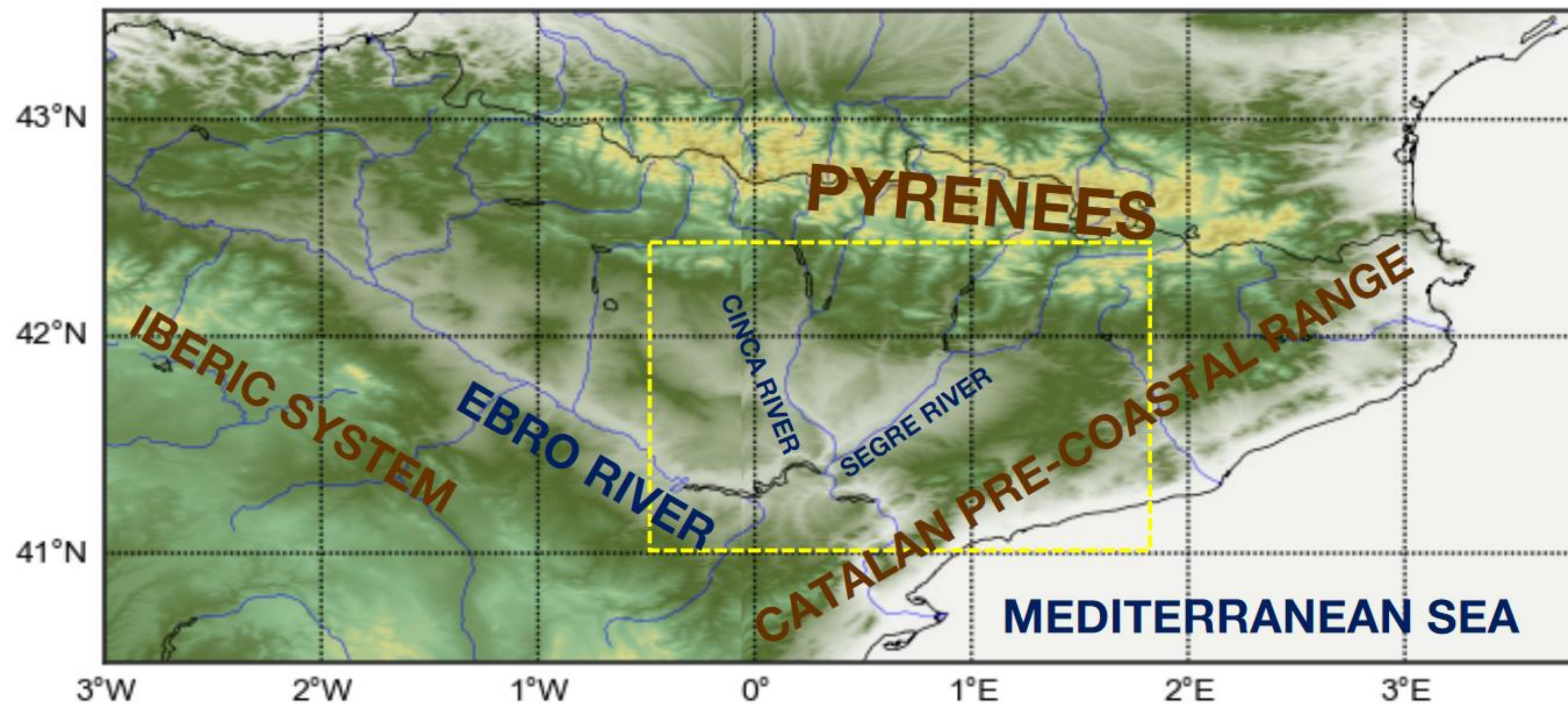


Characterisation of the marine-air intrusion *Marinada* in the eastern Ebro subbasin

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



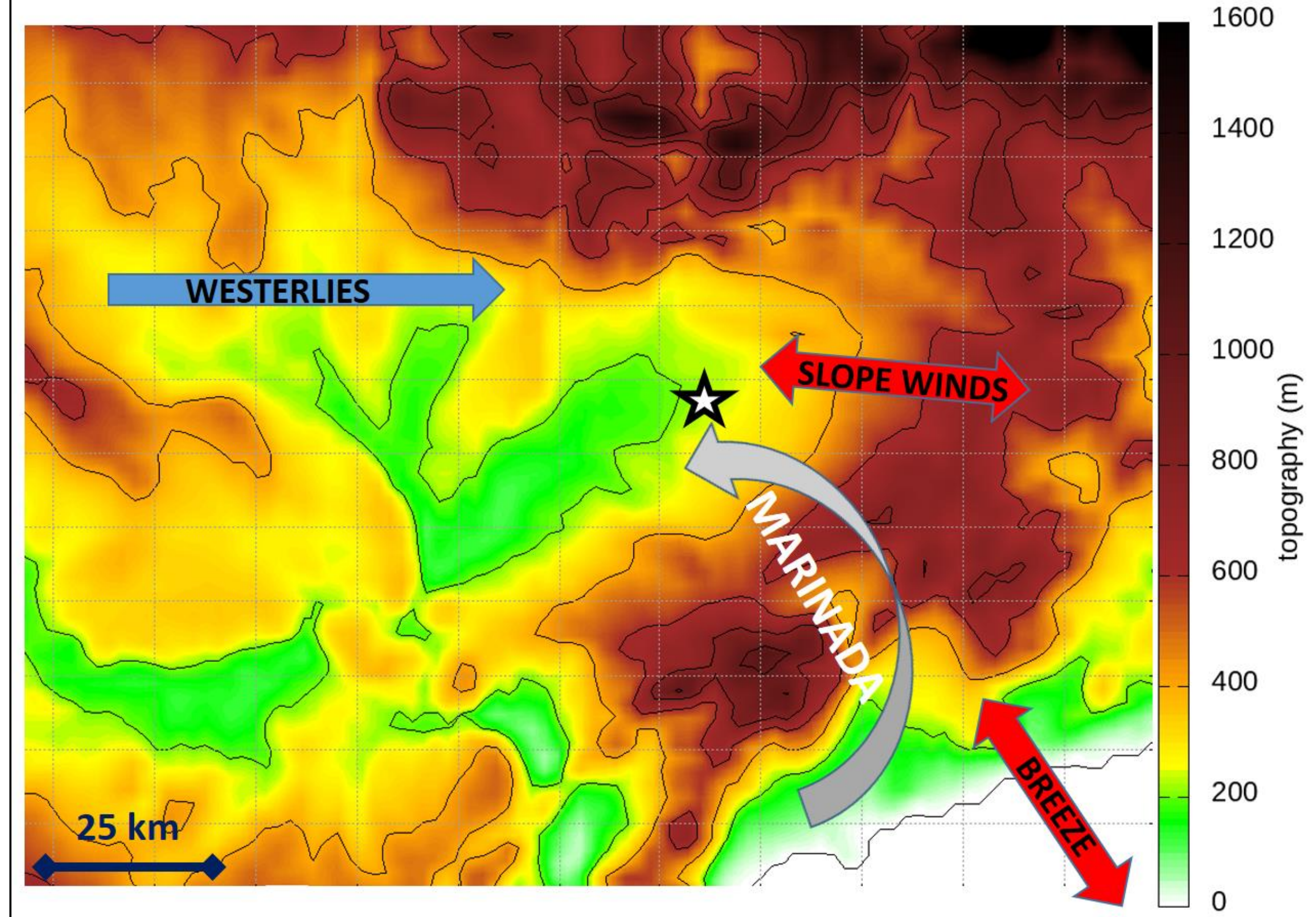
Universitat
de les Illes Balears

PREVIOUS WORKS

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

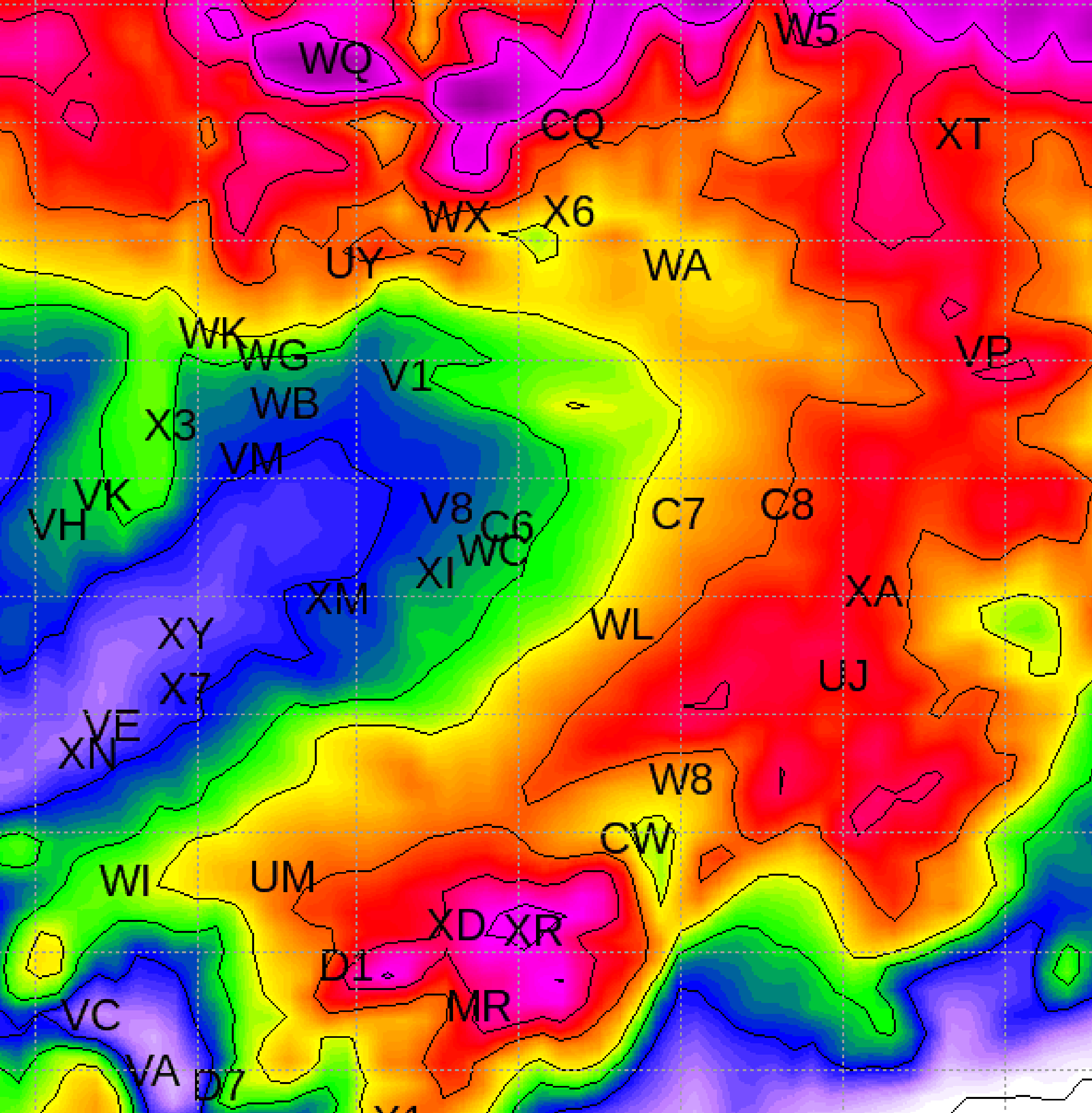
Thermally-driven local winds
Cuxart et al. (2012)

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)



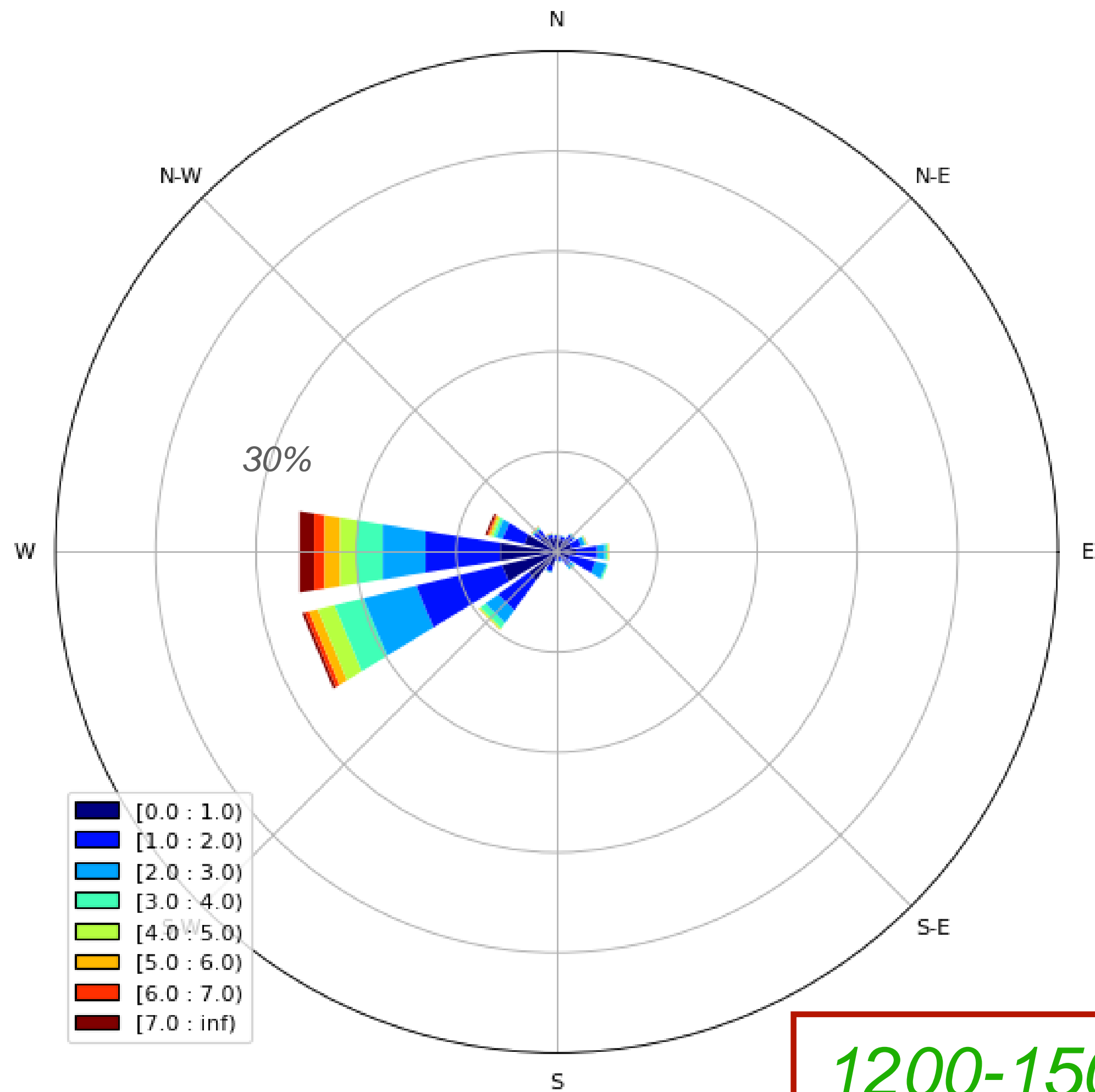
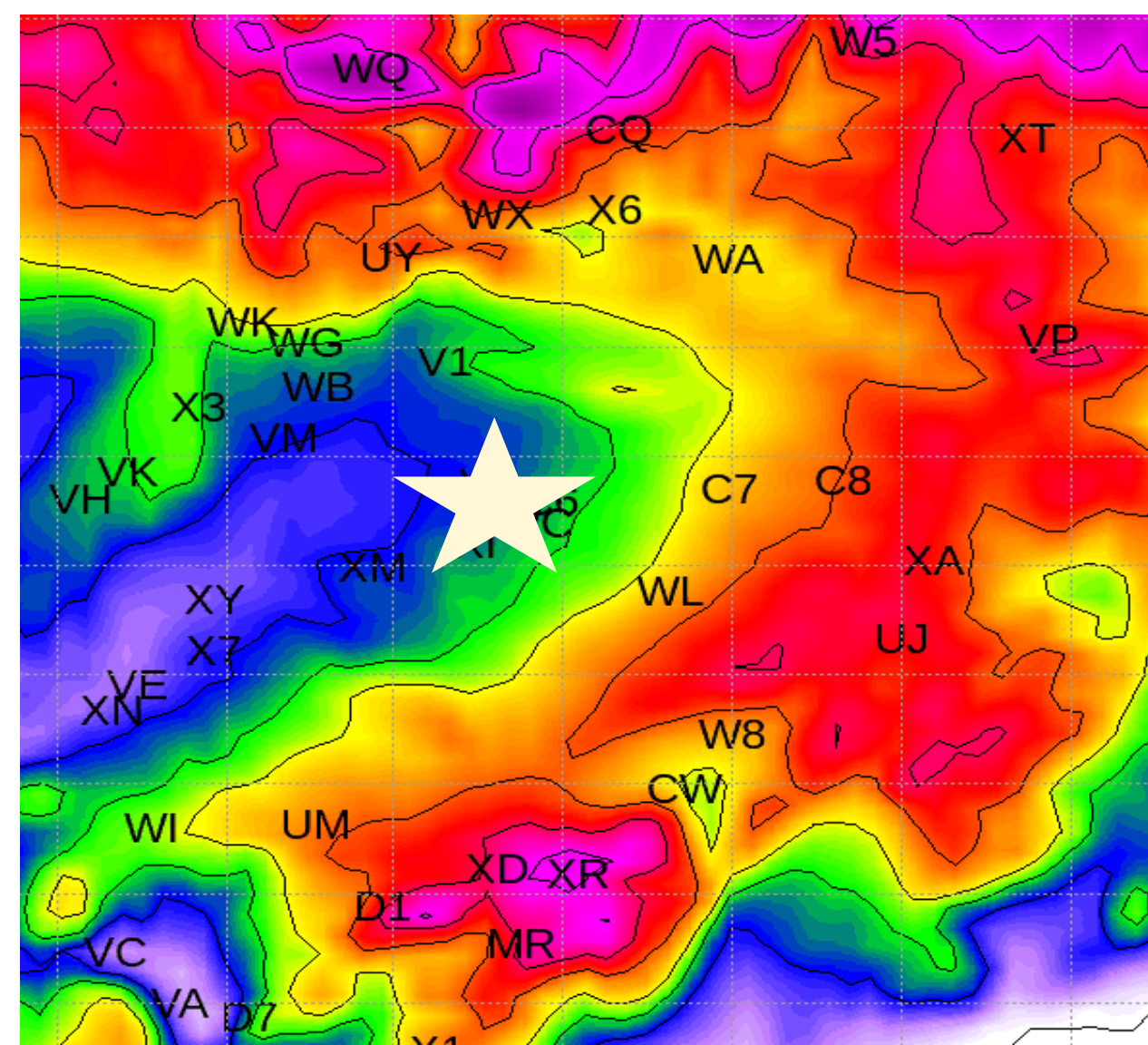
MARINADA, A WELL-KNOWN WIND

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

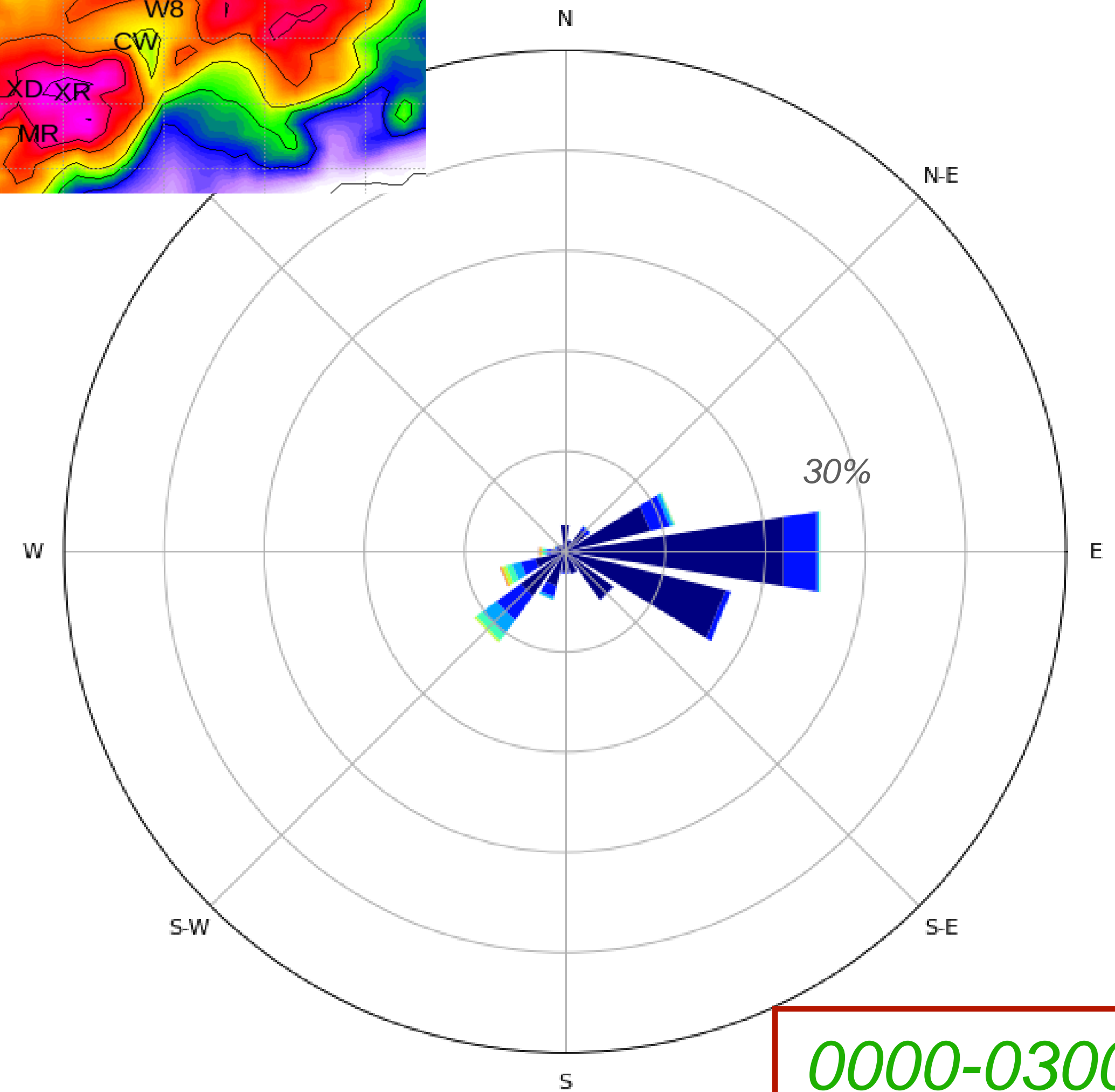
METHODOLOGY

- ✓ 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 *El Poal* (2003-2021)

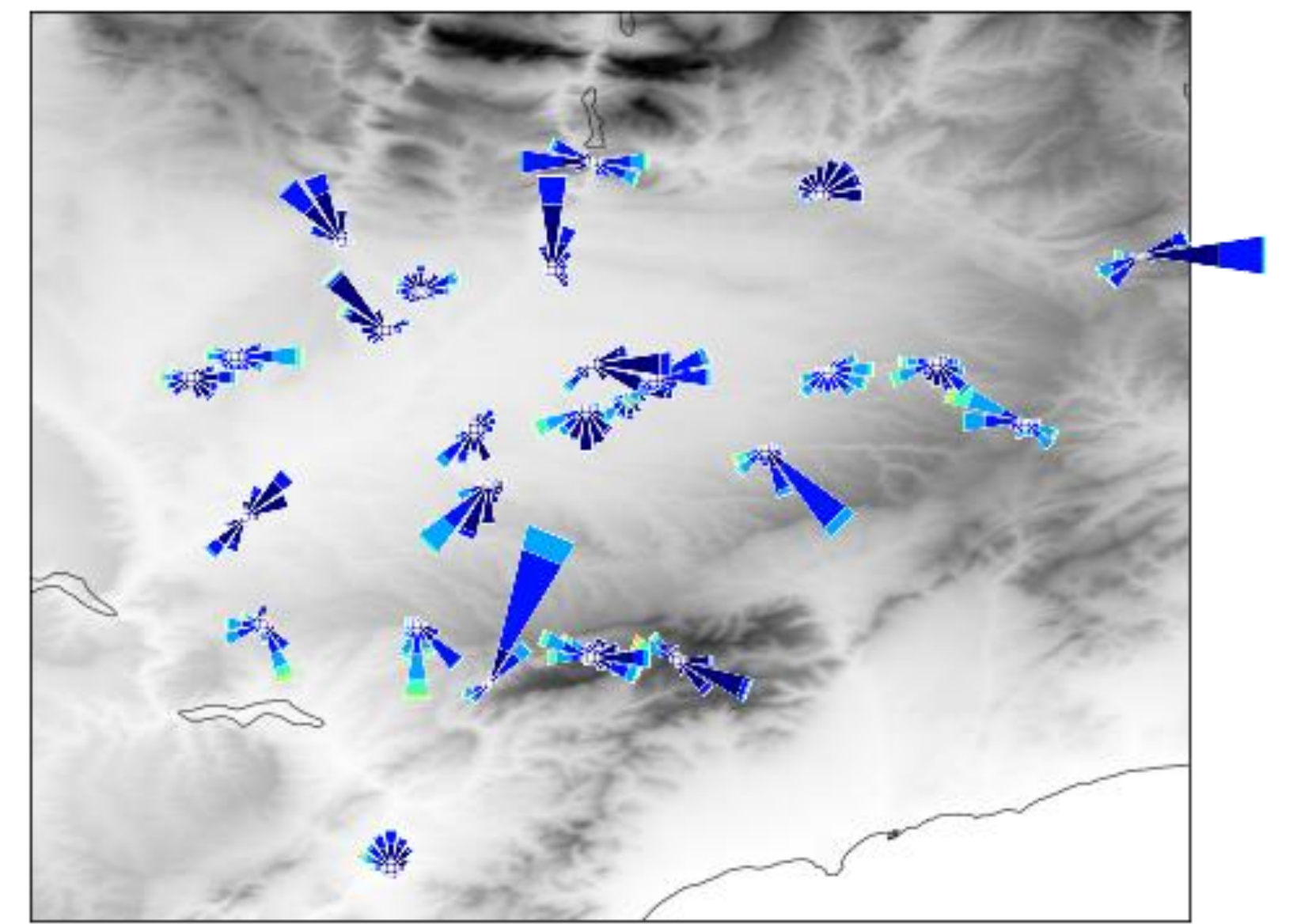
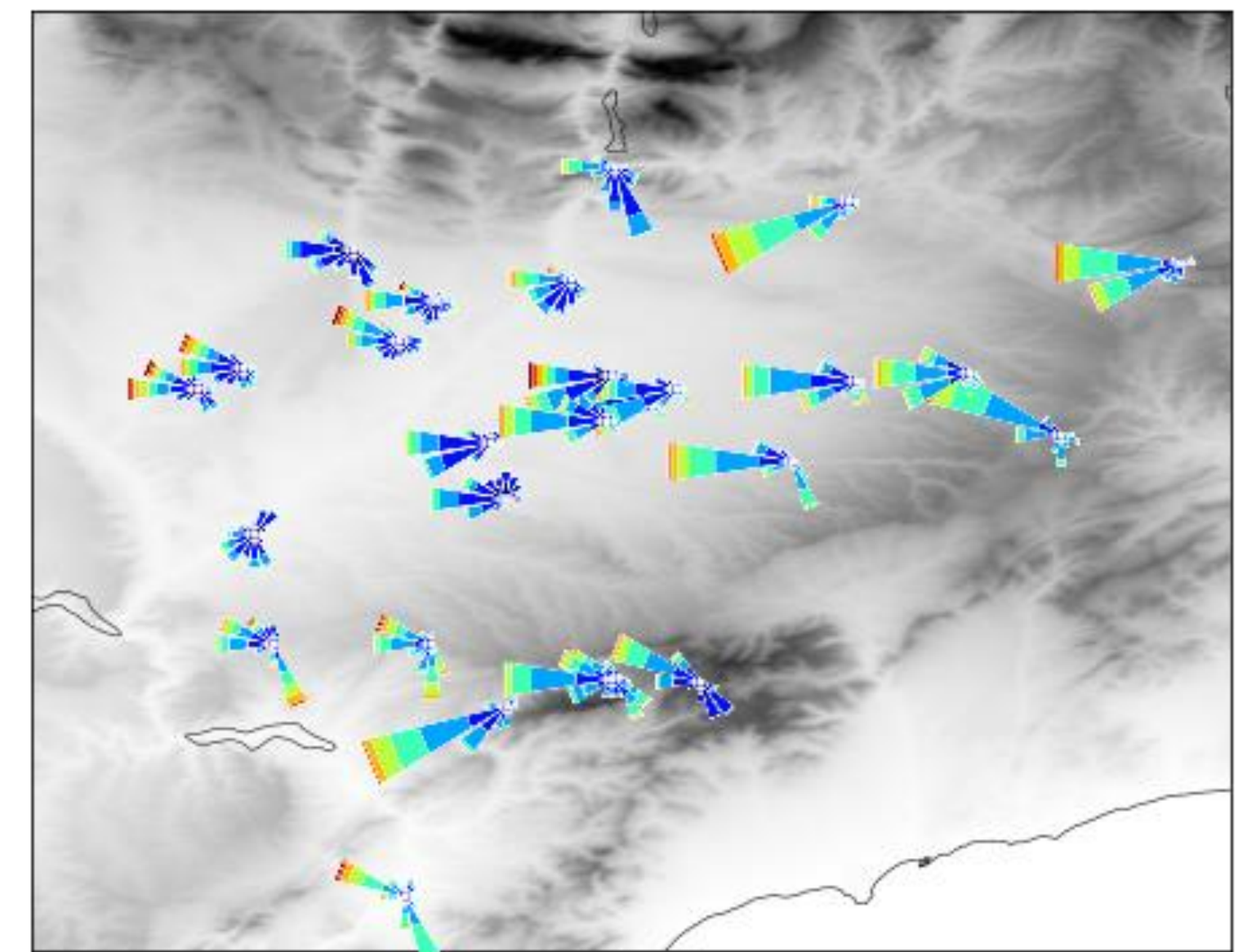
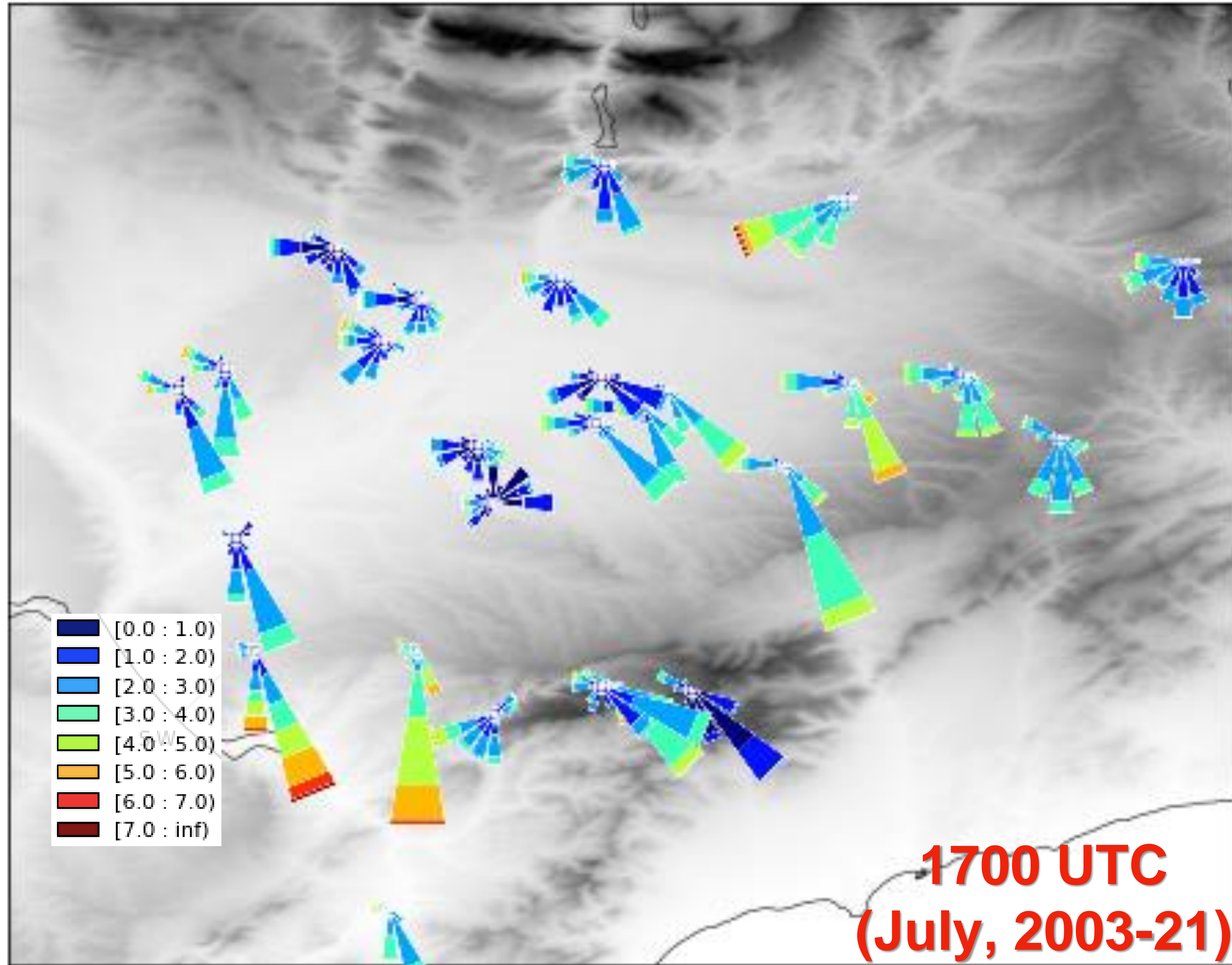


1200-1500 UTC

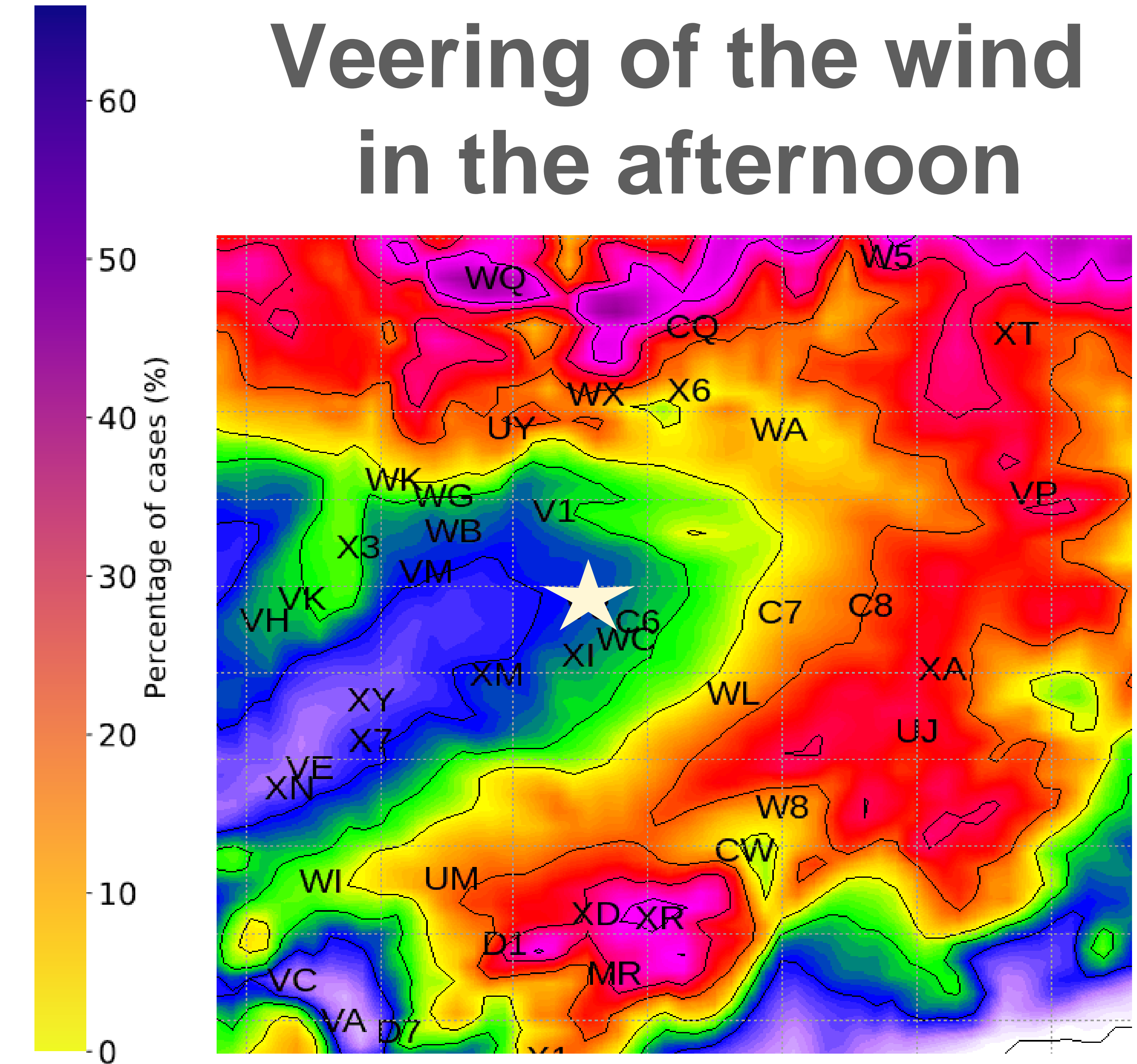
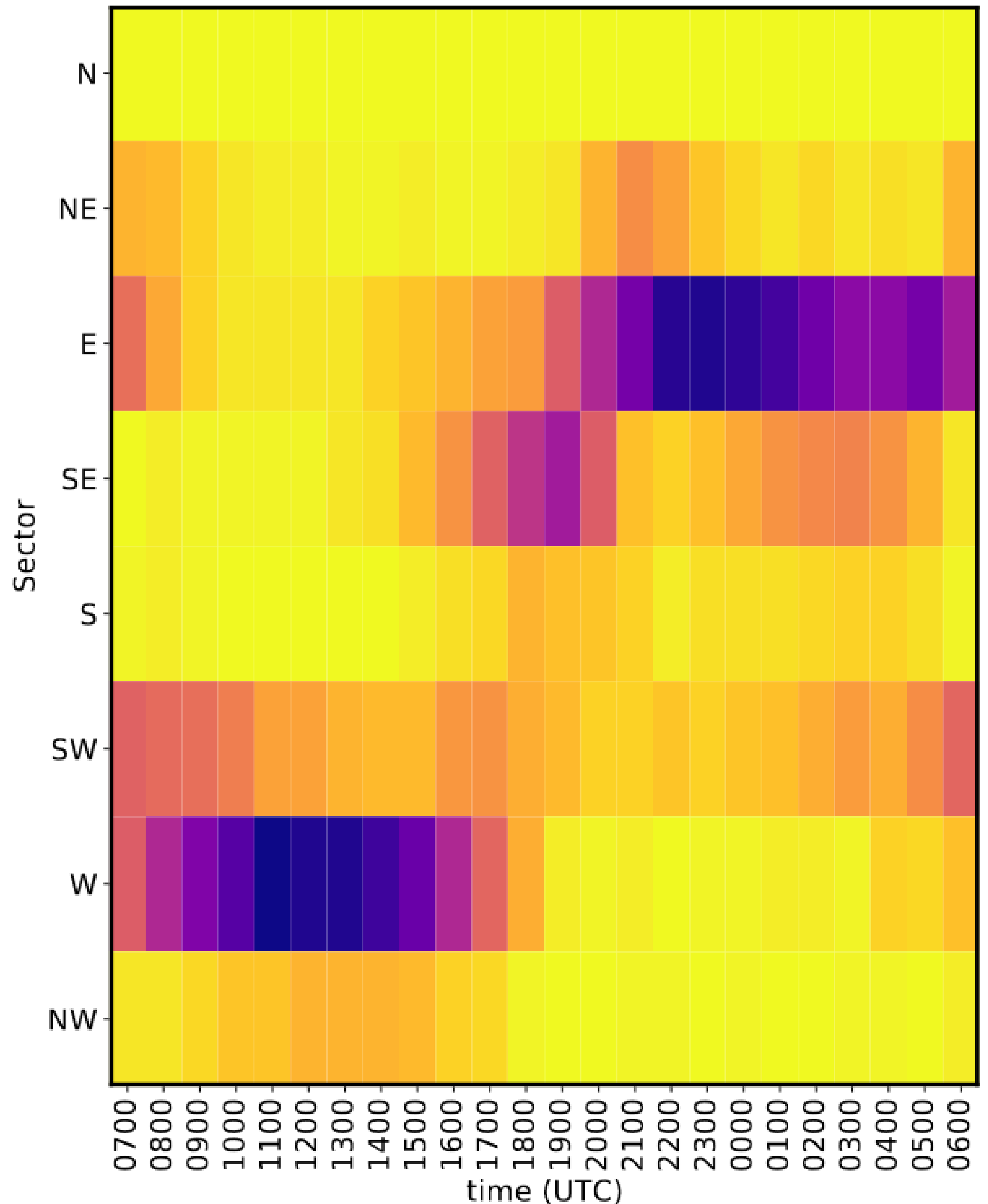


0000-0300 UTC

Statistical analysis (2003-2021)



Veering of the wind in the afternoon



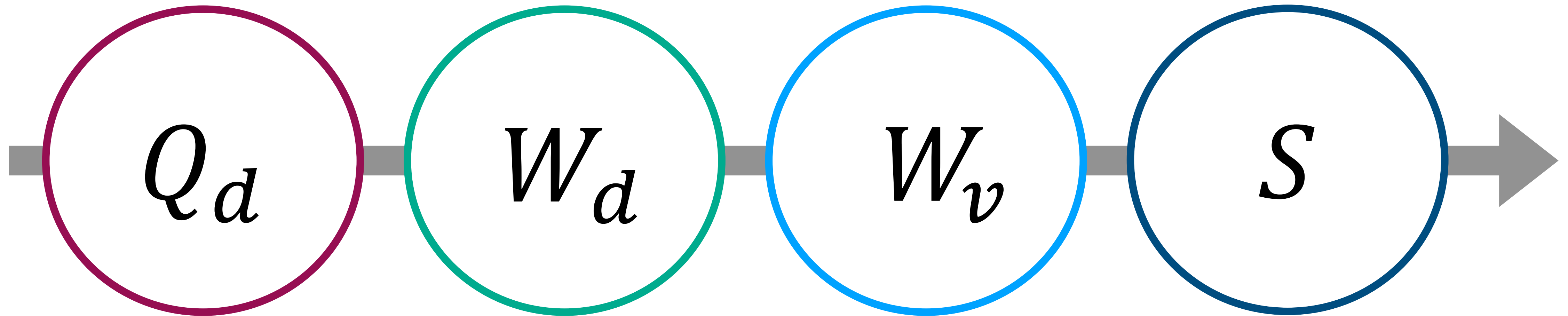
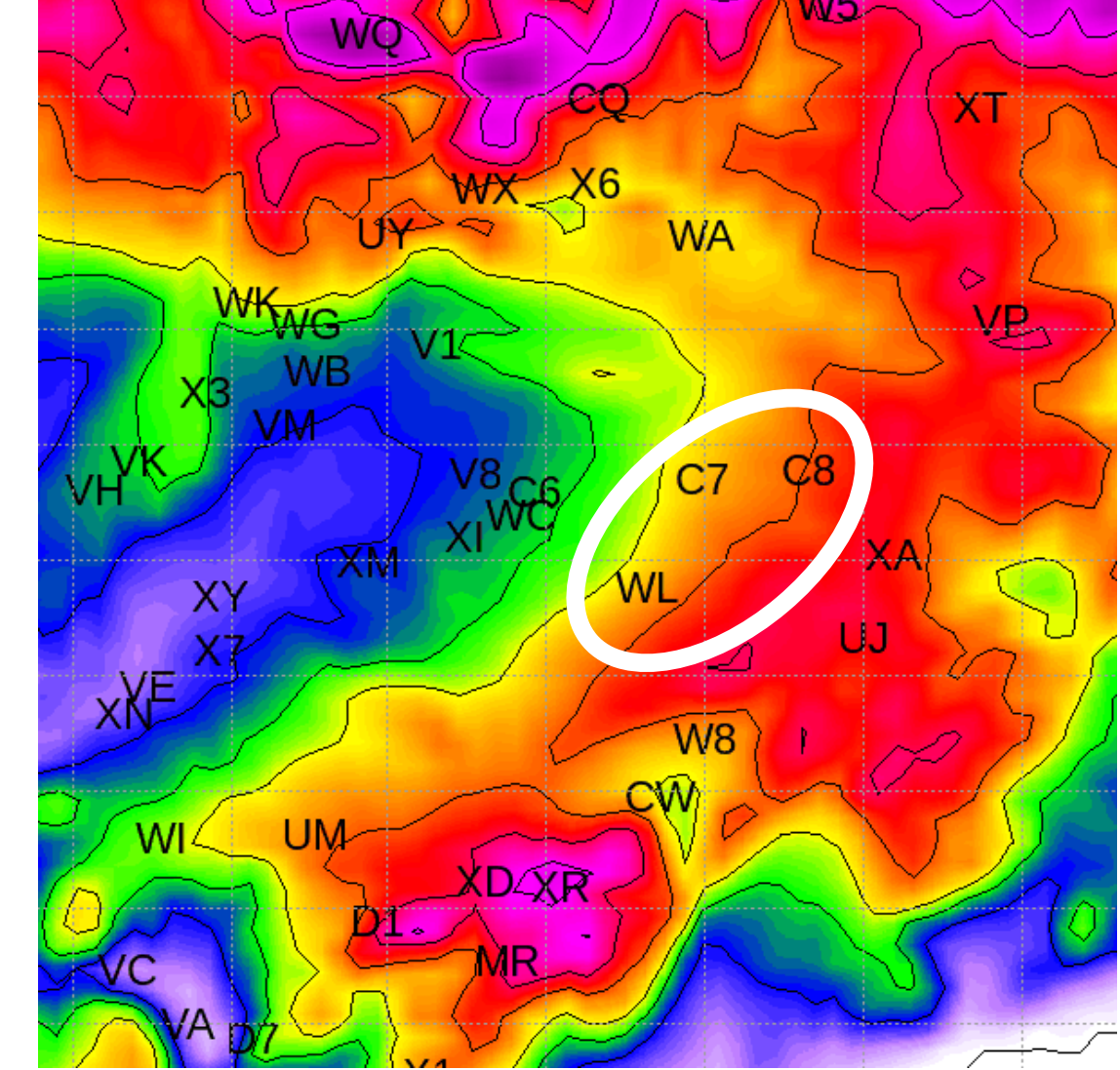
July, 2003-21

SELECTING THE MARINADA EVENTS (2003-21)

WL

C8

C7



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

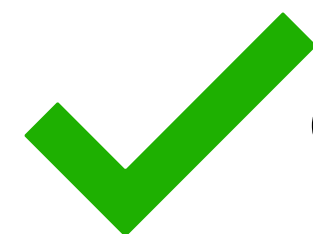
Insolation deficit index
Martinez et al. (2008)



Cloudy days

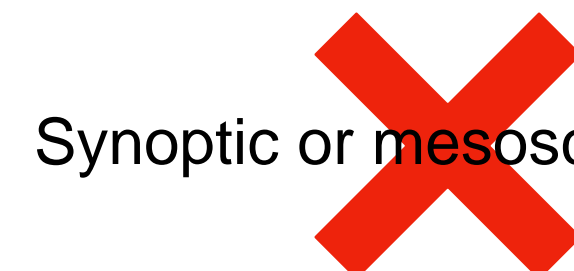
$$70^\circ < W_d < 180^\circ$$

3h



Consistency

W_v after 1200 UTC

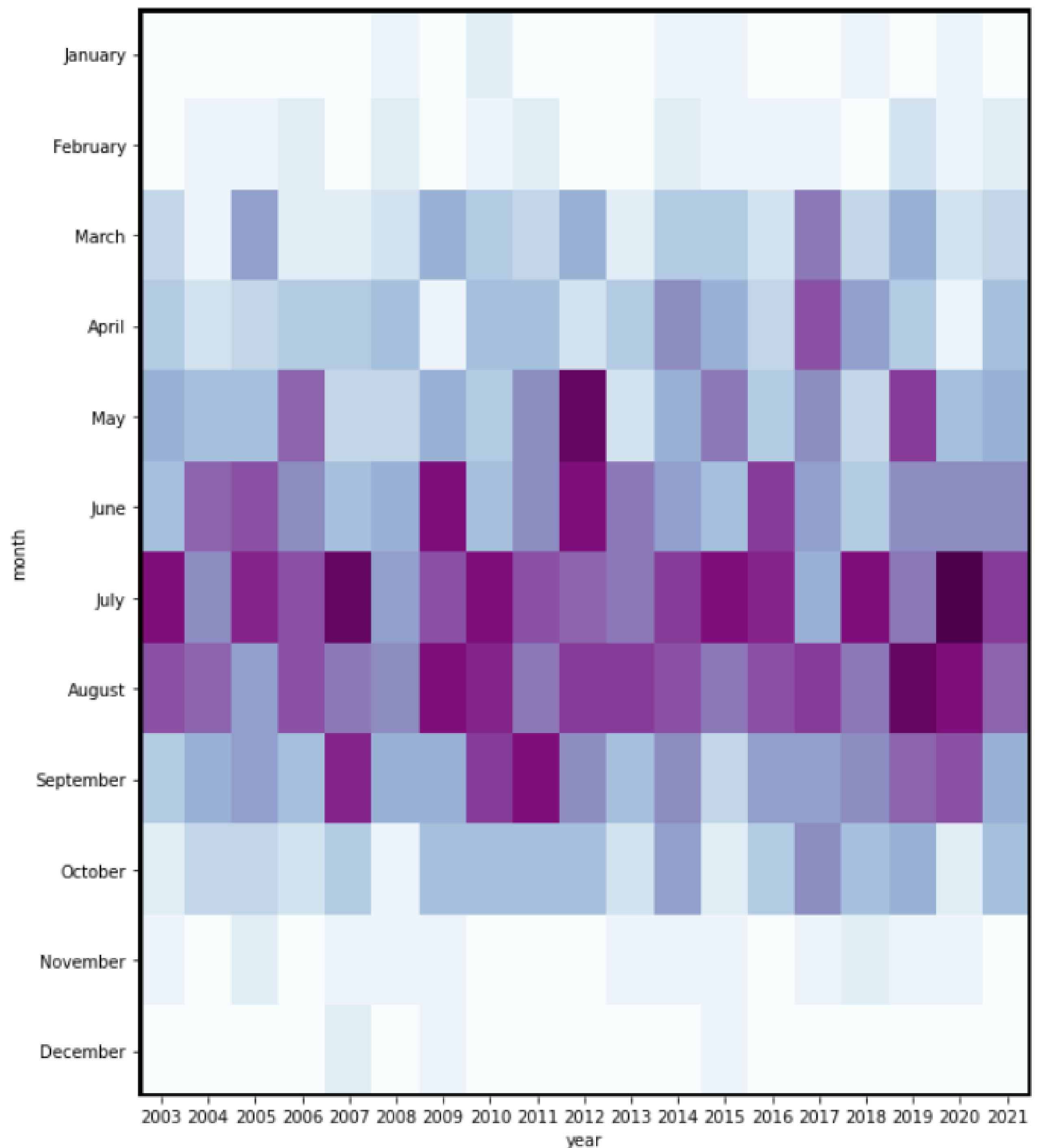


Synoptic or mesoscale effects

Simultaneity
WL, C8, C7



Local effects

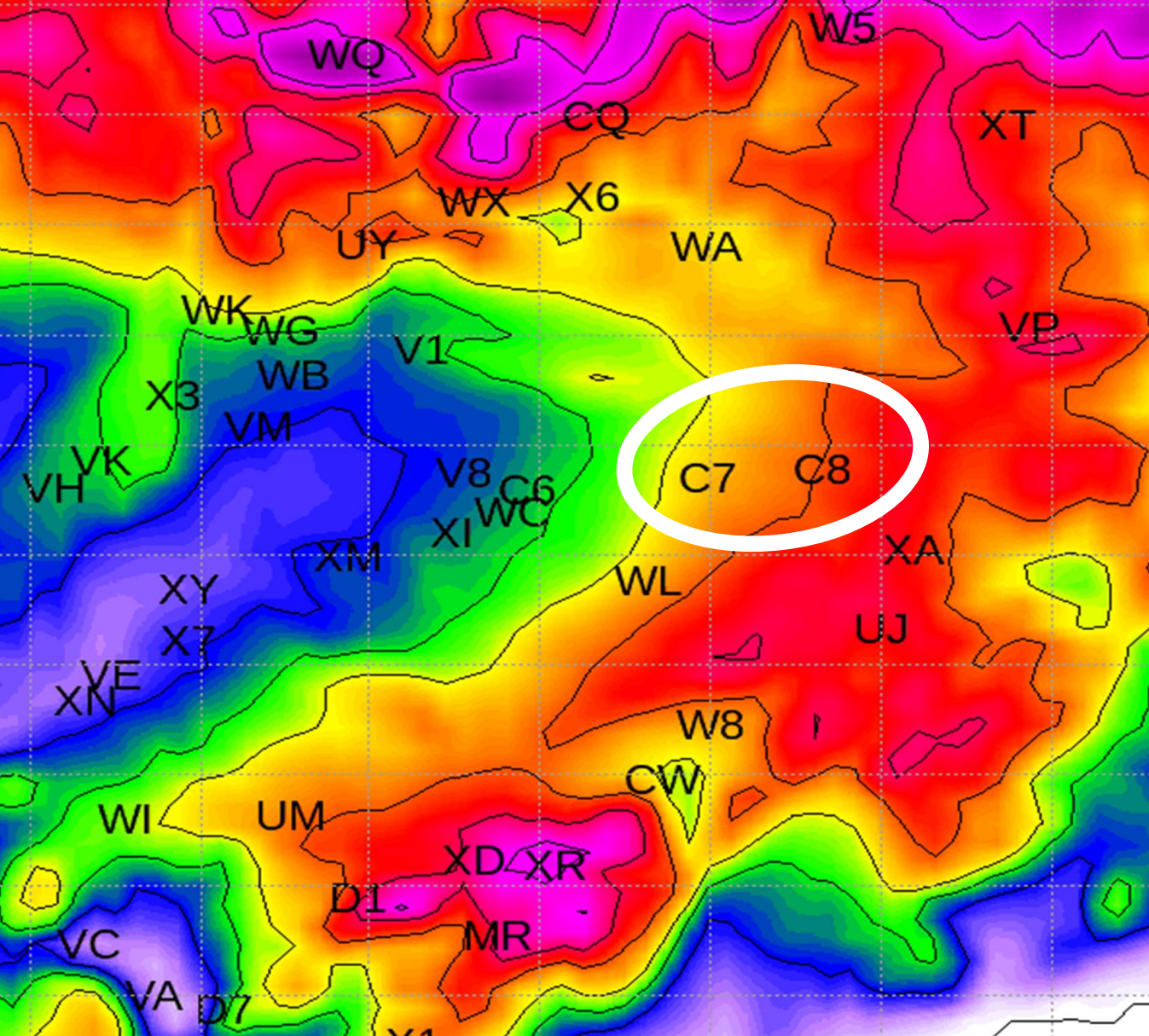


Number of Marinada events selected by the filter

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

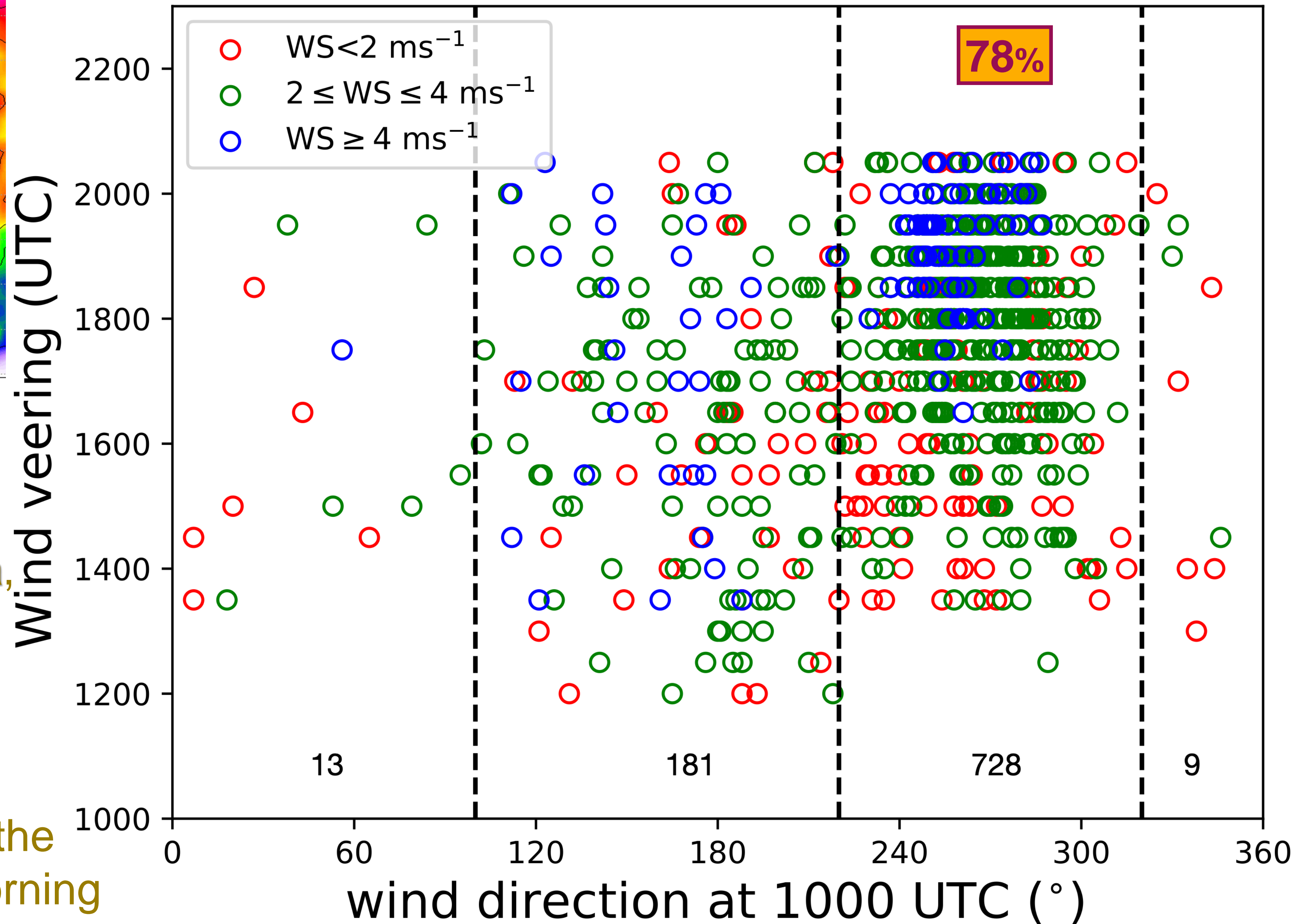
synoptical situation?

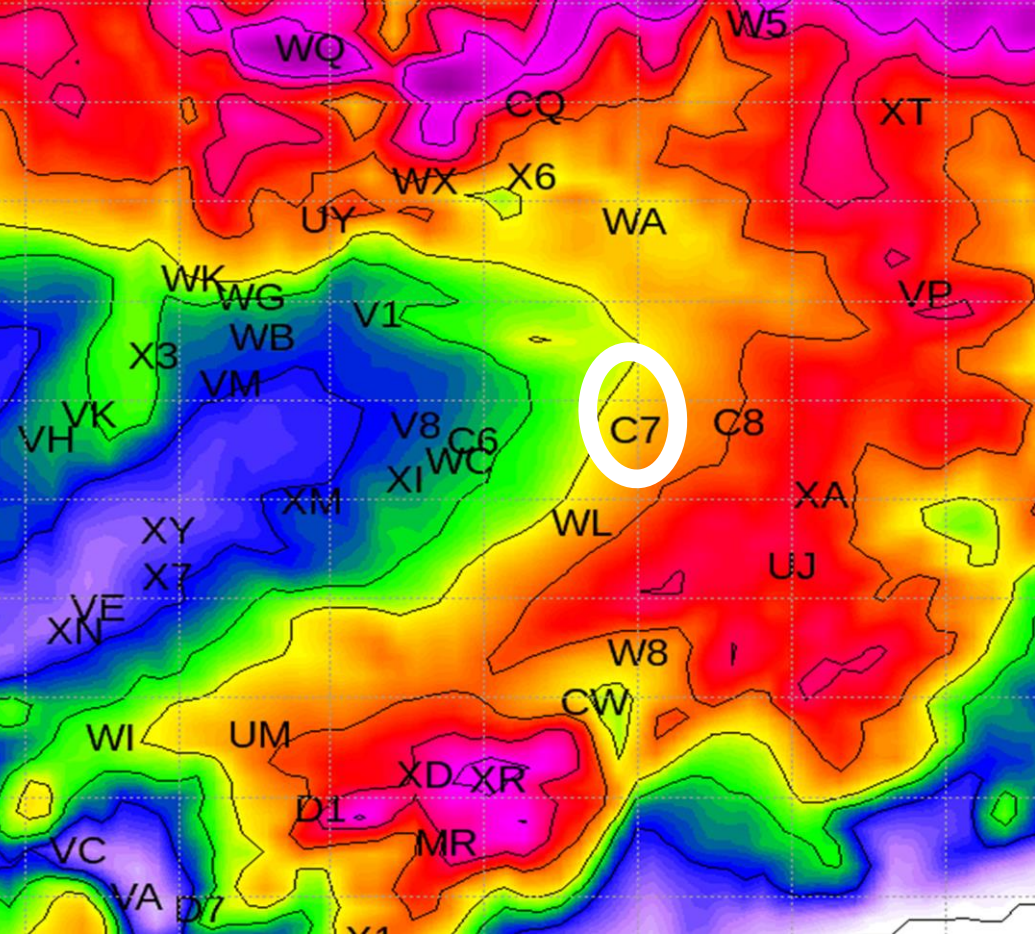
Further analysis of these events →



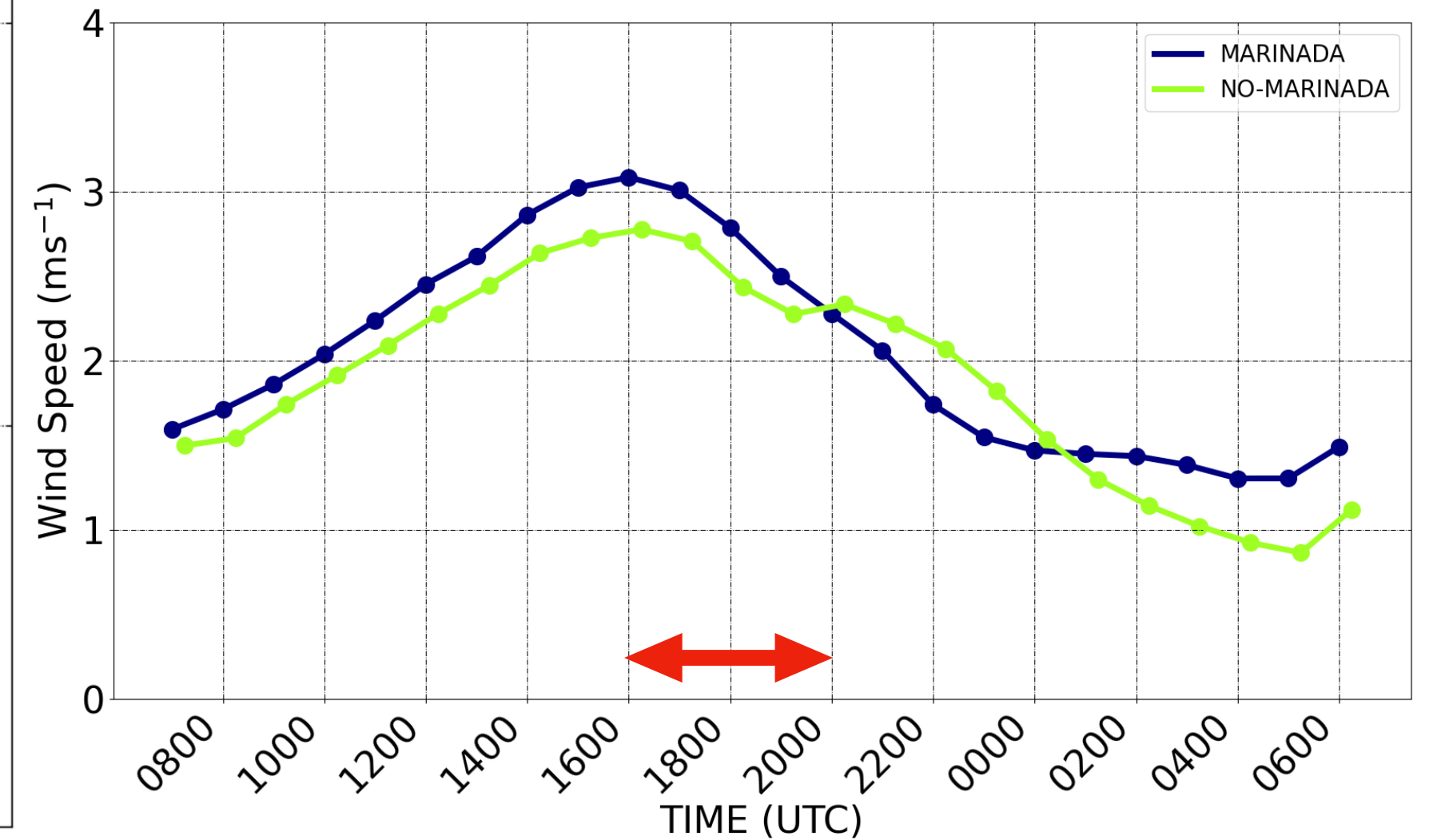
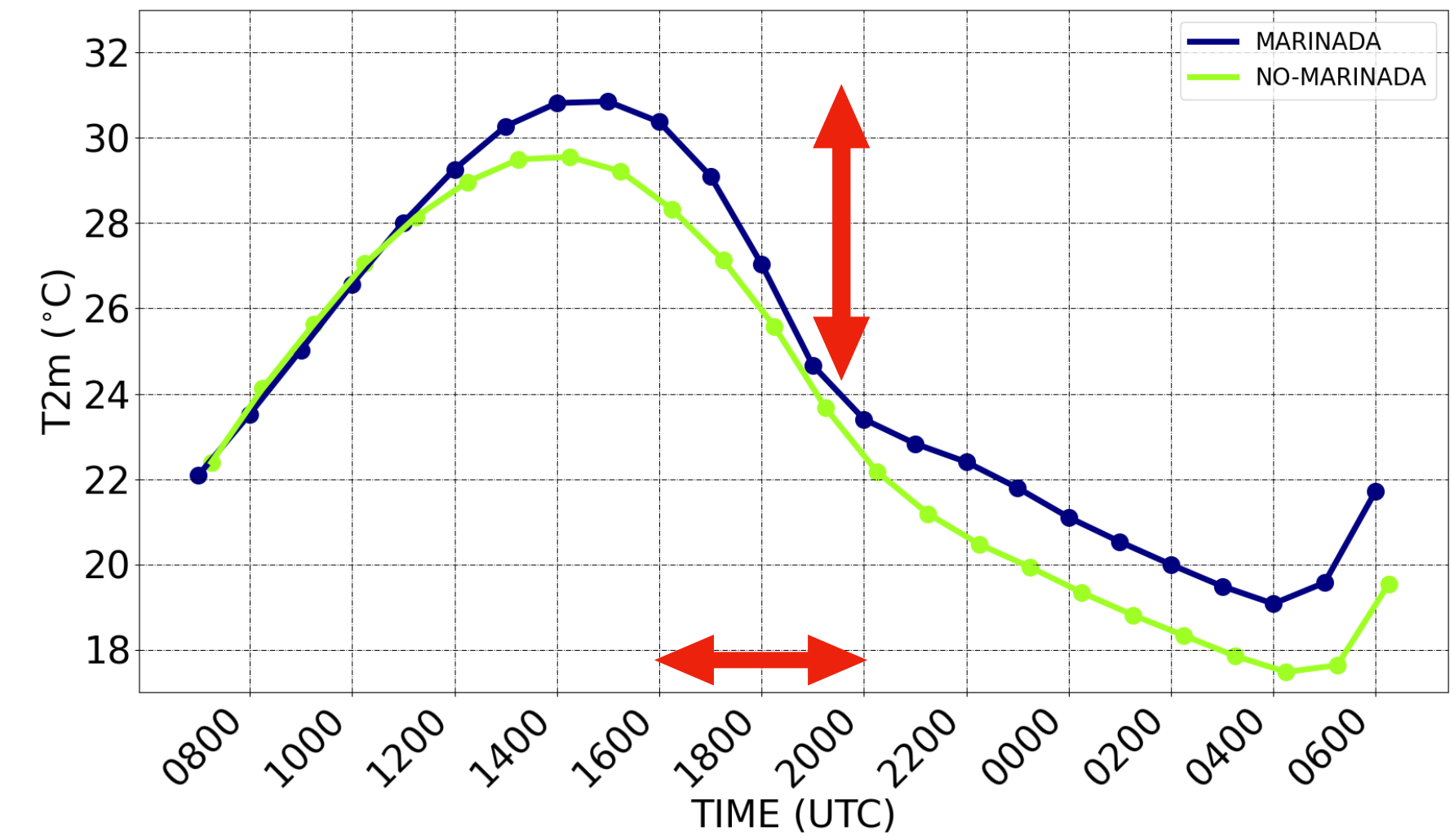
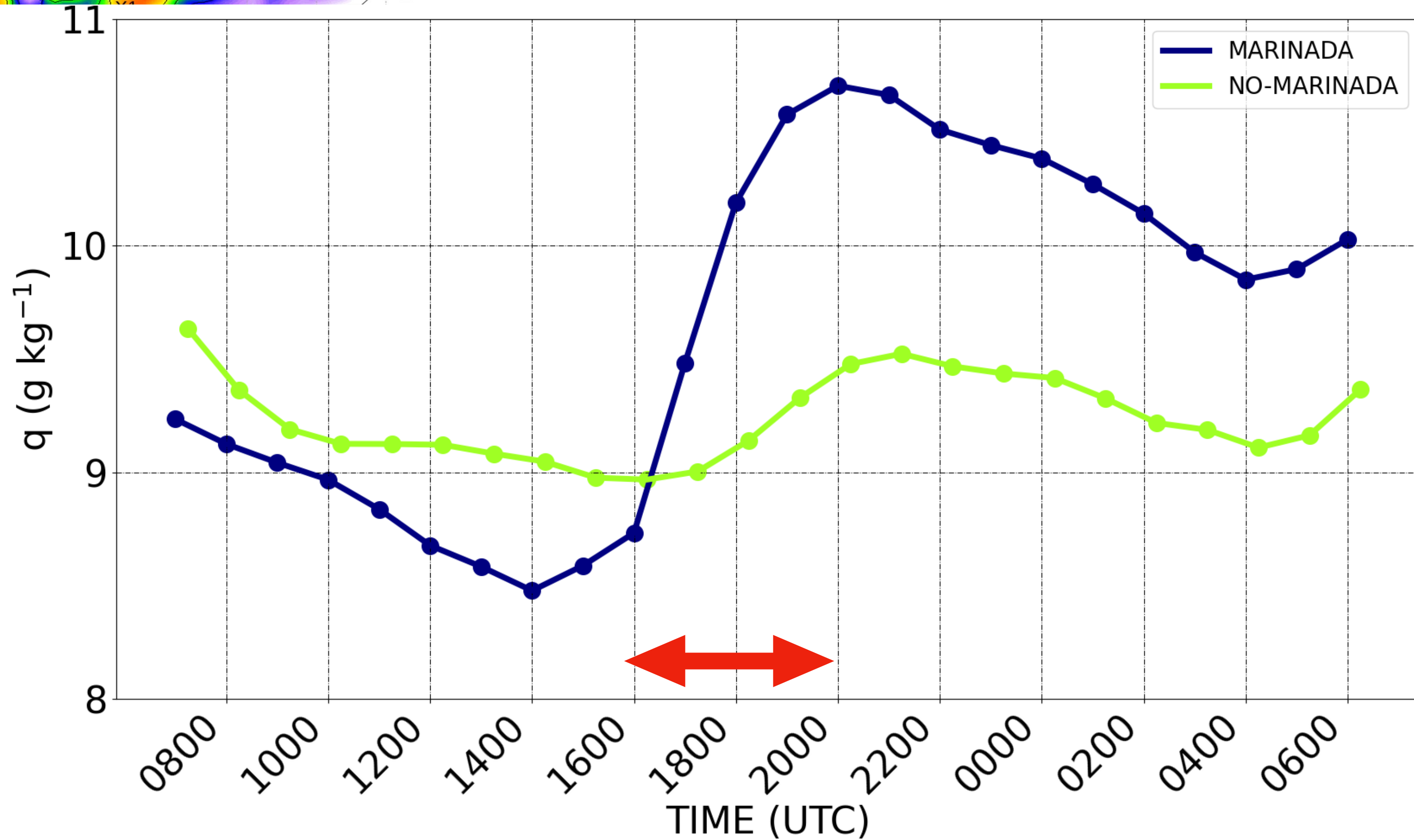
✓ During the **Marinada**, winds are mainly from W (upslope)

✓ The arrival of the **Marinada** depends on the wind intensity in the morning





Cold and humid advection (maritime origin)



Averages July, 2003-21

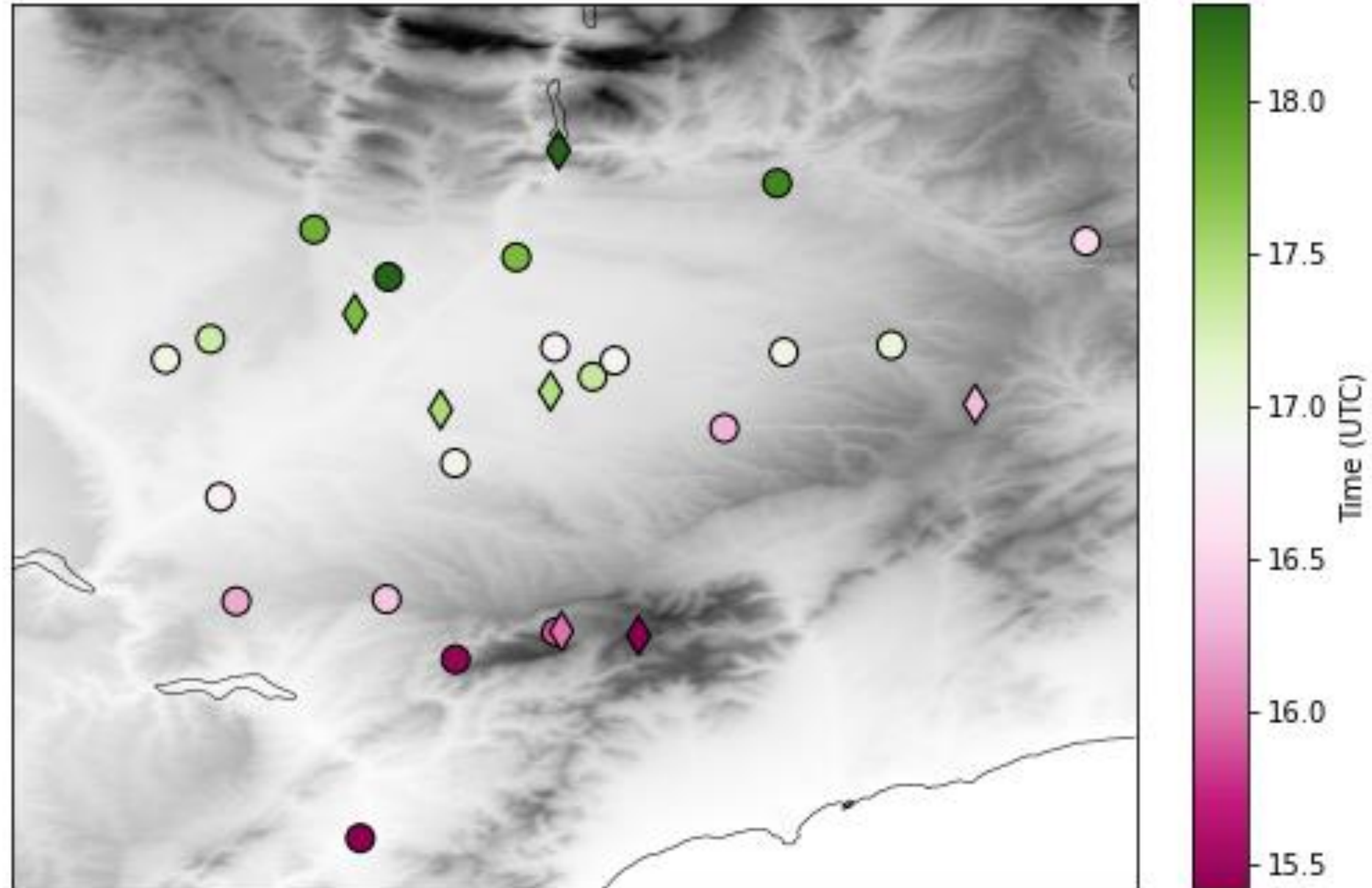
The specific humidity change as a indicator of the **Marinada** arrival

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

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

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

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



Marinada events during the LIAISE experimental field campaign

Ma: selected by the filter

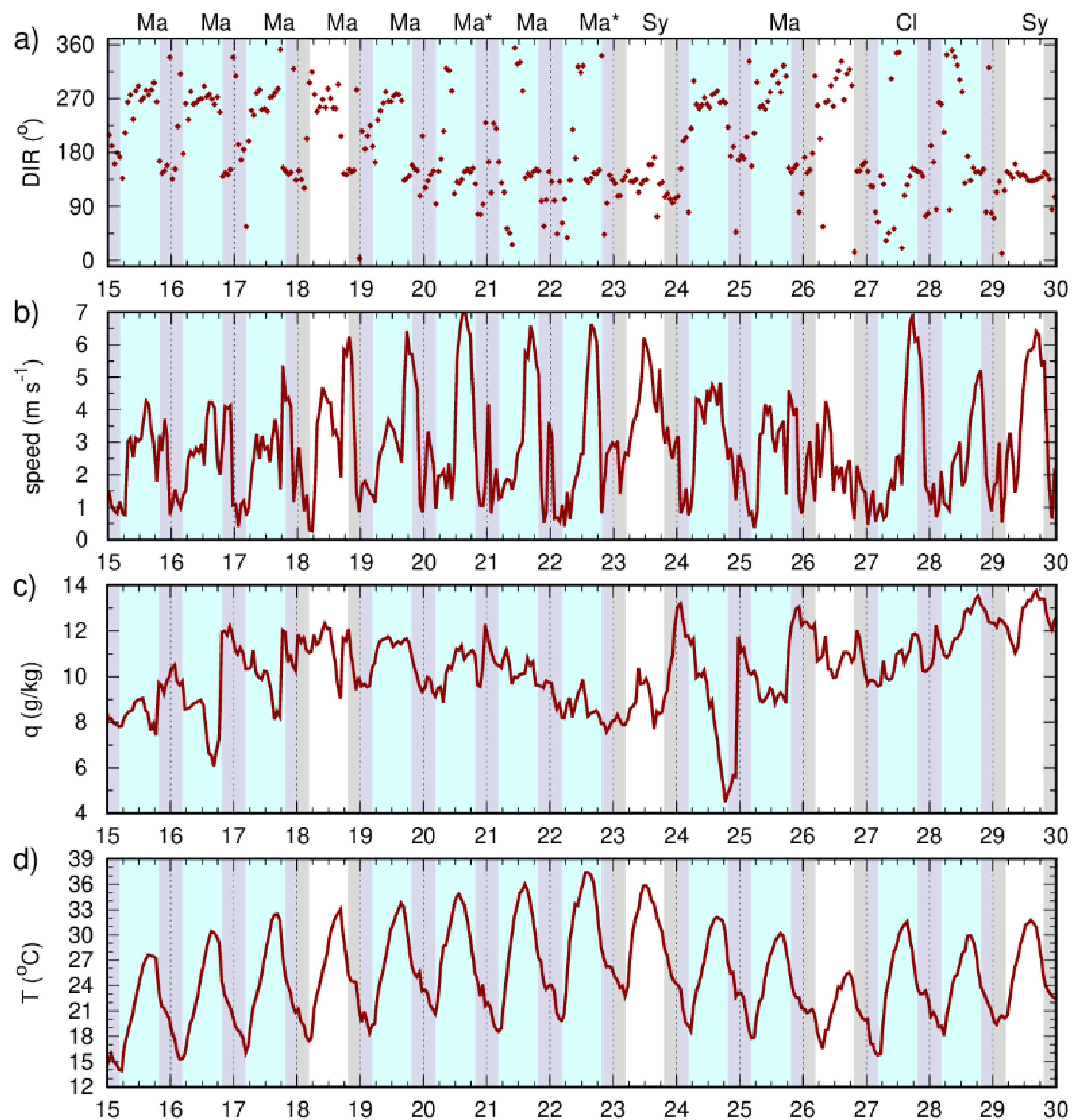
Ma*: veering earlier than 12 UTC

✓ thermal low, high T

✓ reported in JJA

✓ 5-15 days per year

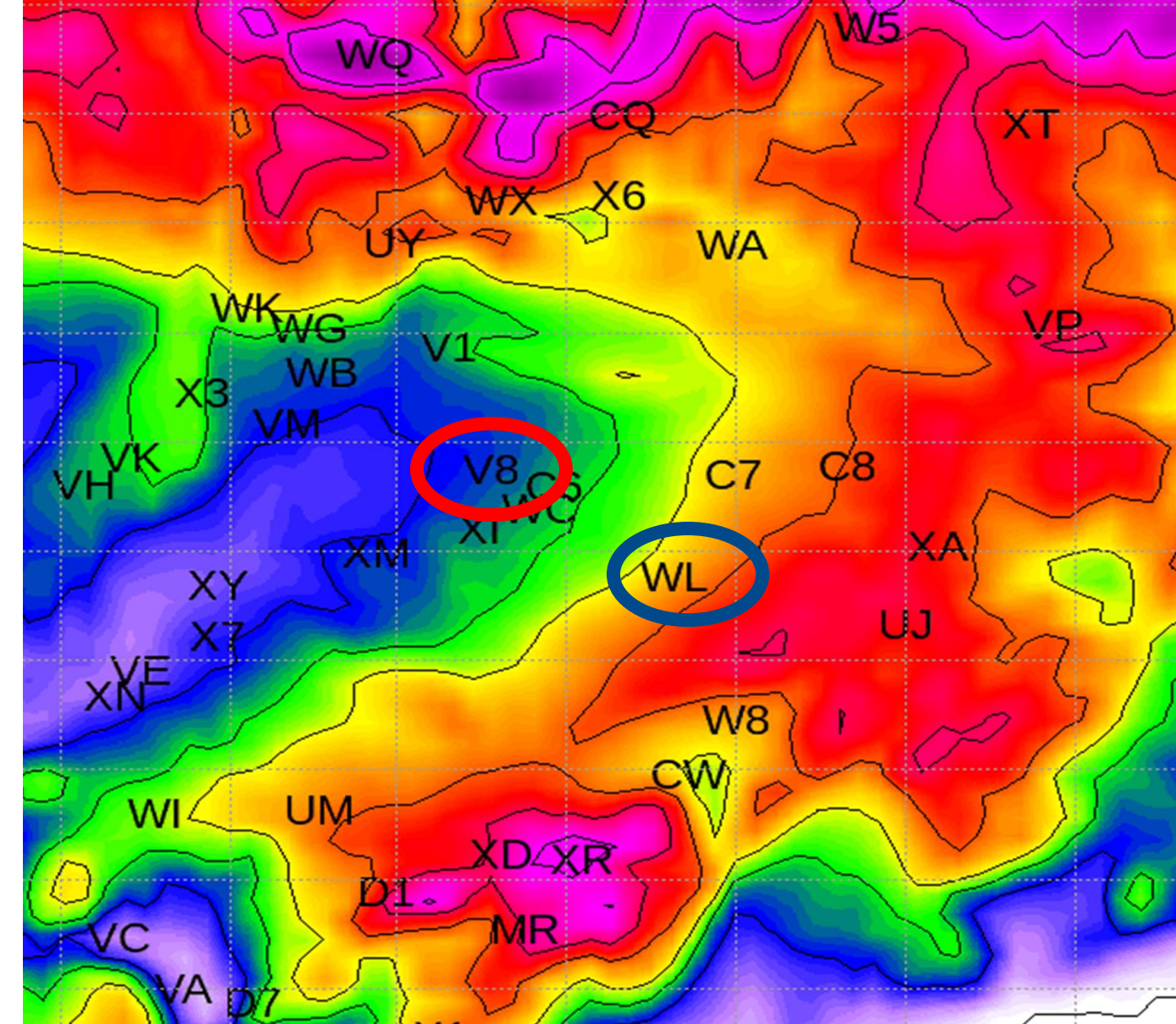
Sy: synoptically forced
(no veering)



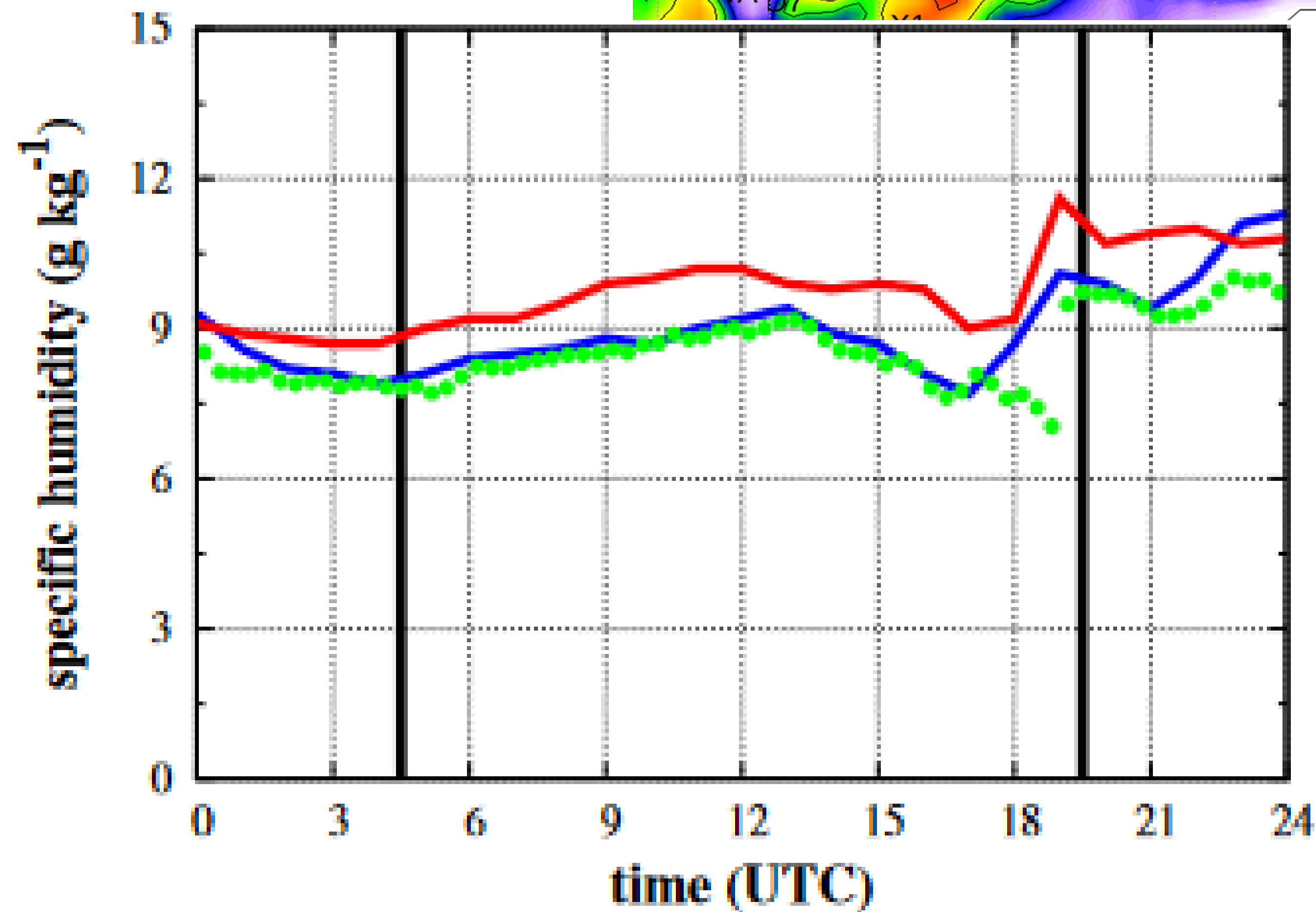
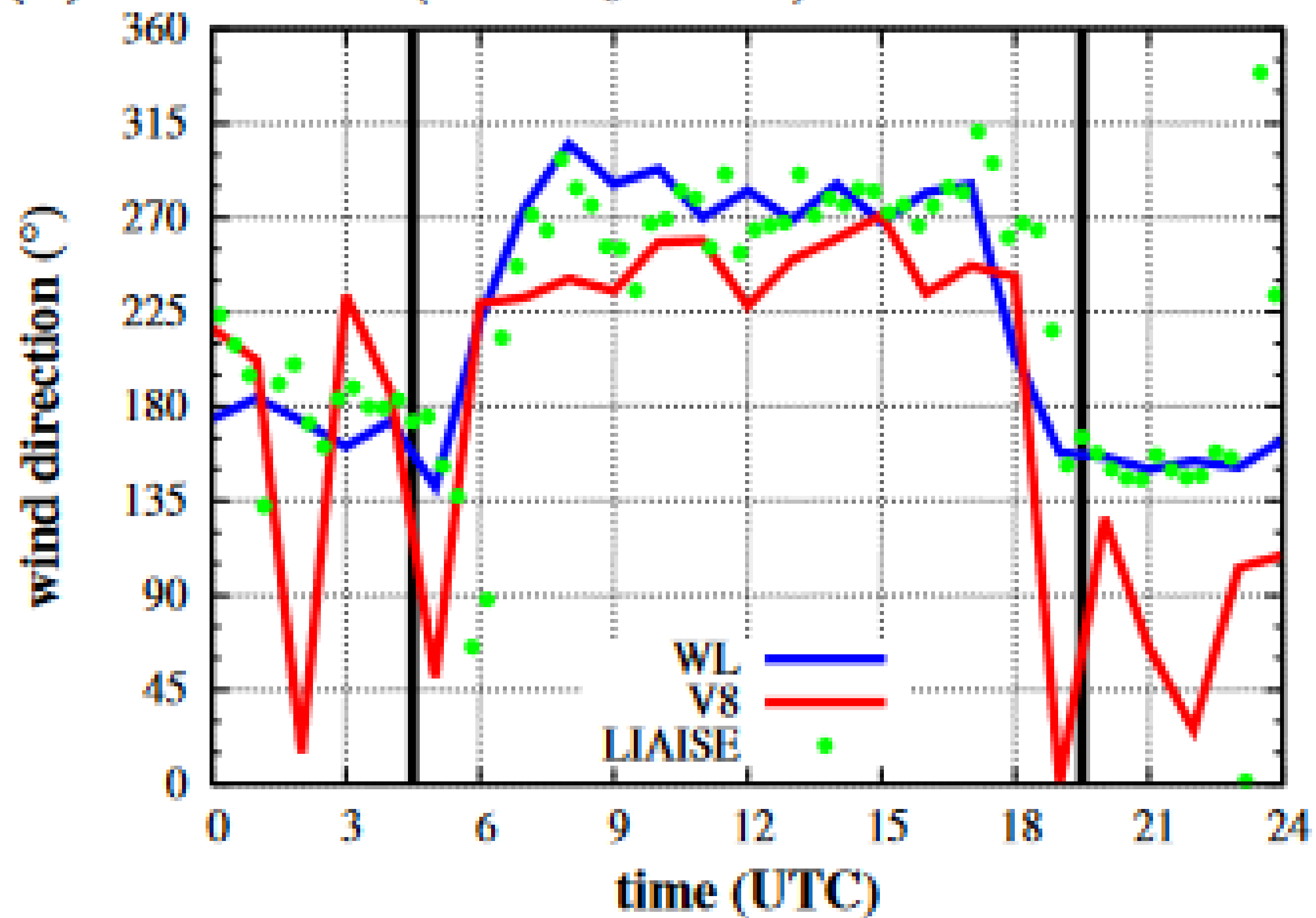
Marinada arrival

17 UTC

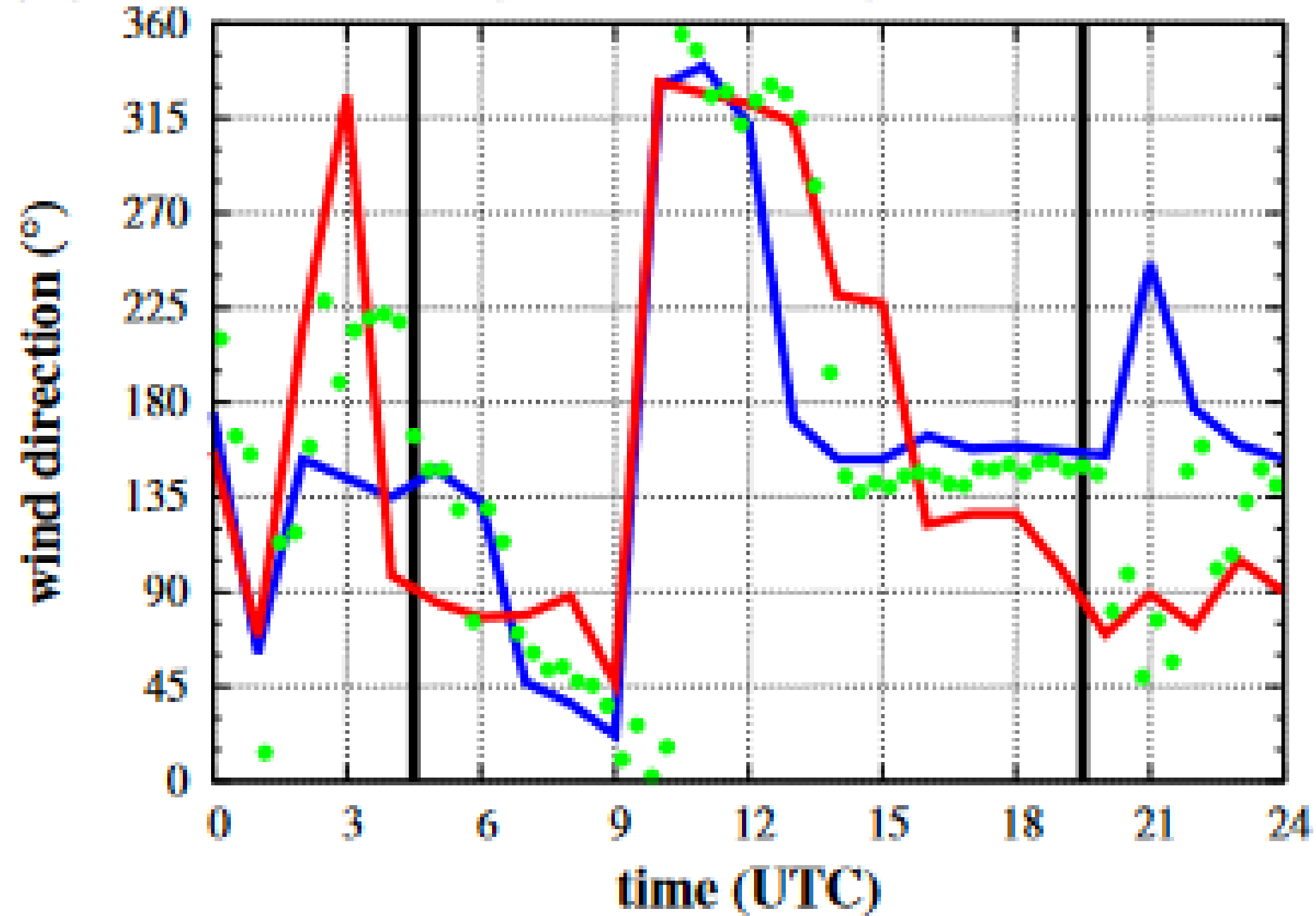
18 UTC, 18 UTC



(a) westerlies (15 July 2021)



(b) thermal low (21 July 2021)



Marinada

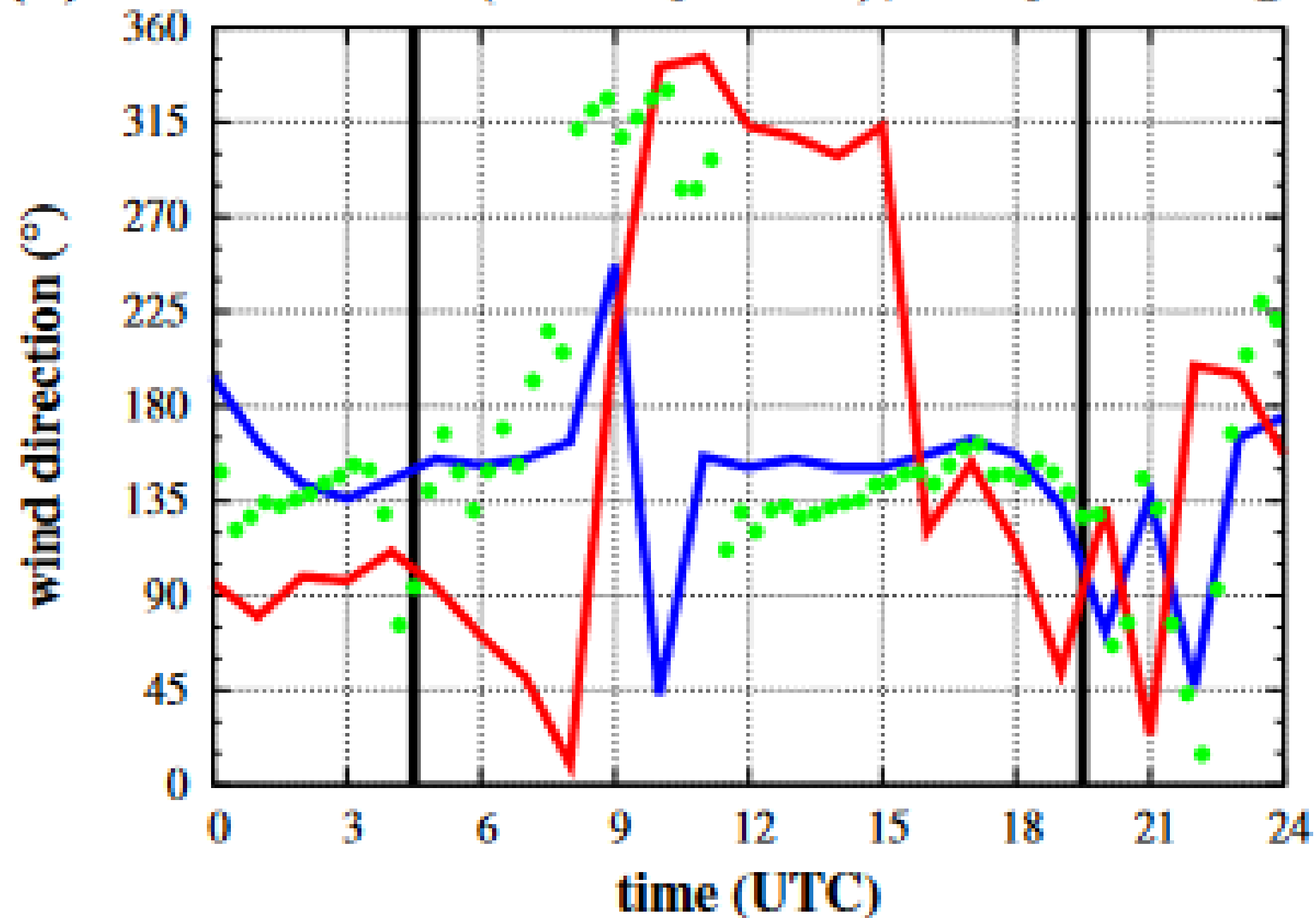
arrival

13 UTC

14 UTC

16 UTC

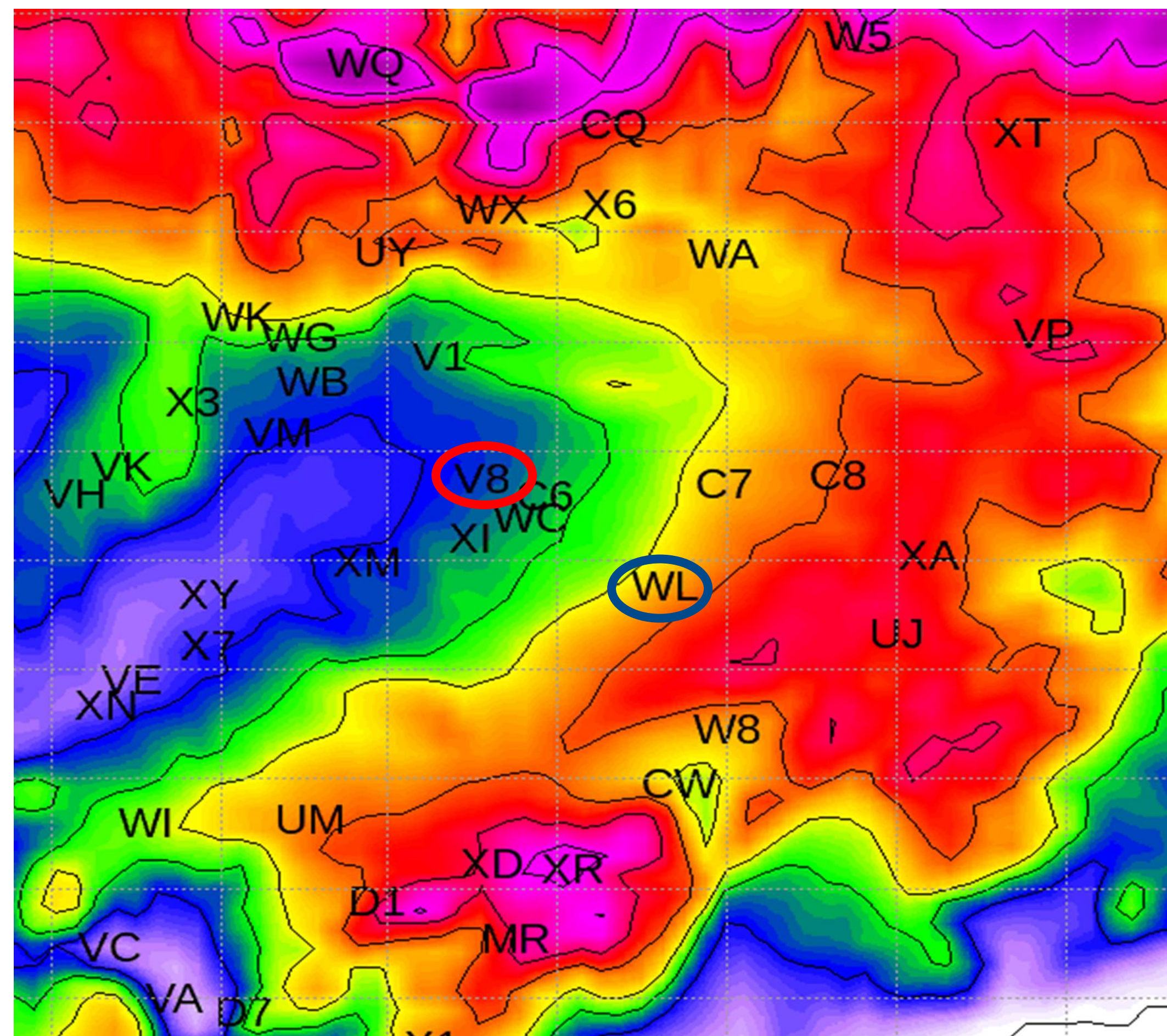
(c) thermal low (20 July 2021), early veering



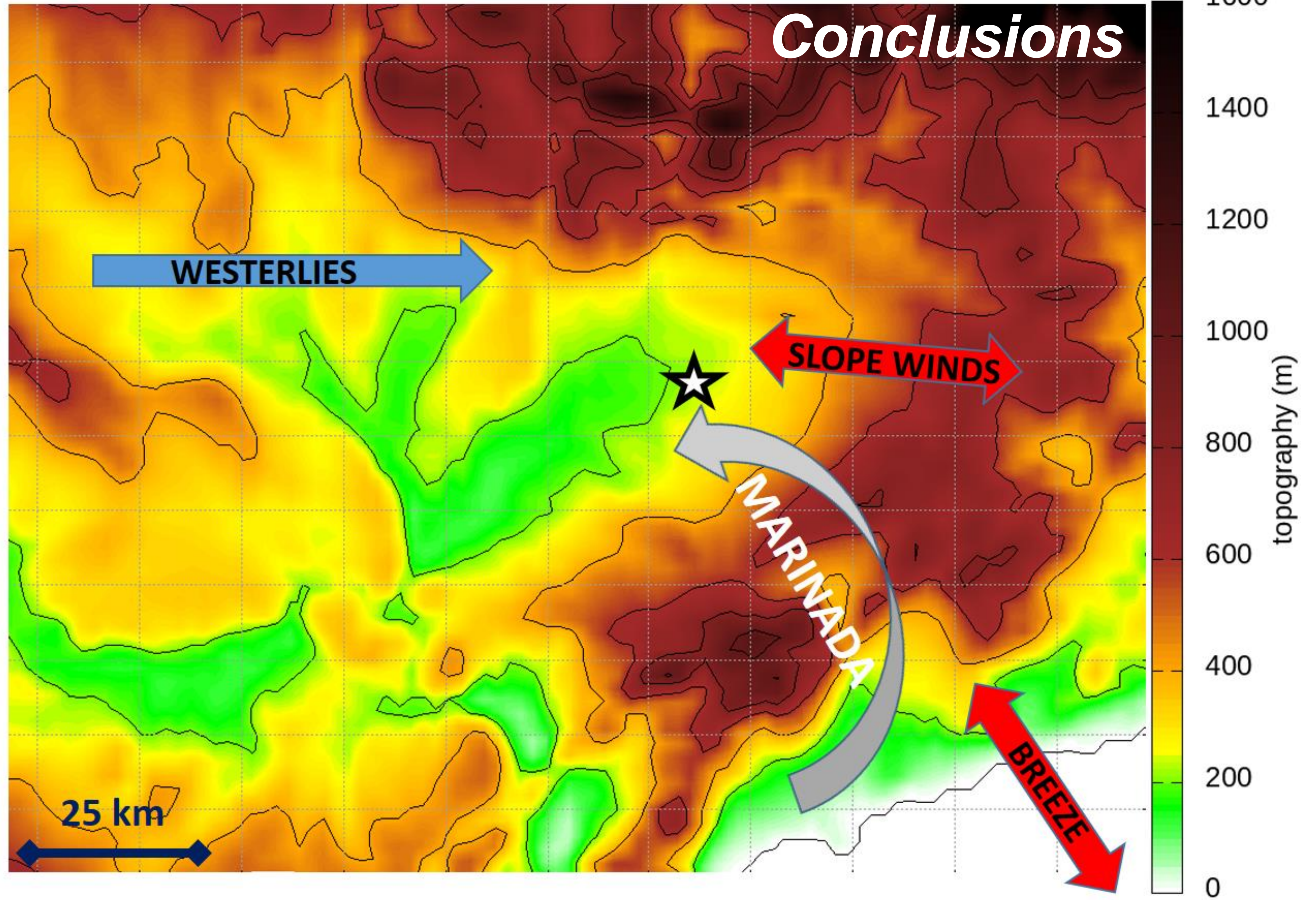
11 UTC

11 UTC

16 UTC



Conclusions



Acknowledgements

Servei Meteorològic de Catalunya (SMC)

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