
 - ✓ Temperature/Humidity ar 2m
- ✓ Filter the observations to select Marinada events

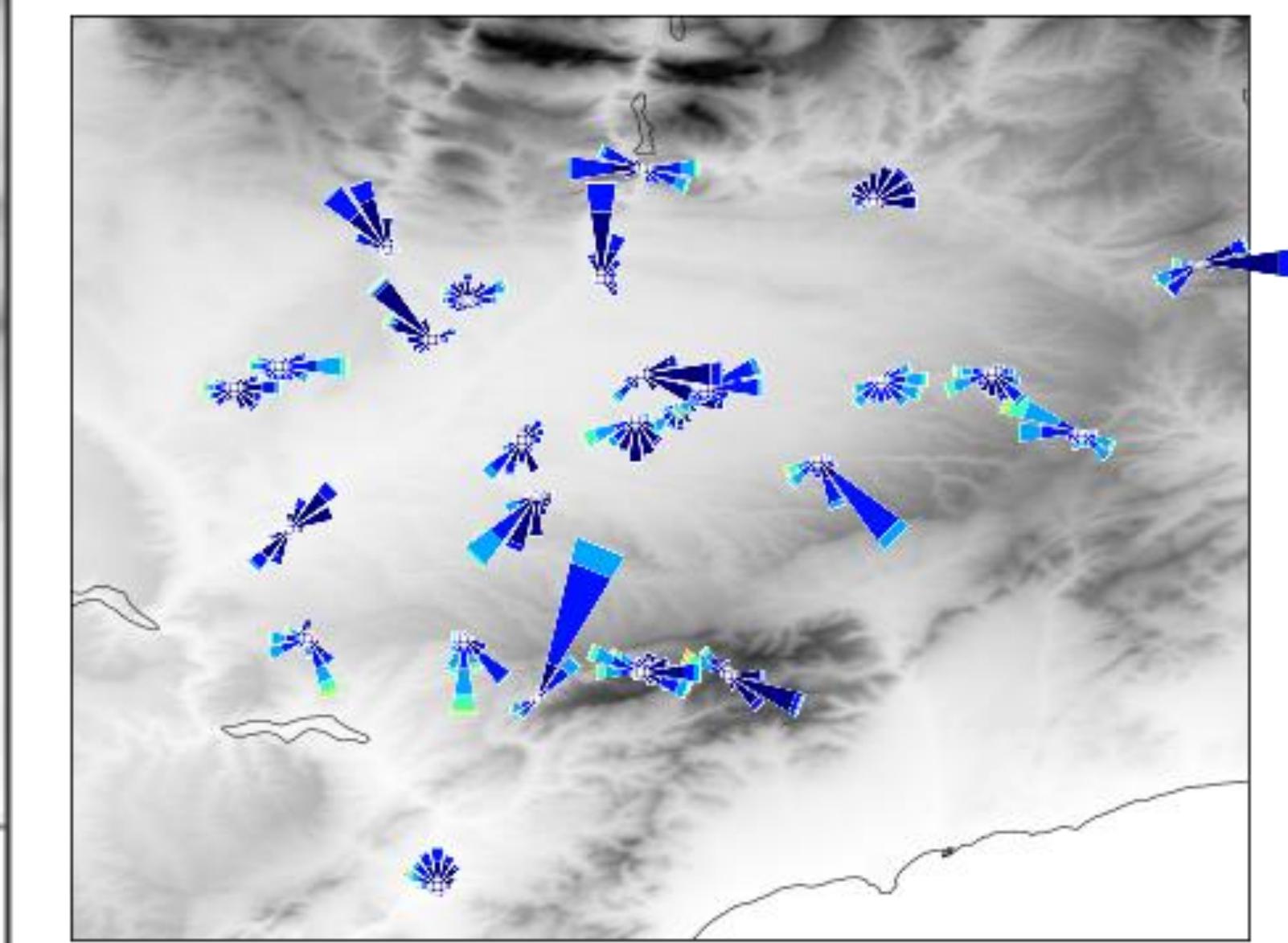
wind roses in *EI Poal* (2003-2021)



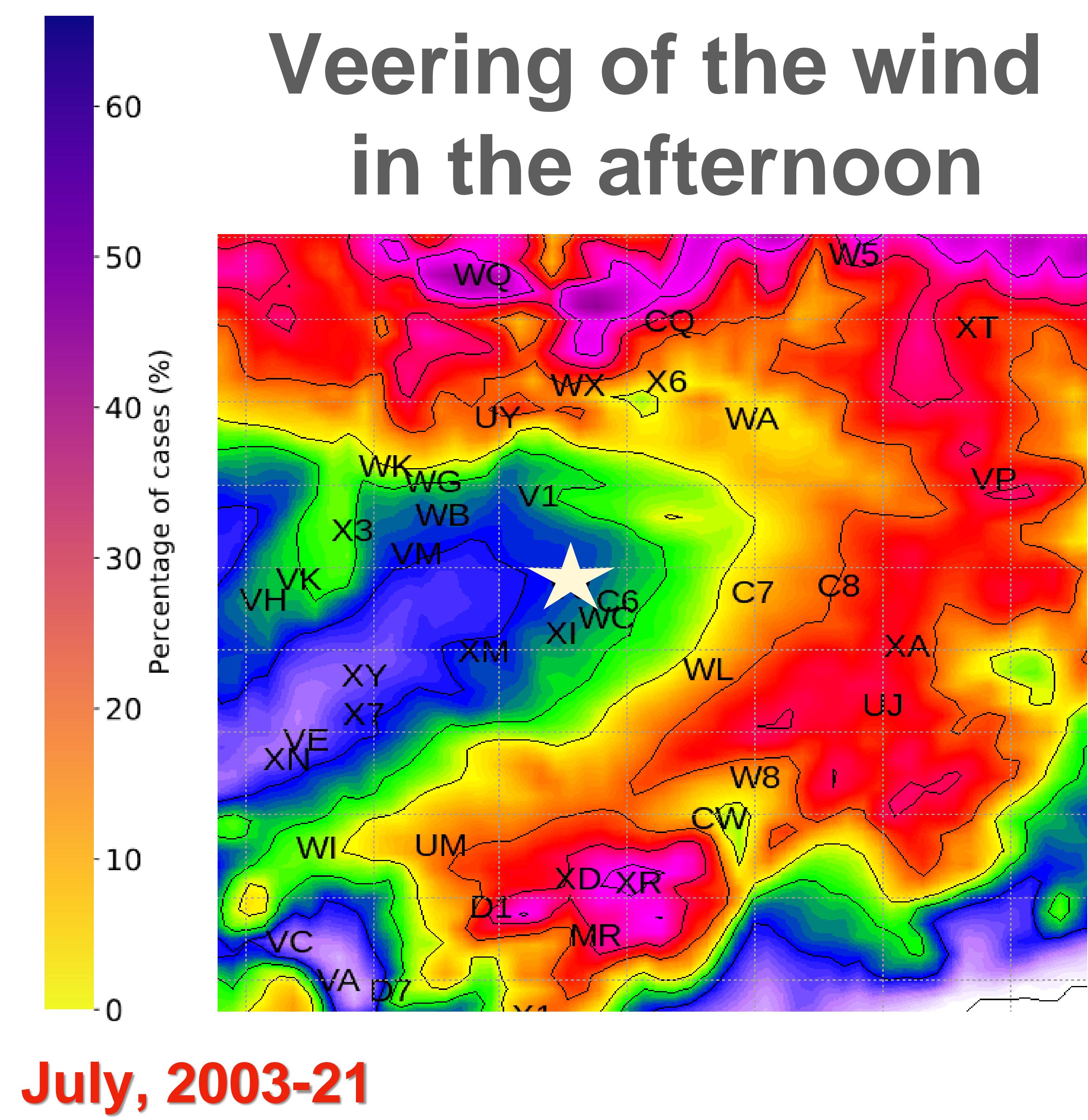
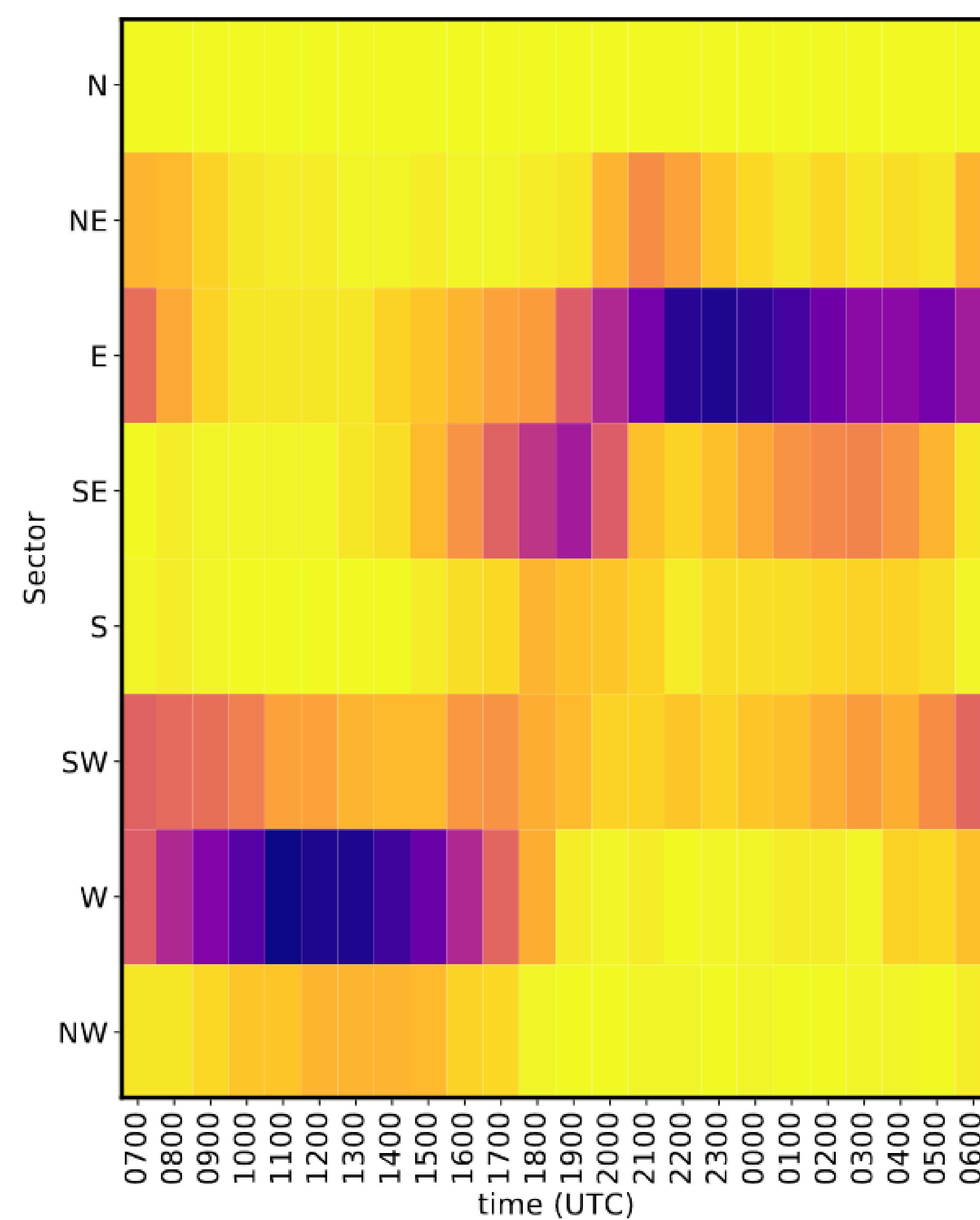
Statistical analysis (2003-2021)



1200-1500 UTC

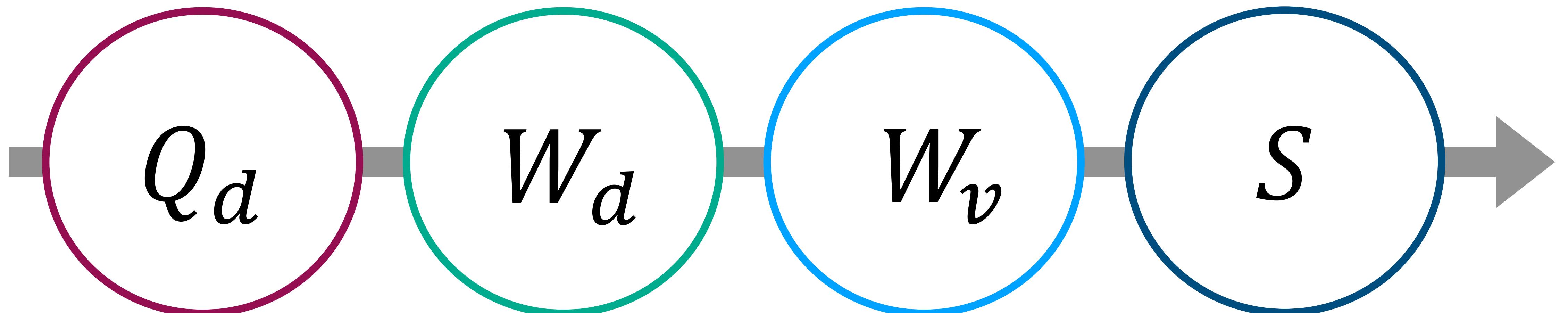
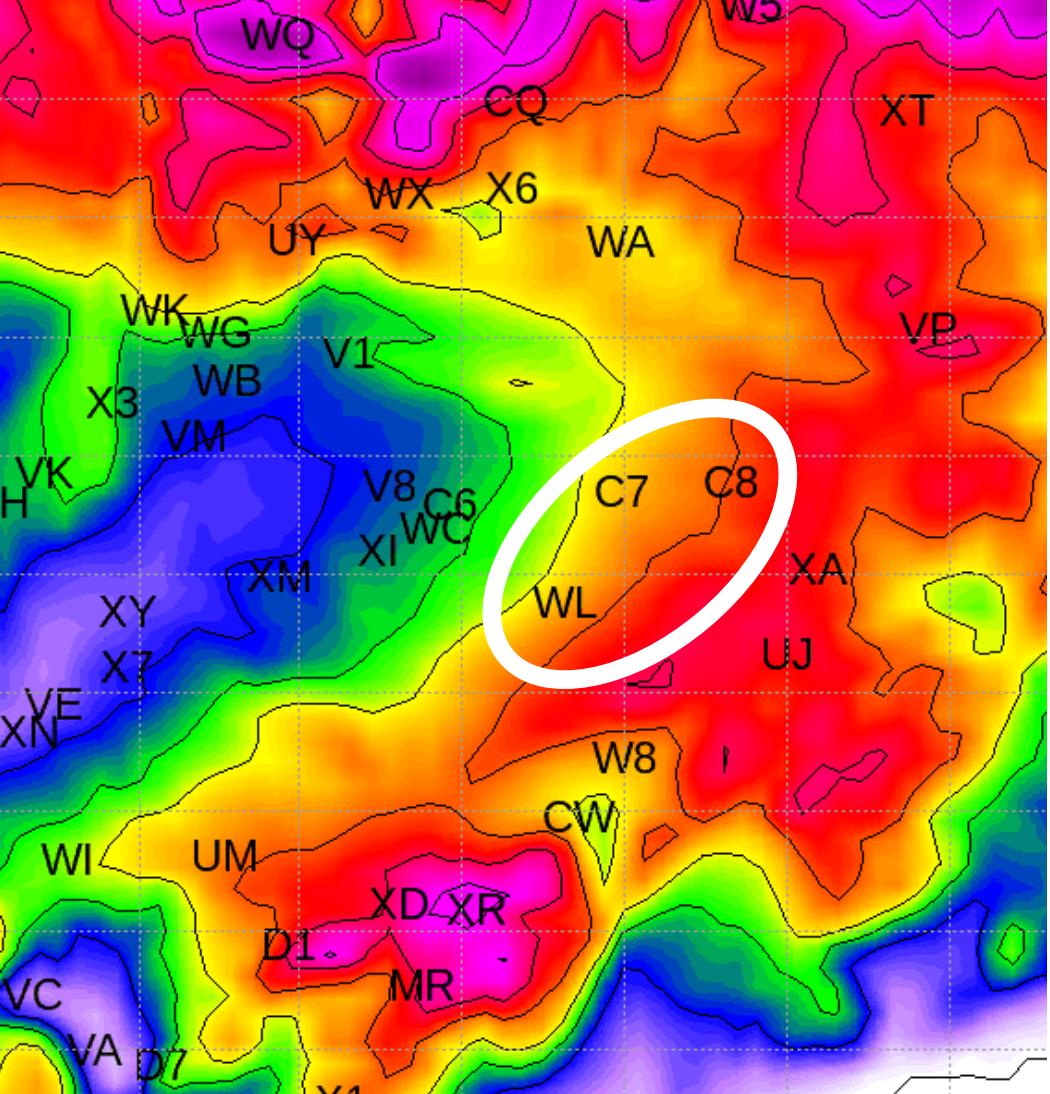


0000-0300 UTC



SELECTING THE MARINADA EVENTS (2003-21)

WL
C8
C7



$$Q_d = \frac{Q_t - Q_e}{Q_t} < 0.4$$

Insolation deficit index

Martinez et al. (2008)



Cloudy days



Consistency

$$70^\circ < W_d < 180^\circ$$

3h

W_v after 1200 UTC

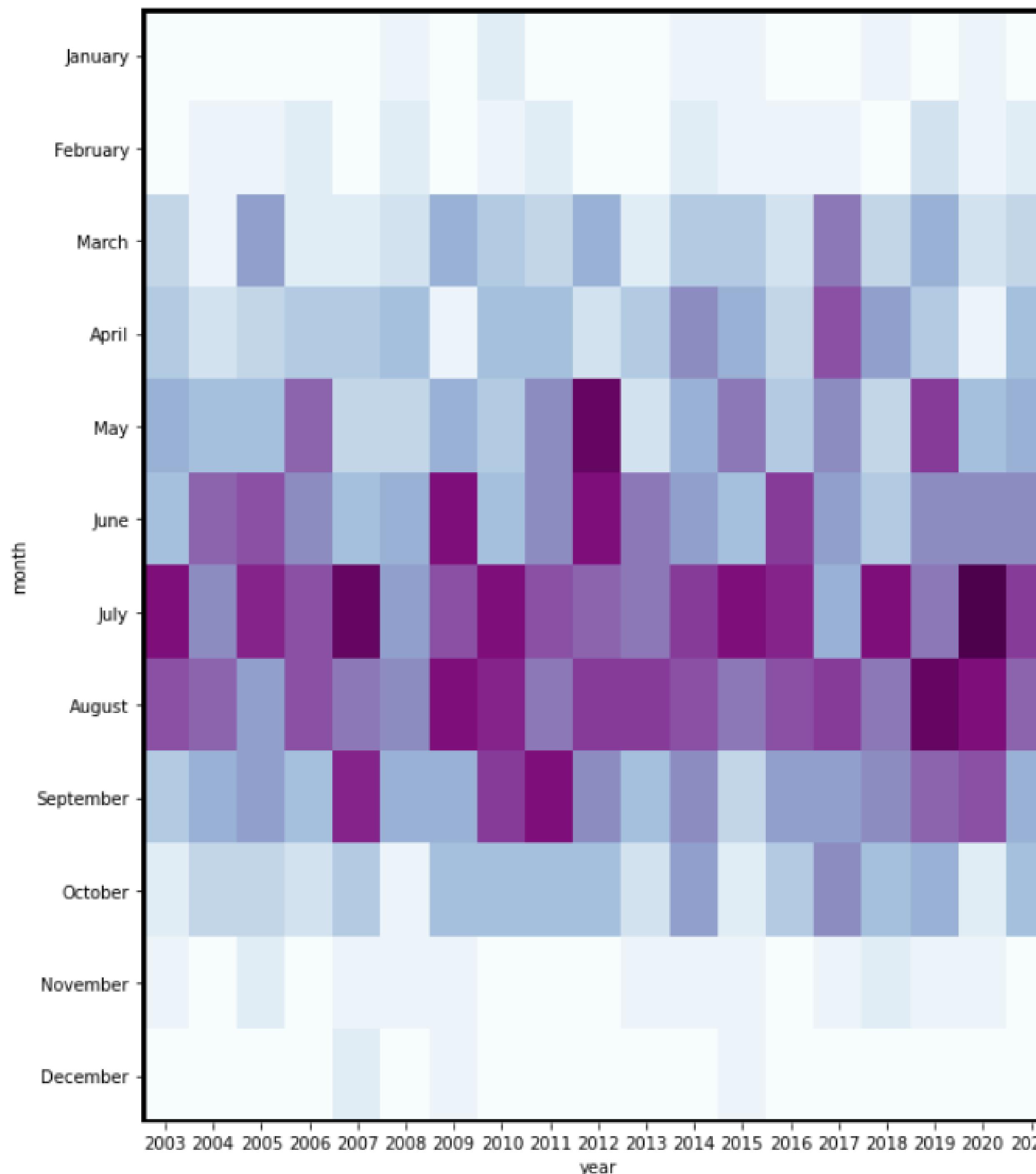
Simultaneity
WL, C8, C7



Synoptic or mesoscale effects



Local effects

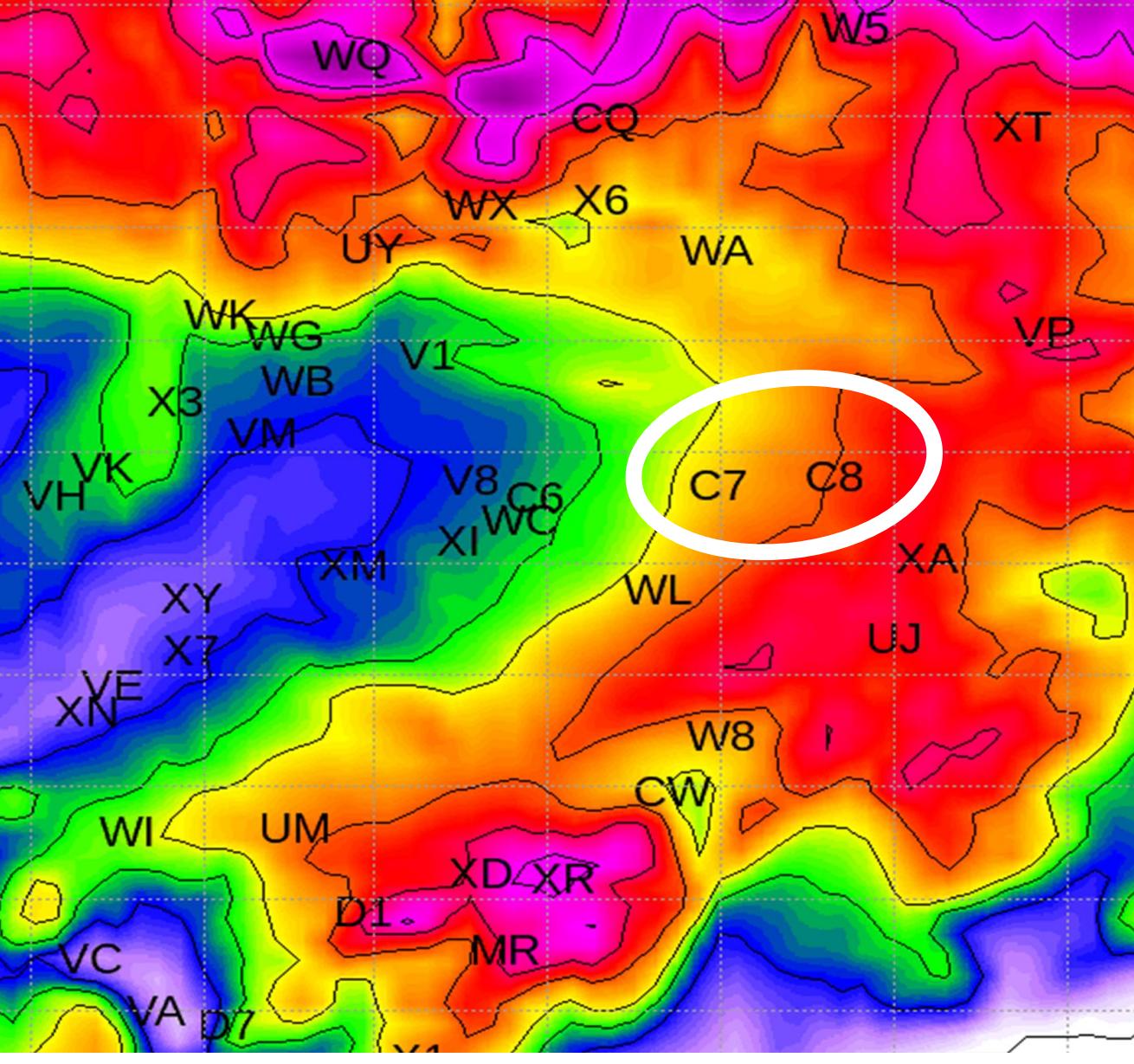


Number of Marinada events selected by the filter

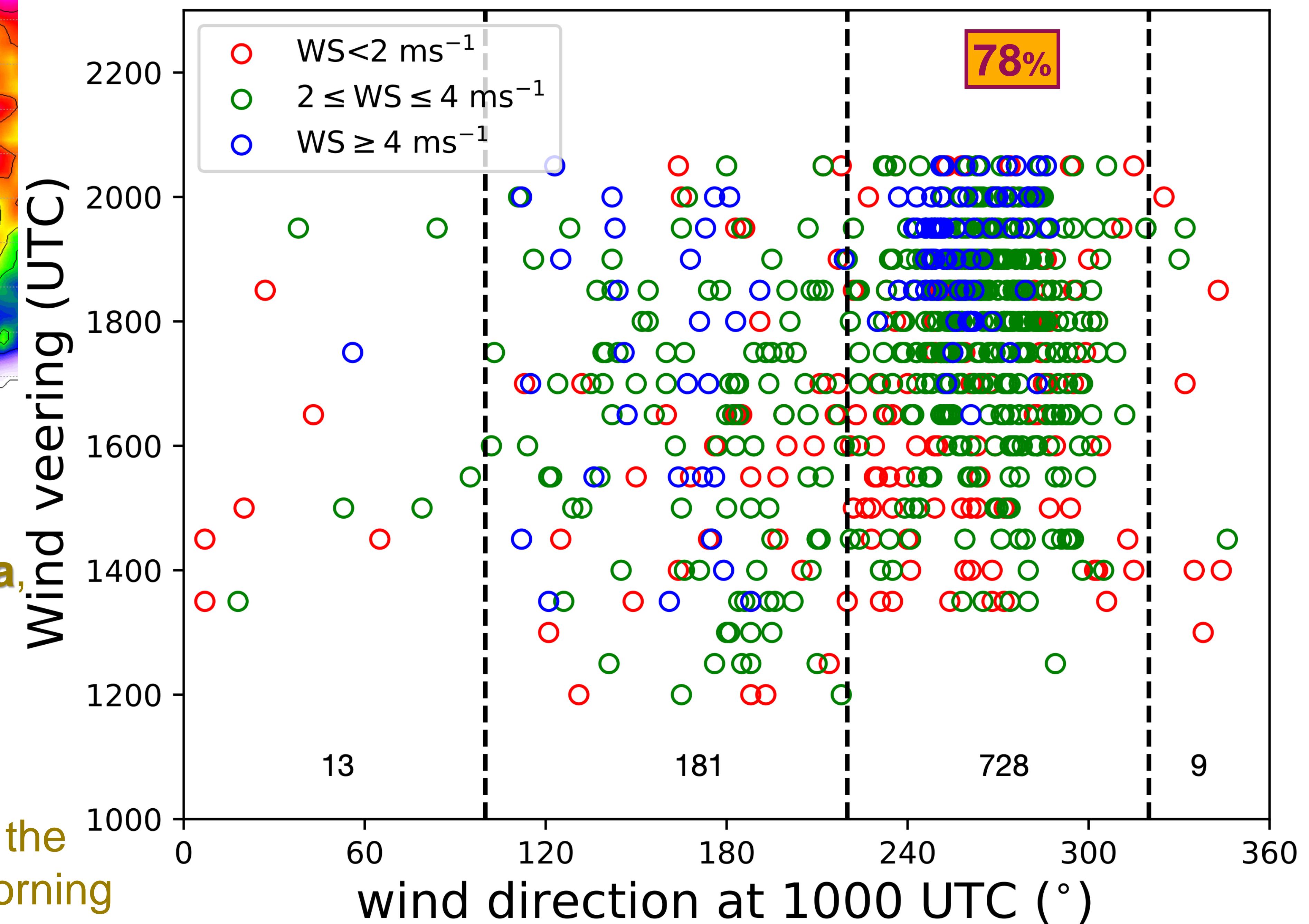
50-80 Marinada events
during the warm months of the year

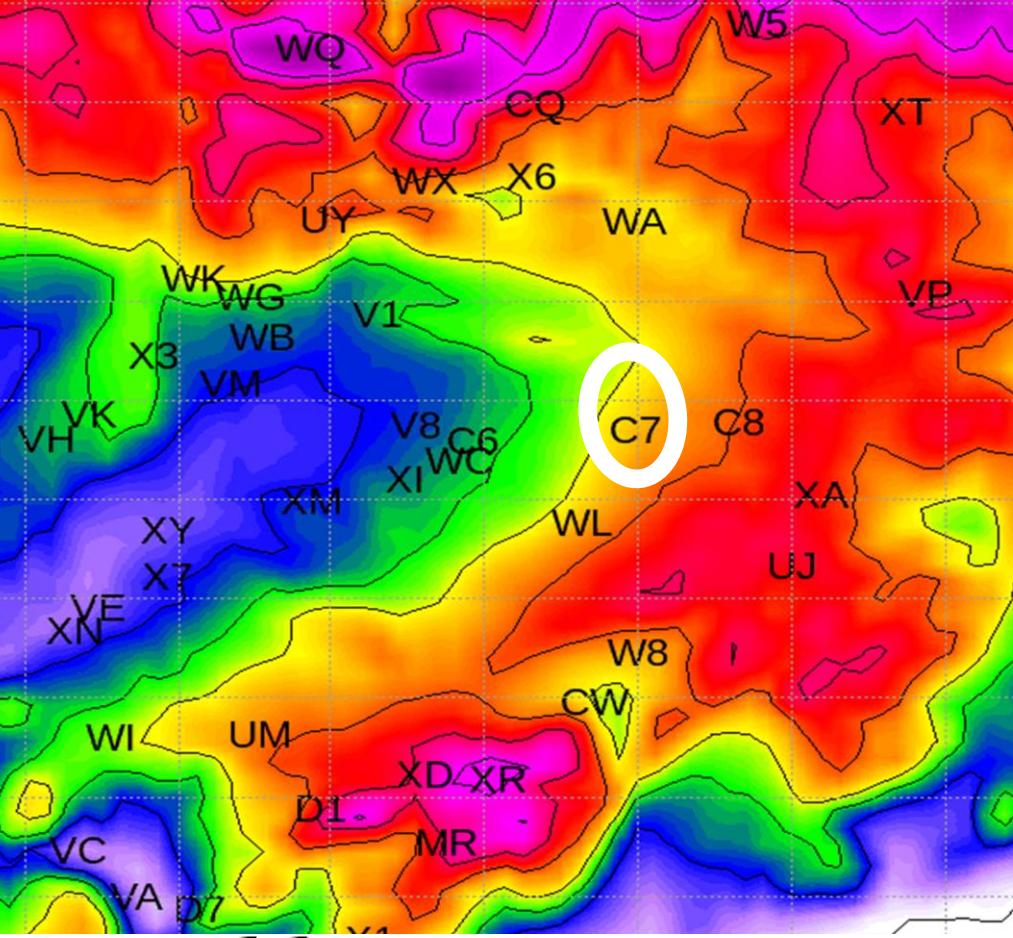
synoptical situation?

Further analysis of these events →

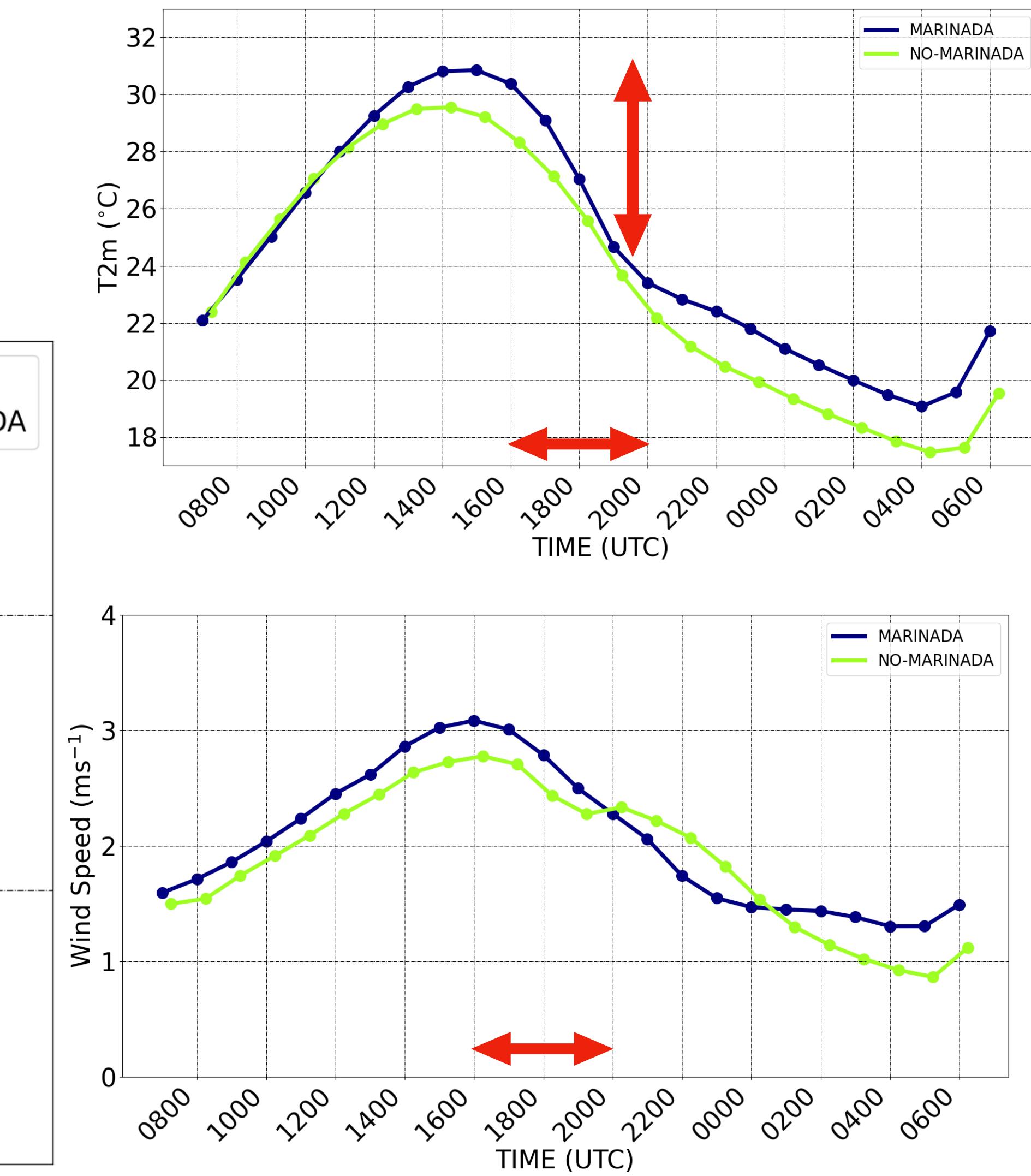
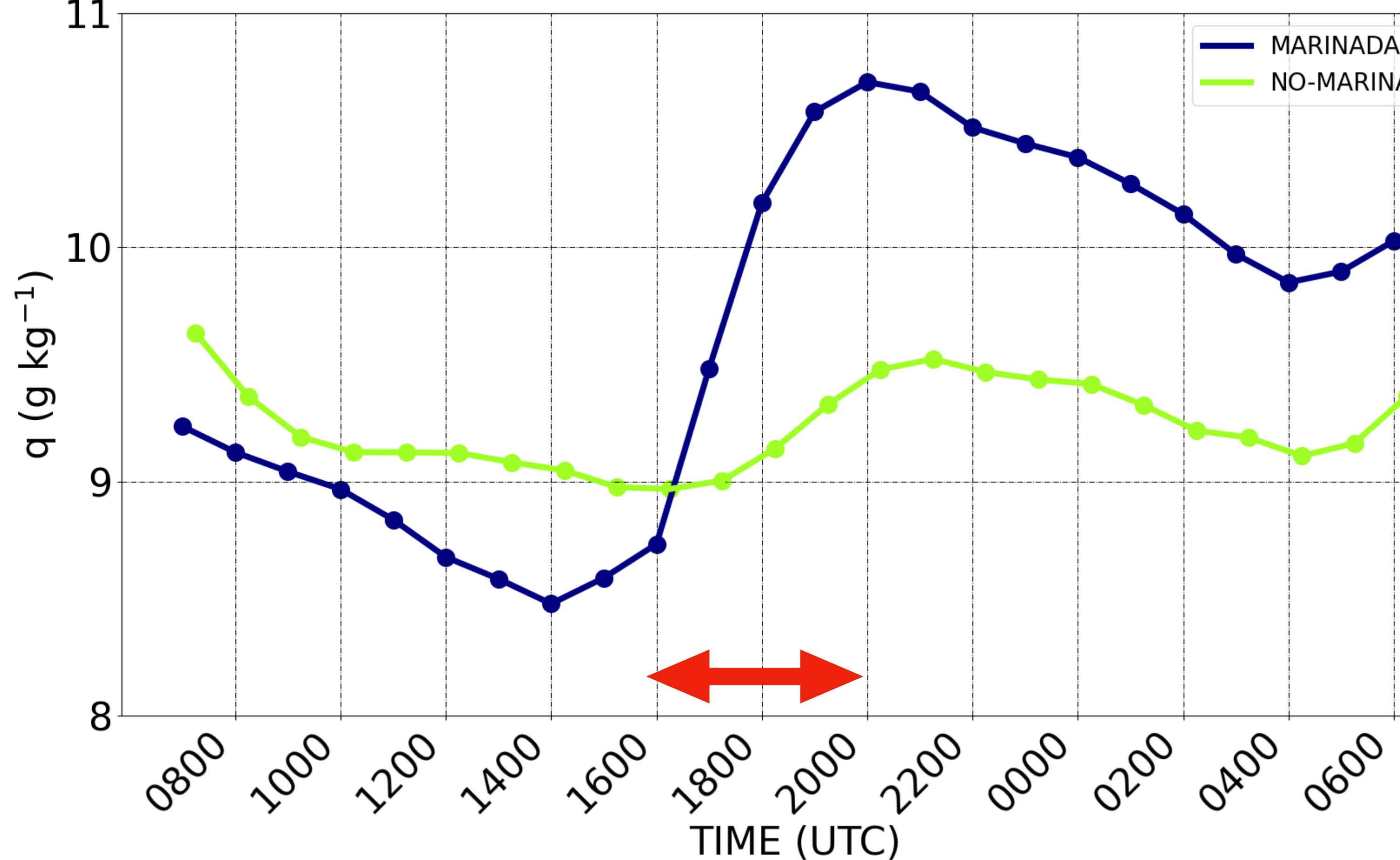


- ✓ During the **Marinada**, winds are mainly from W (upslope)
- ✓ The arrival of the **Marinada** depends on the wind intensity in the morning





Cold and humid advection (maritime origin)



Averages July, 2003-21

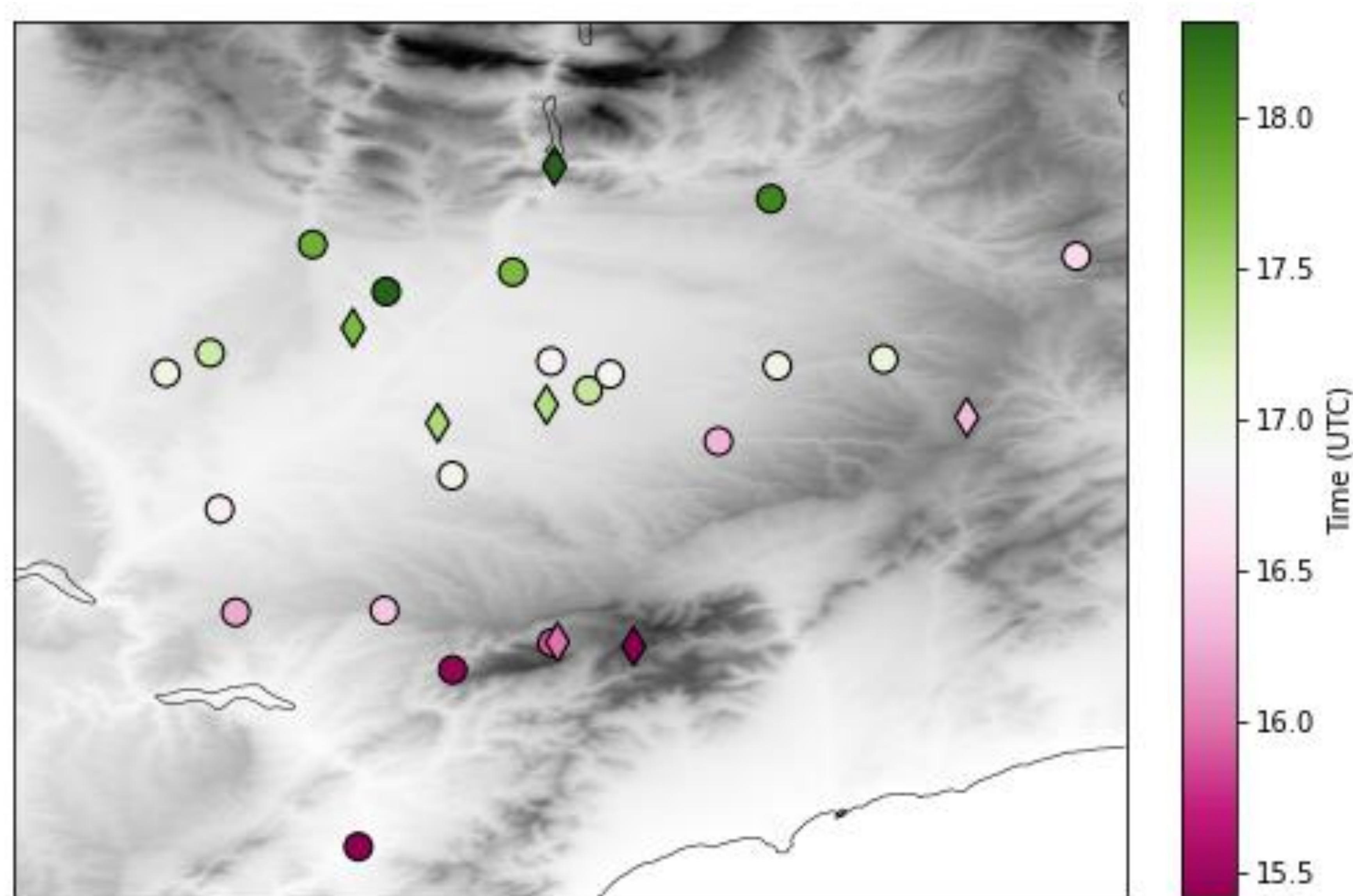
The specific humidity change as a indicator of the Marinada arrival

$$1 < \Delta q < 2 \text{ g kg}^{-1}$$

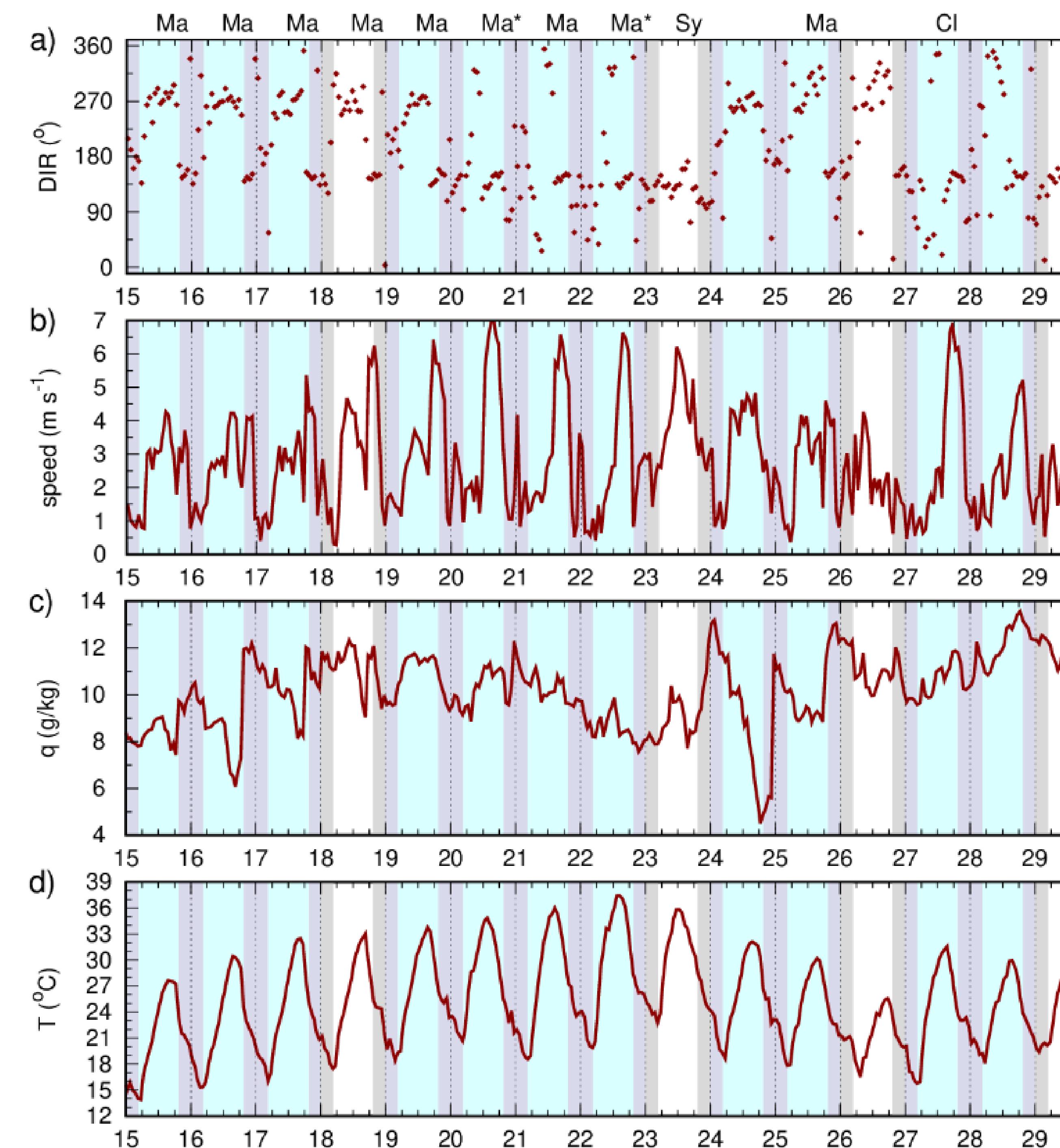
$$1530 < W_v < 1850 \text{ UTC}$$

$$W_s \sim 5 - 6 \text{ m s}^{-1}$$

$$\Delta T \sim -2^\circ \text{C}$$



Marinada events during the LIAISE experimental field campaign



Ma: selected by the filter

Ma*: veering earlier than 12 UTC

- ✓ thermal low, high T
- ✓ reported in JJA
- ✓ 5-15 days per year

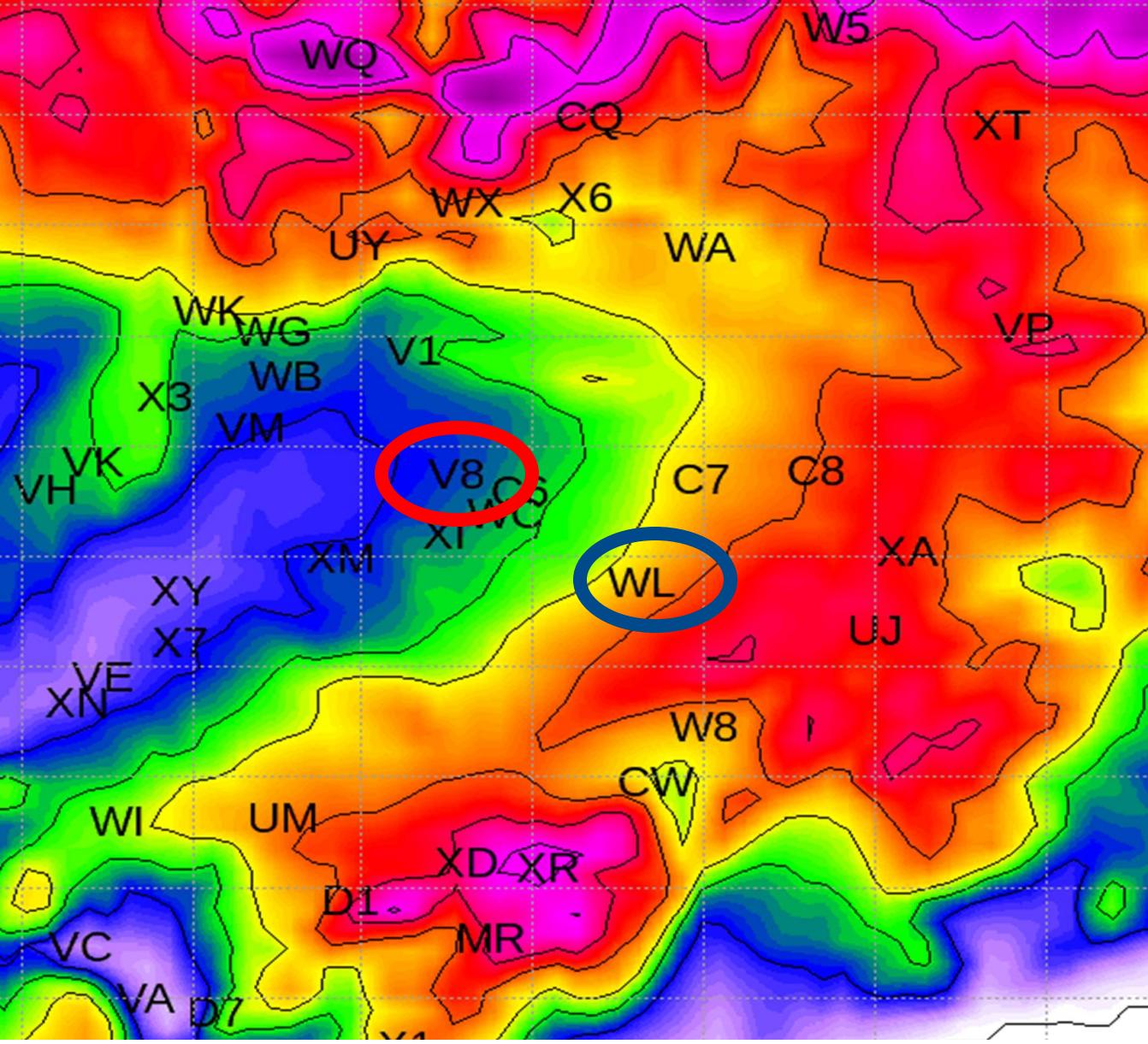
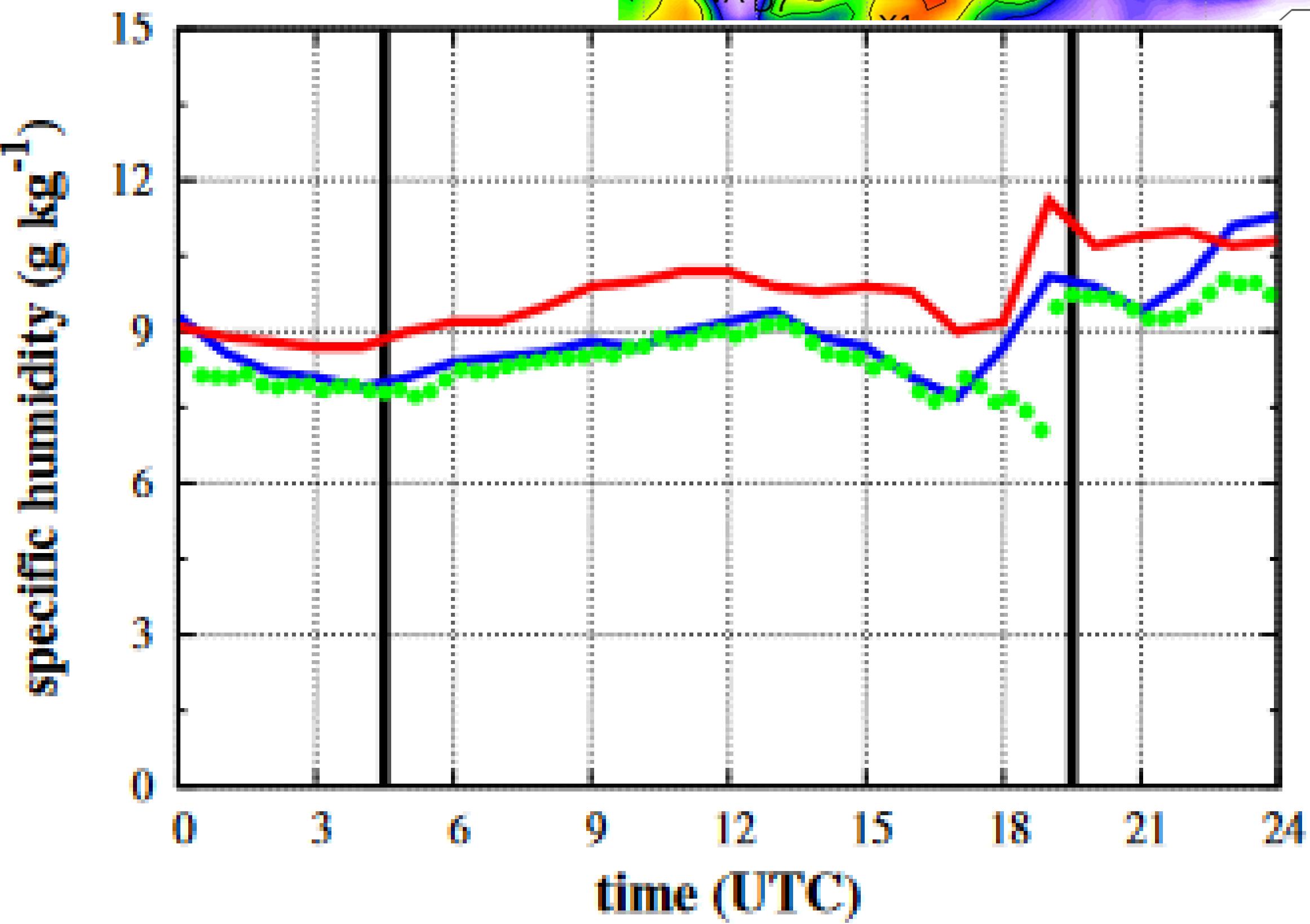
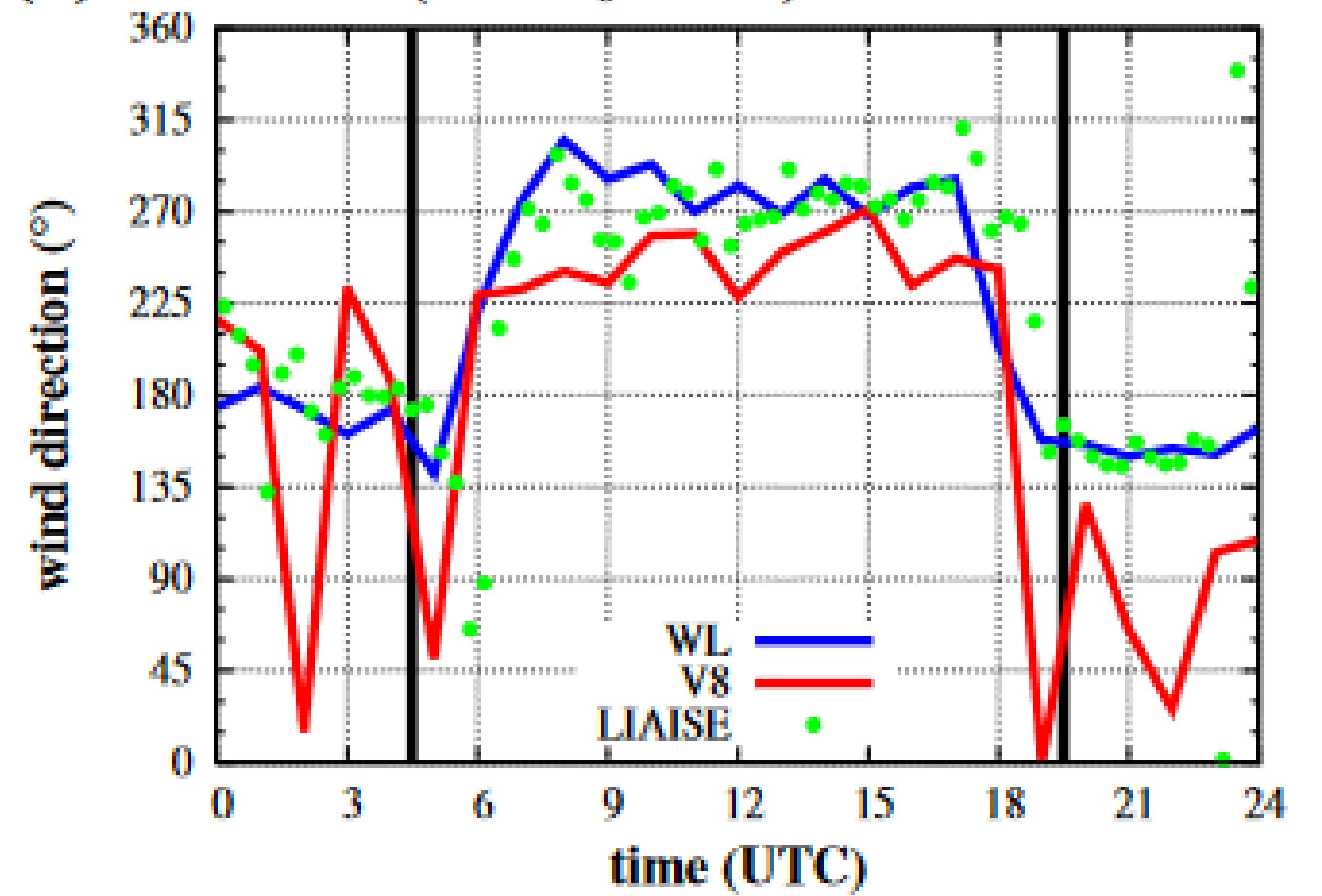
Sy: synoptically forced
(no veering)

Marinada arrival

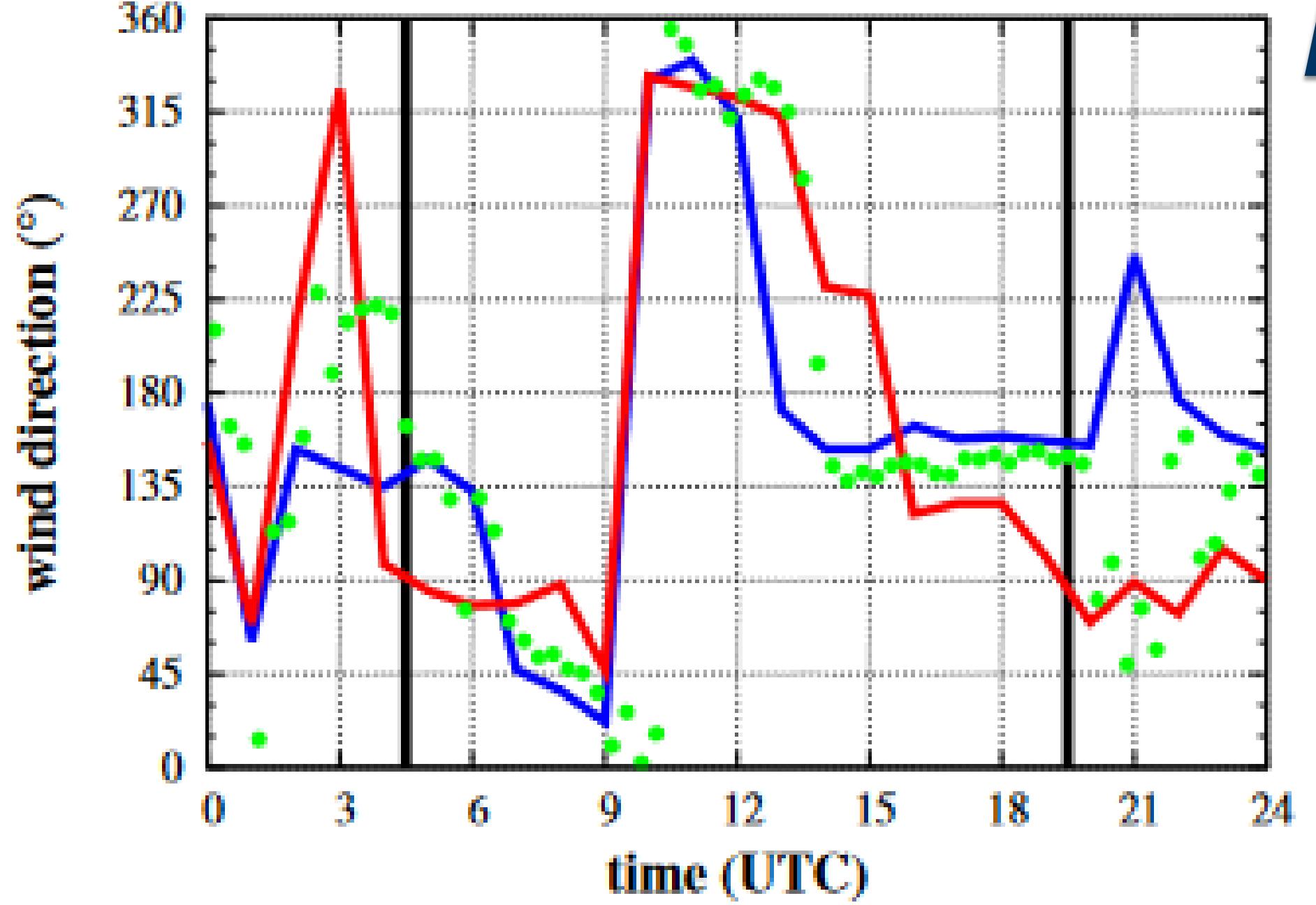
17 UTC

18 UTC, 18 UTC

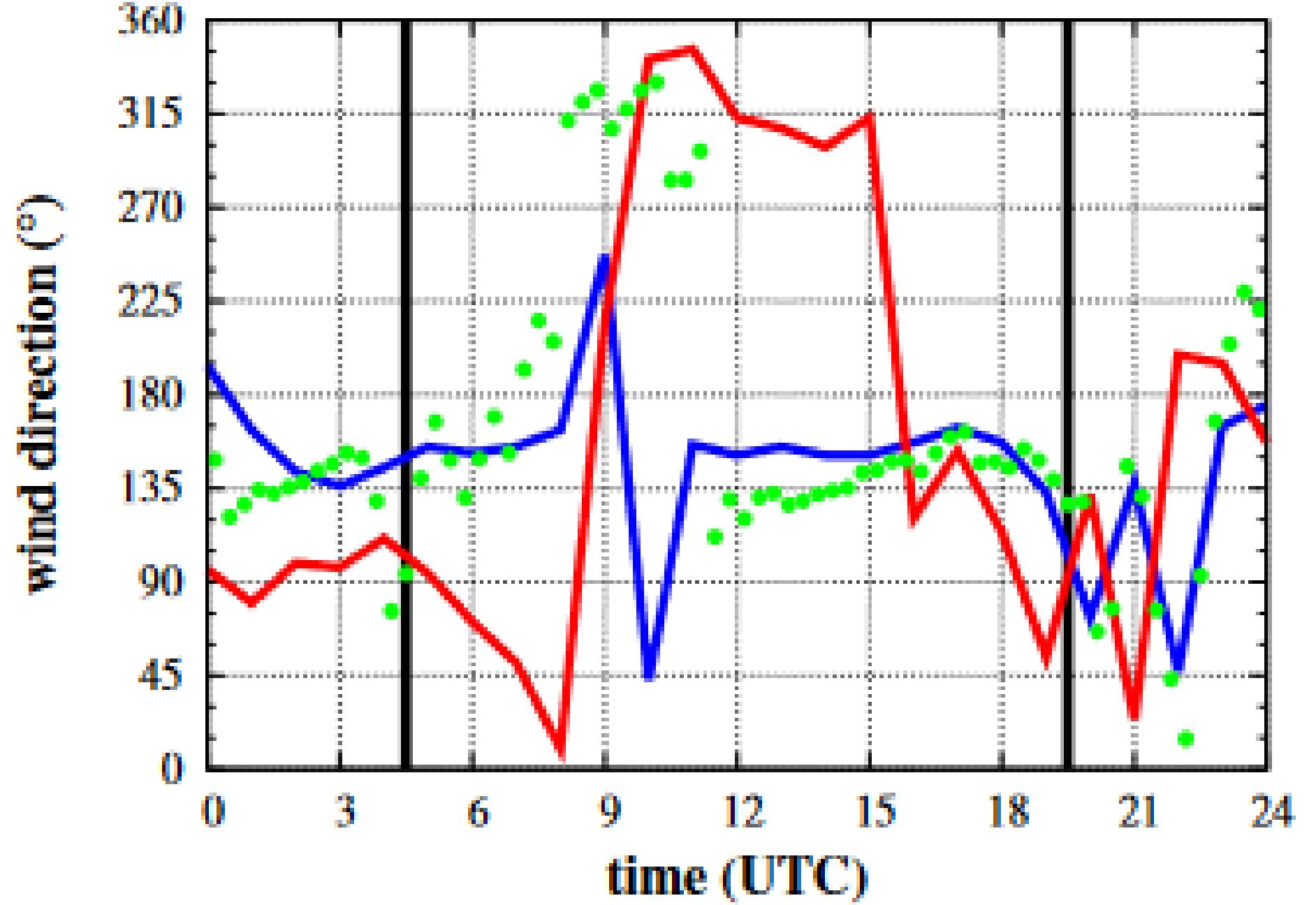
(a) westerlies (15 July 2021)



(b) thermal low (21 July 2021)

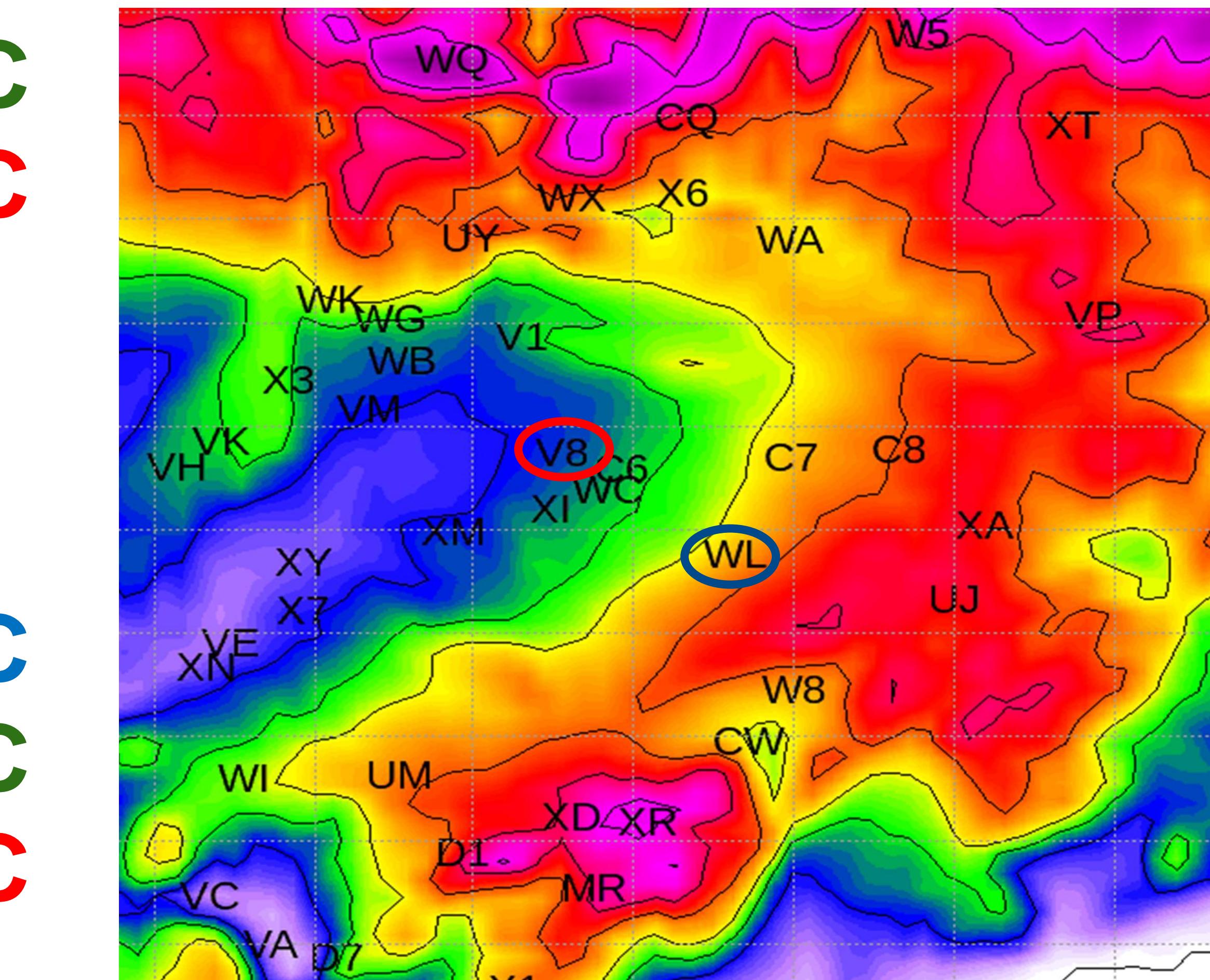


(c) thermal low (20 July 2021), early veering

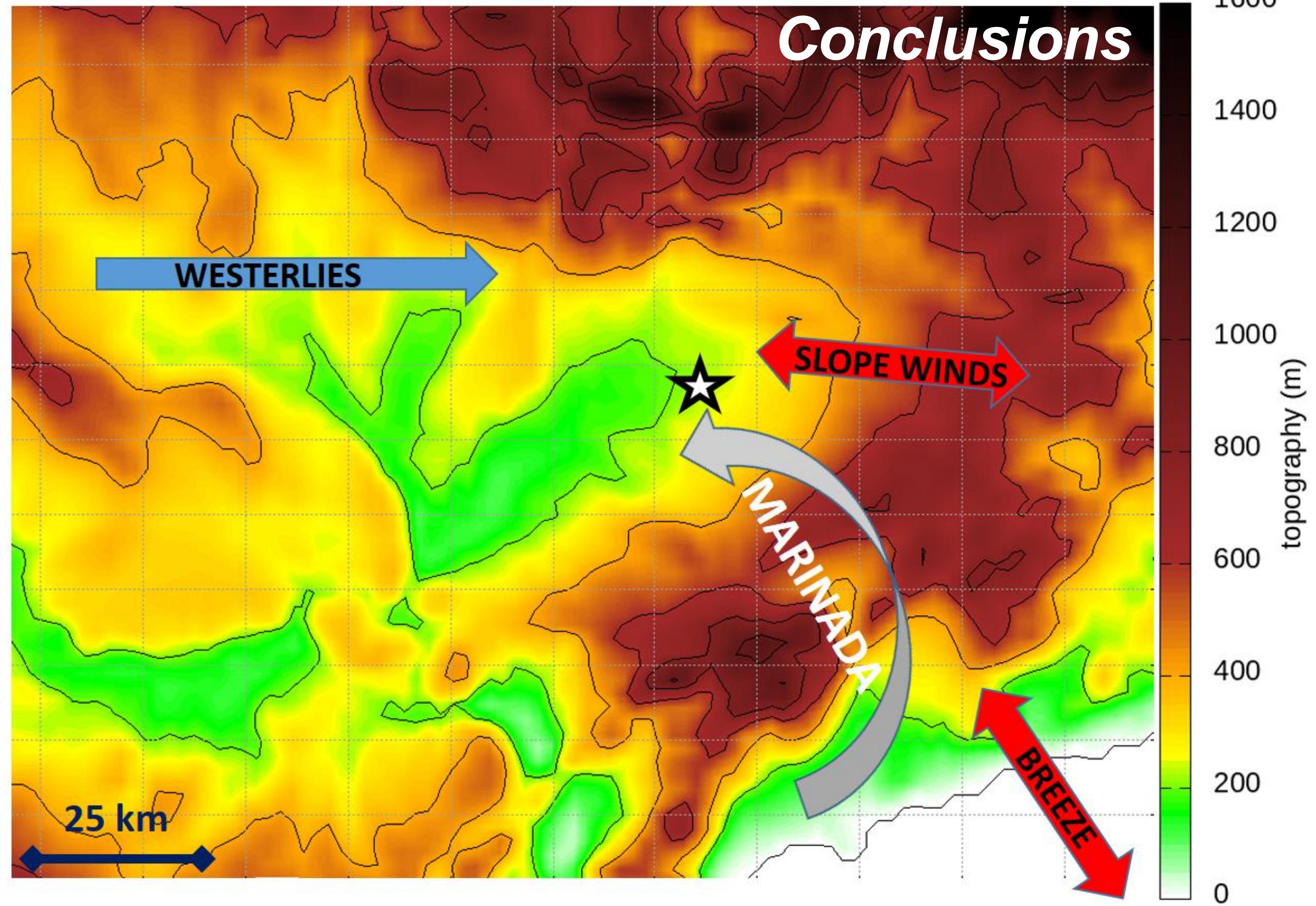


Marinada
arrival
13 UTC
14 UTC
16 UTC

11 UTC
11 UTC
16 UTC



Conclusions



Acknowledgements

Servei Meteorològic de Catalunya (SMC)

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“ESF Investing in your future”

