

# **Pedrogão Grande, June 2017**

## **An Extreme Fire Event**

**Rita M. Cardoso**  
**(rmcardoso@fc.ul.pt)**

**Pedro M.M. Soares, Miguel Lima, Luana Santos, Ricardo M Trigo**



June 17, 2017

Severe drought in 72% of the country

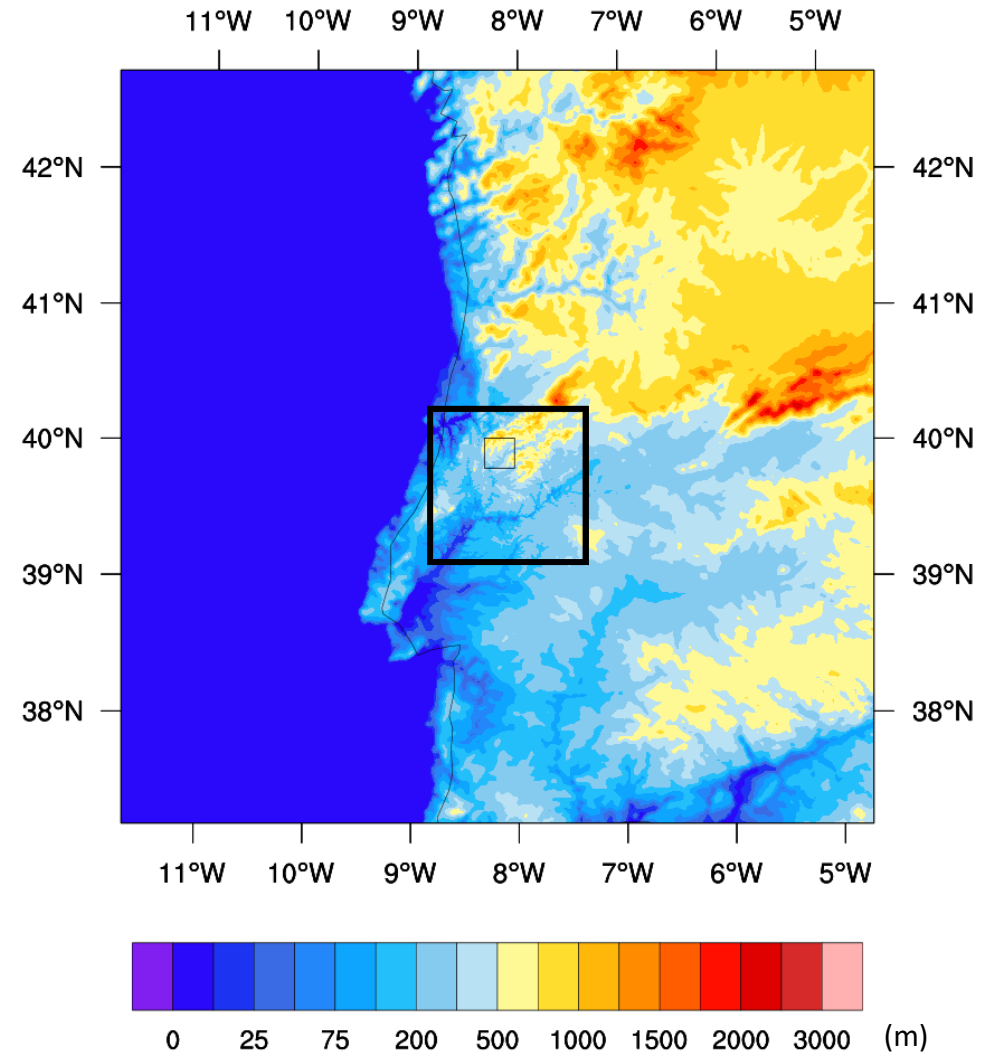
Heatwave since the 7<sup>th</sup>

13:38 UTC, first ignition 500m from Escalos Fundeiros

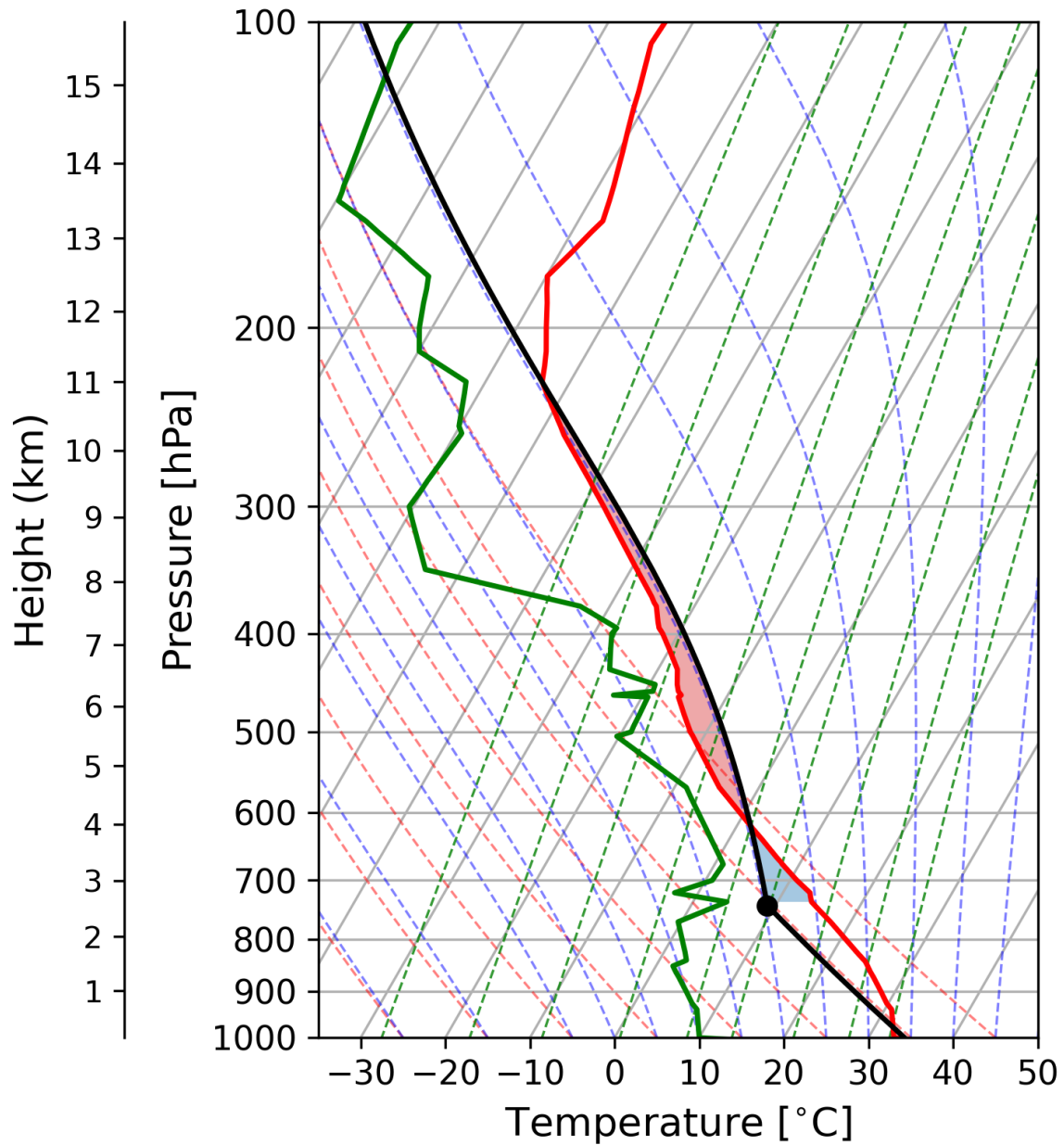
15:15 UTC, second ignition near Regadas Cimeiras

# Simulations

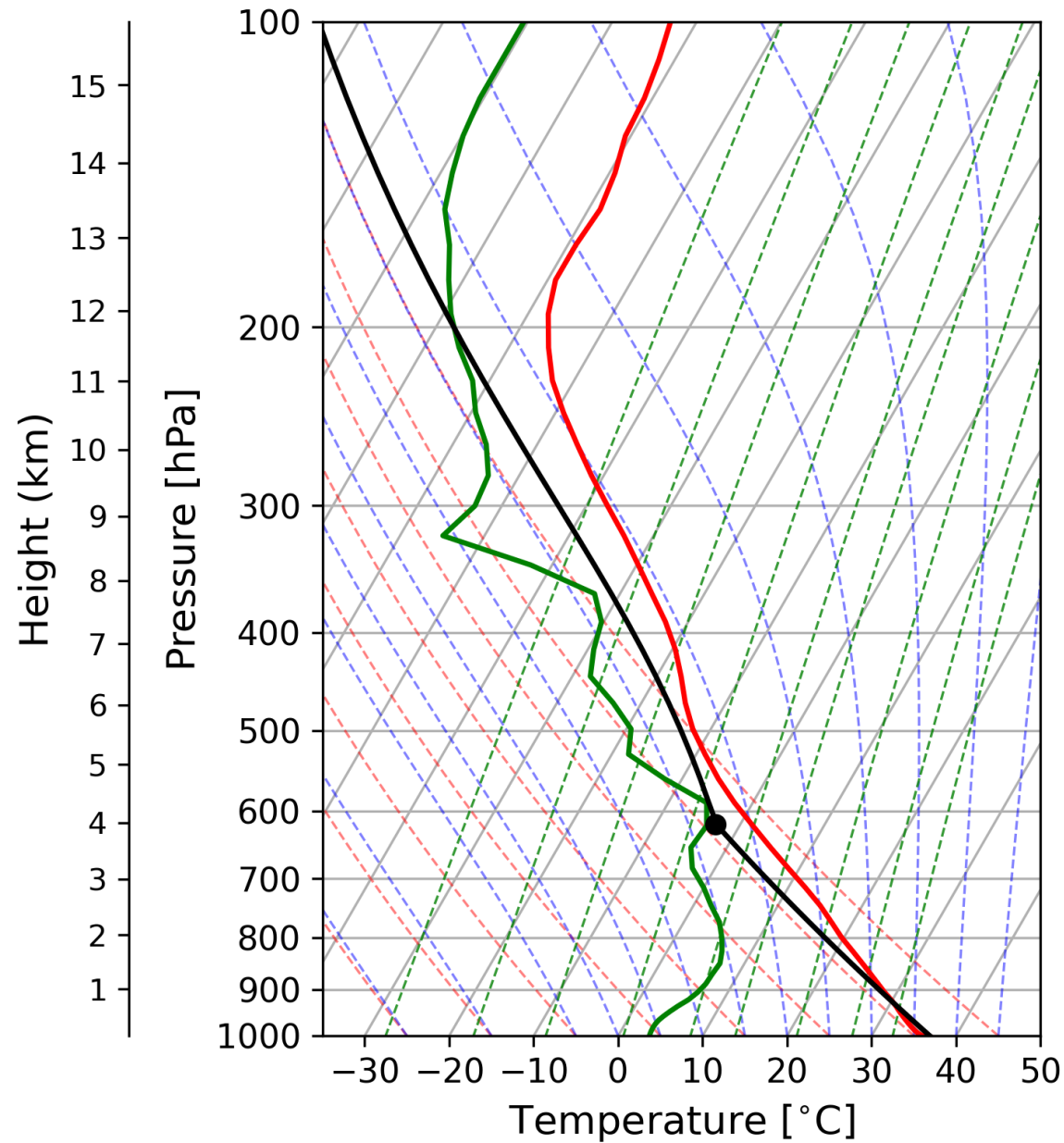
- WRF 4.4.2 model
- ERA5 analysis as boundary conditions
- 3 Nested Domains (2 km, 400 m, 80 m)
- Fire Model in 3<sup>rd</sup> domain (8 m resolution)
- 68 vertical levels
- Start of simulation 25 hours before ignition (12:00 UTC 16<sup>th</sup> of June 2017)
- 3 boundary layer schemes (shown: YSU or Yonsei University PBL)
- 3 microphysics schemes (shown: Eta or Ferrier scheme)



### Obs Lx

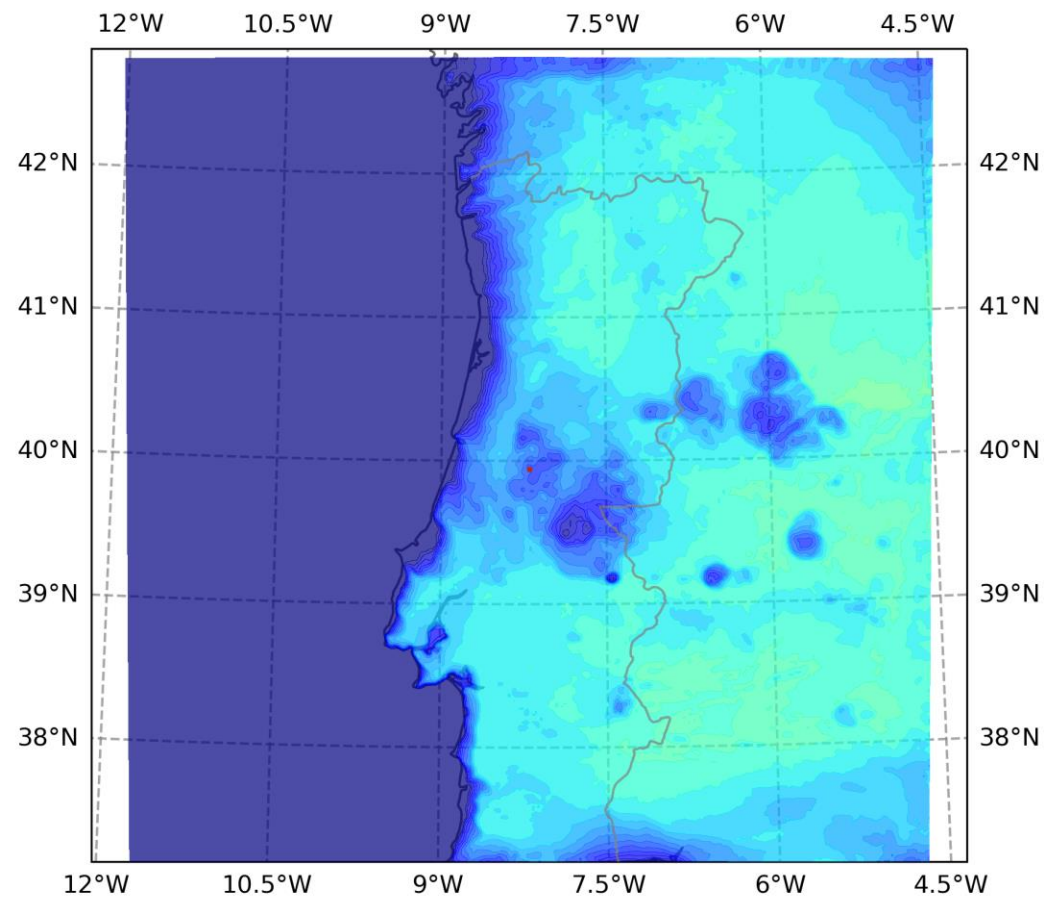


### WRF Lx

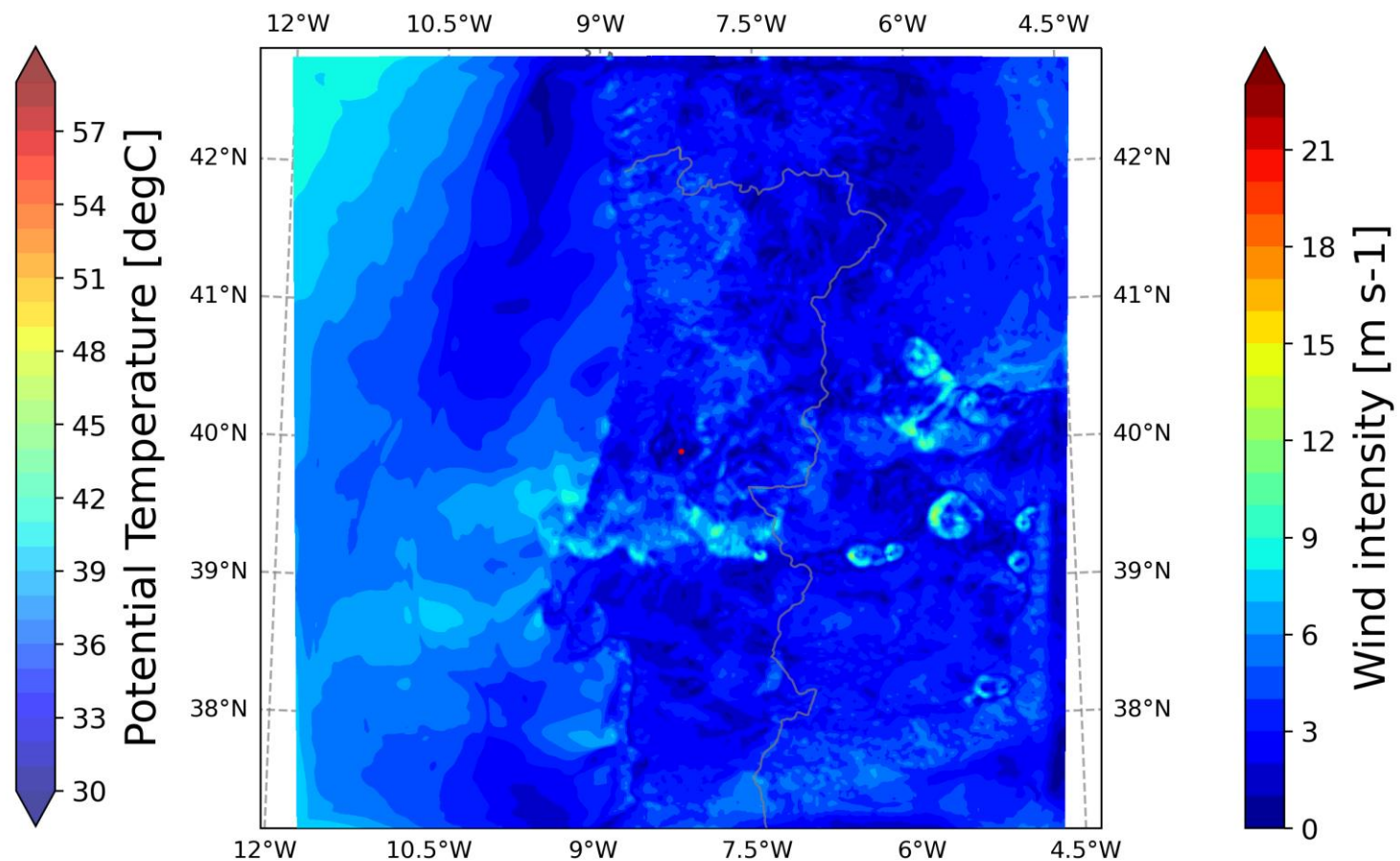


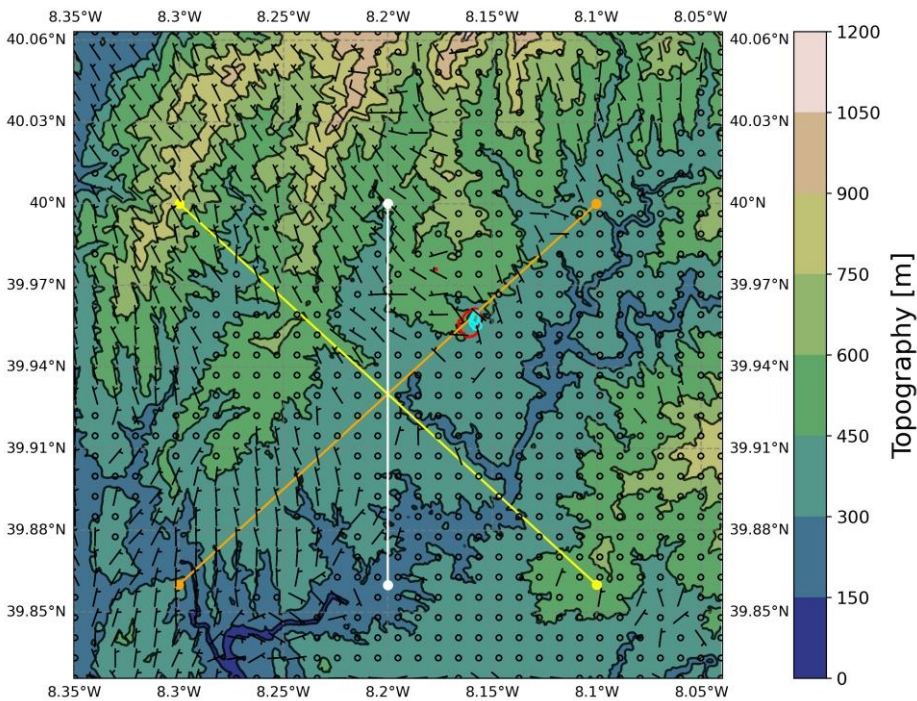
# Potential temperature and Wind speed

17\_13:00:00

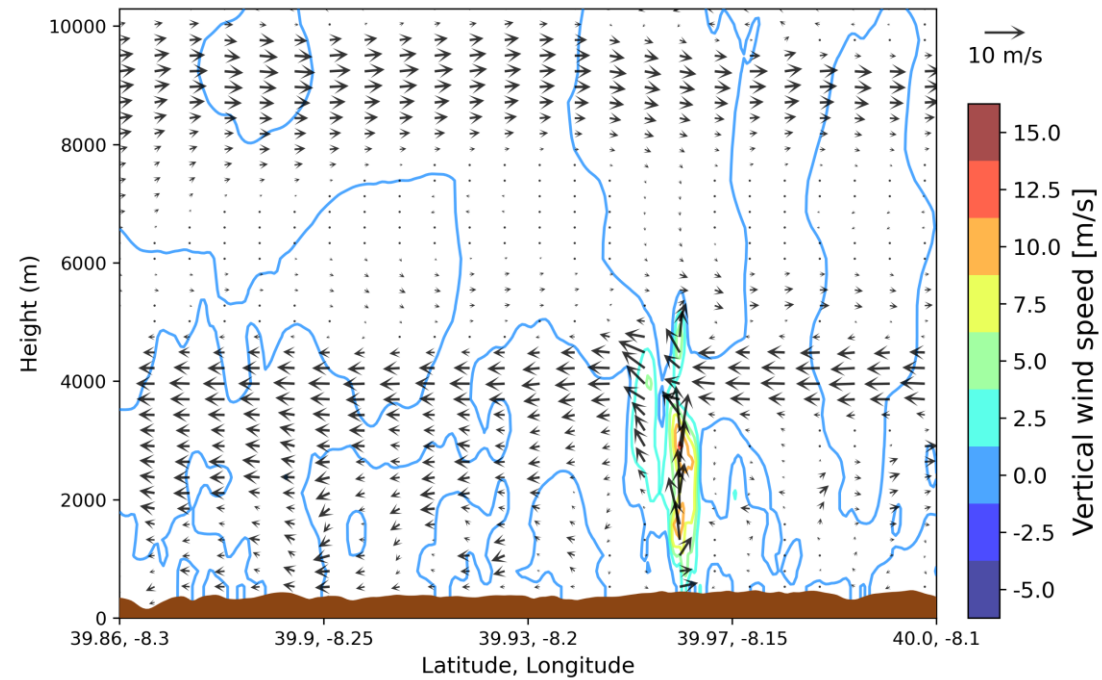
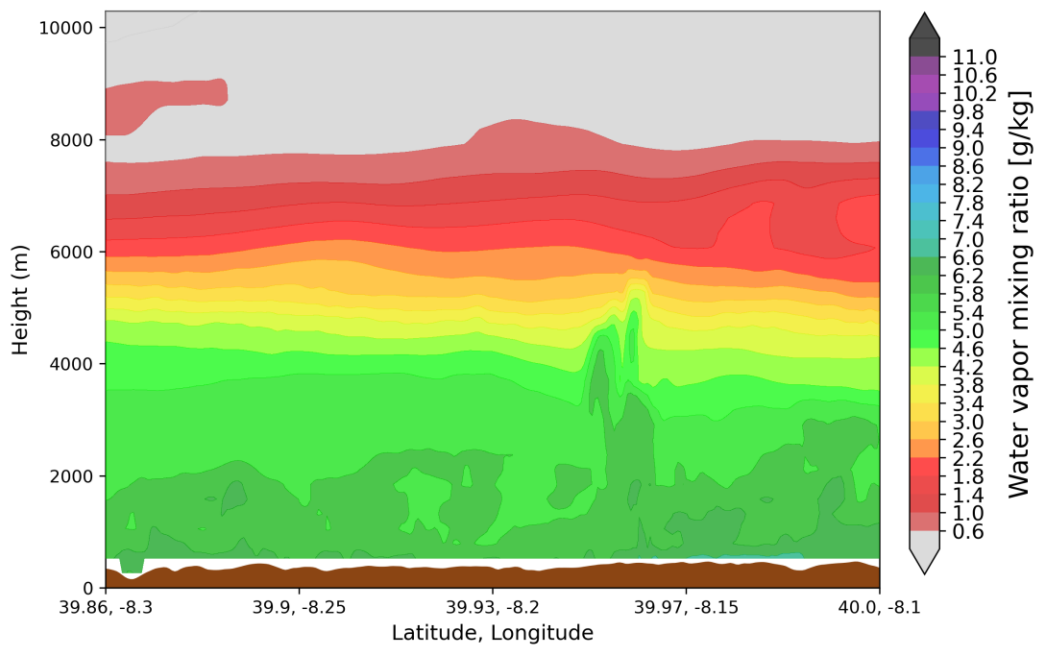
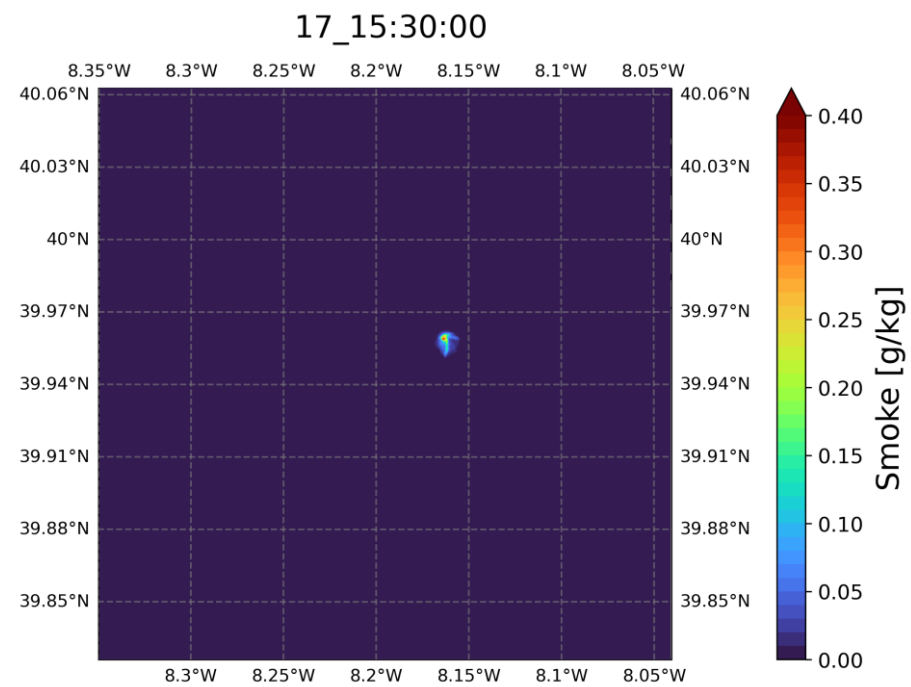


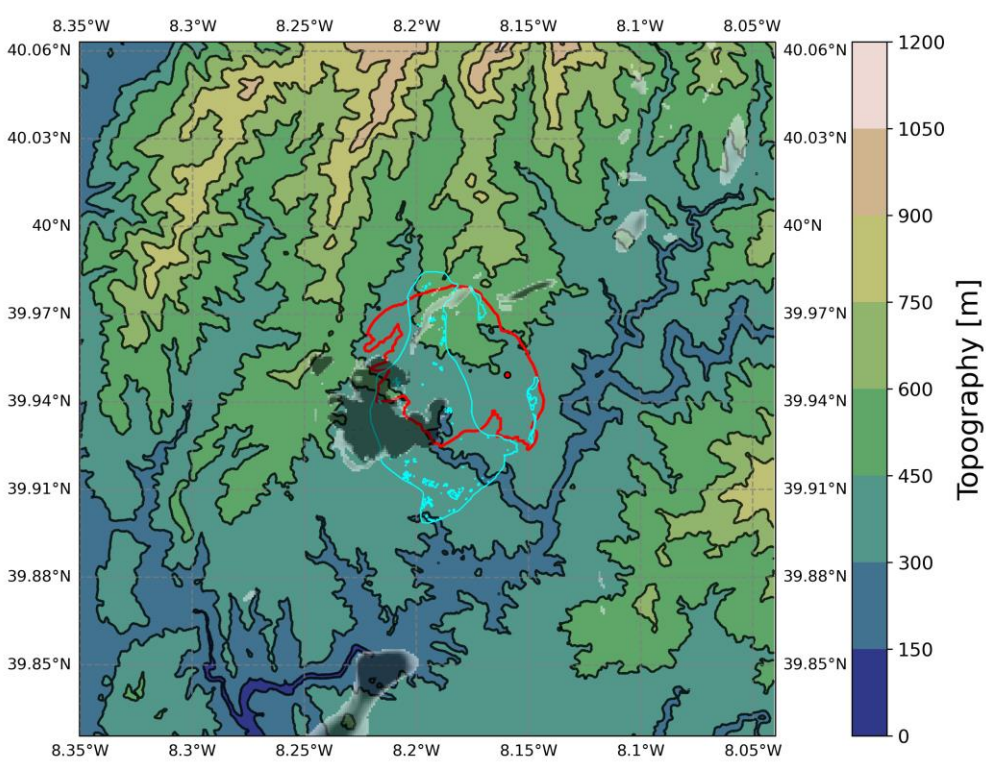
17\_13:00:00



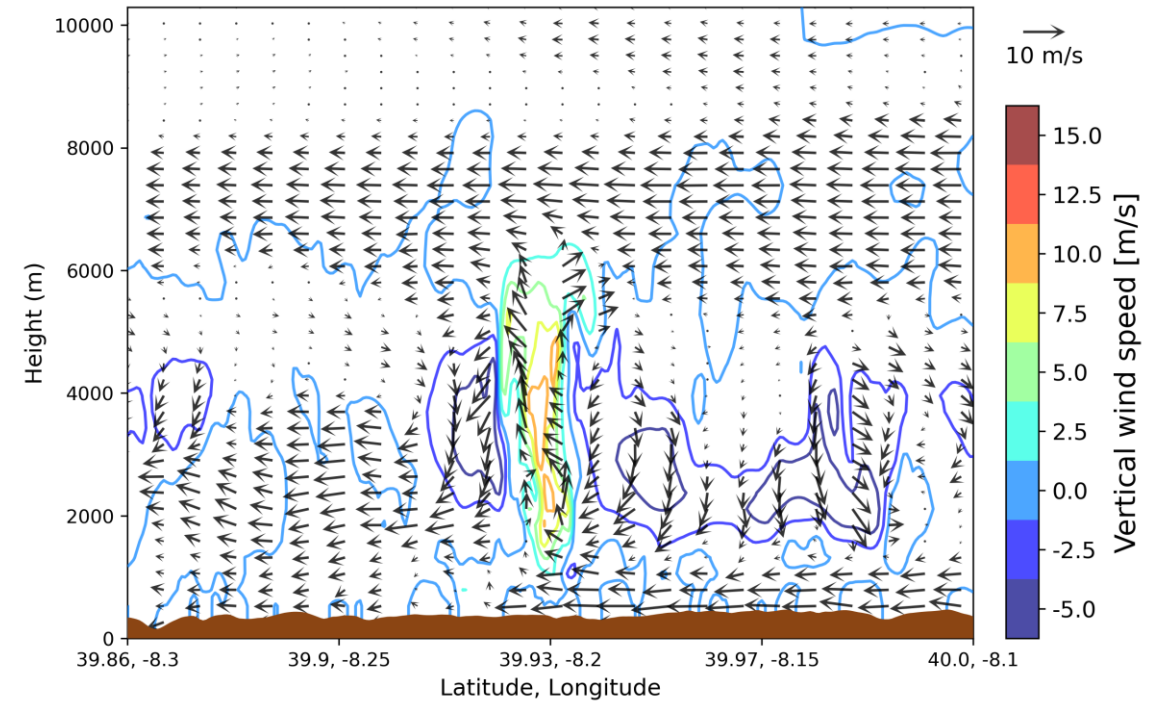
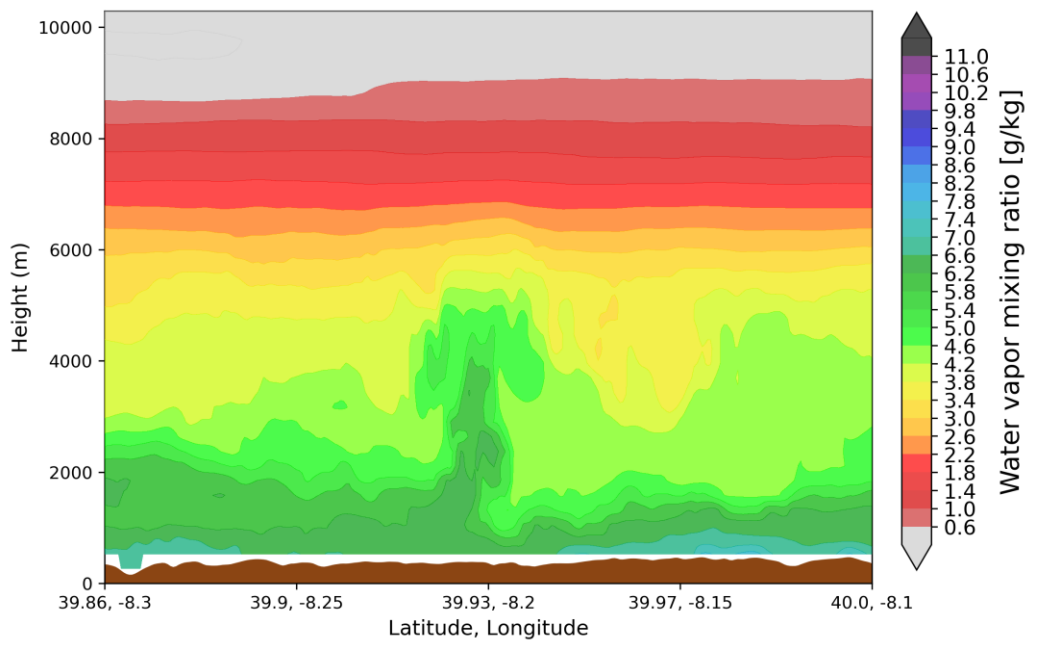
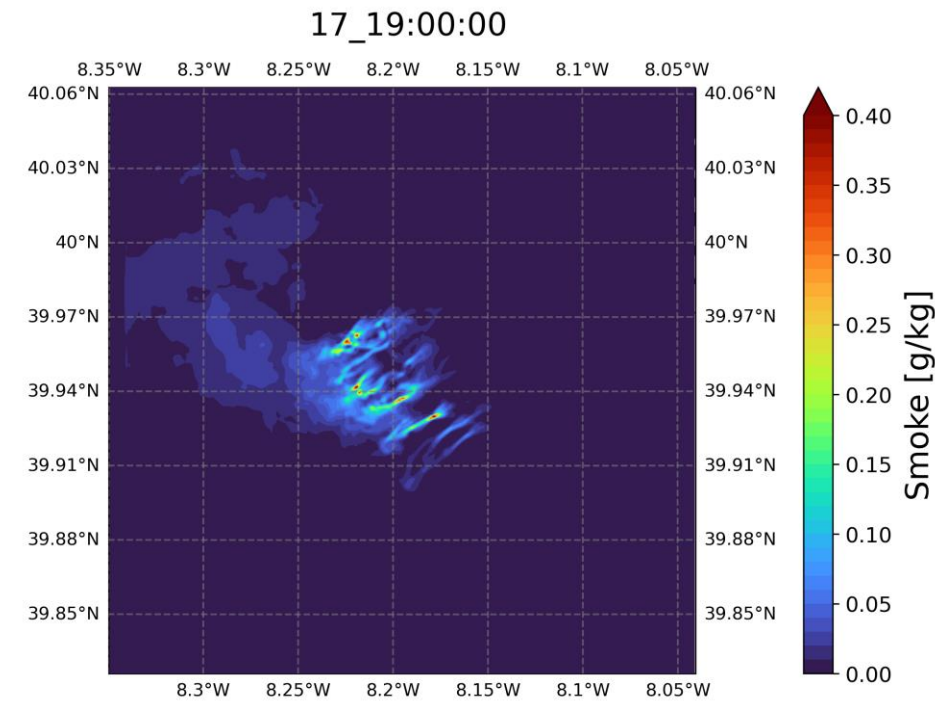


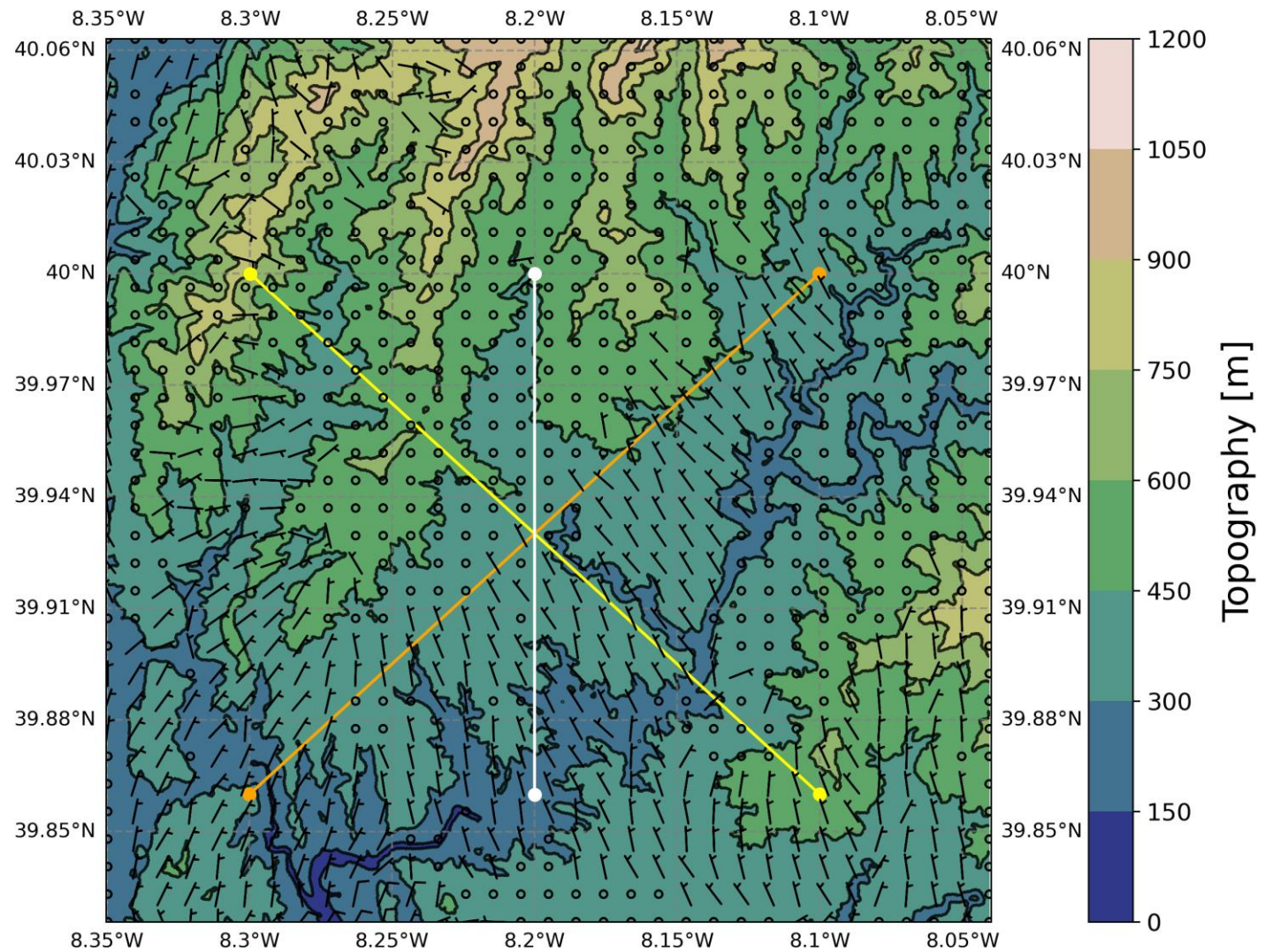
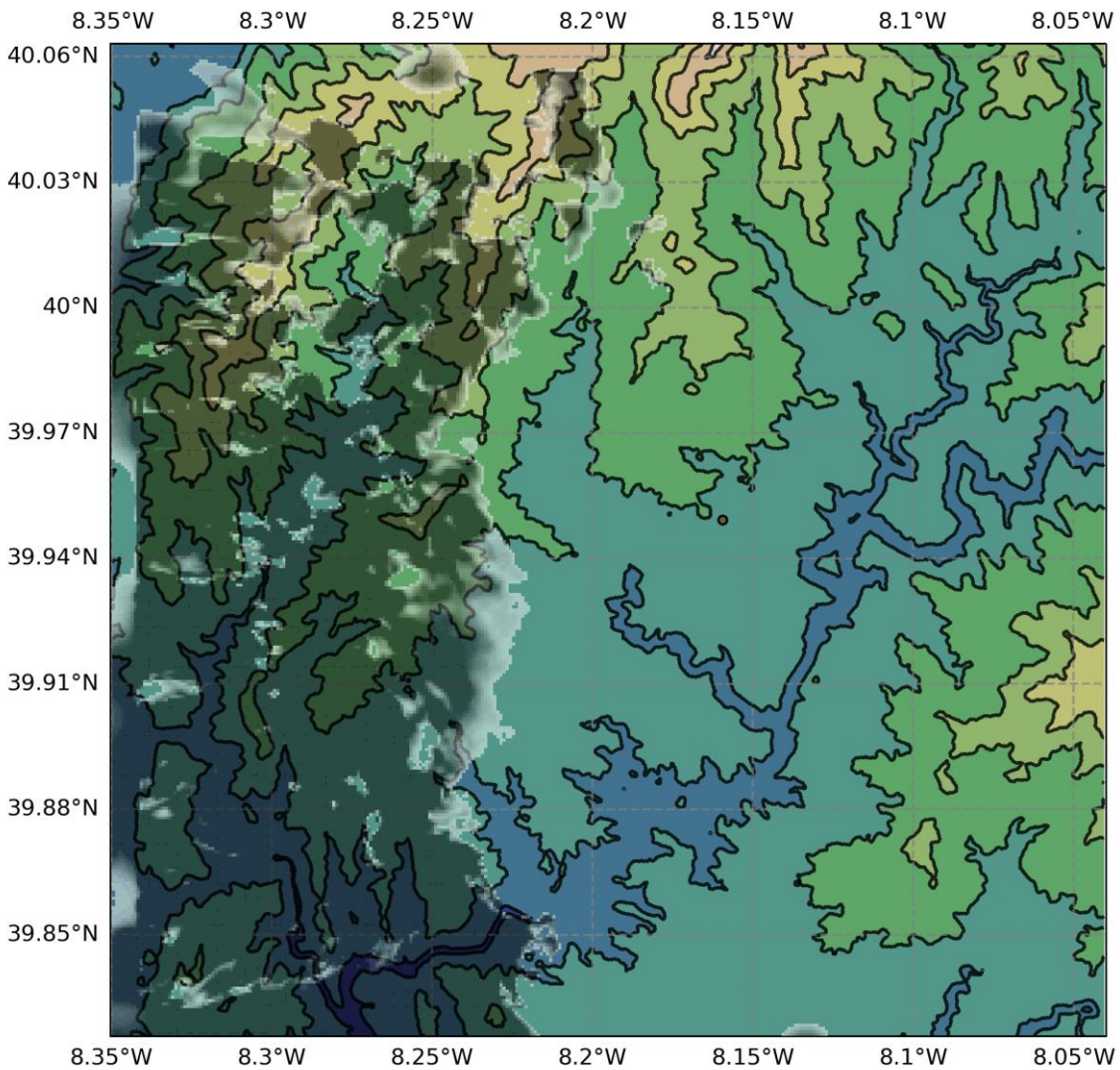
15:30





19:00







# Summary

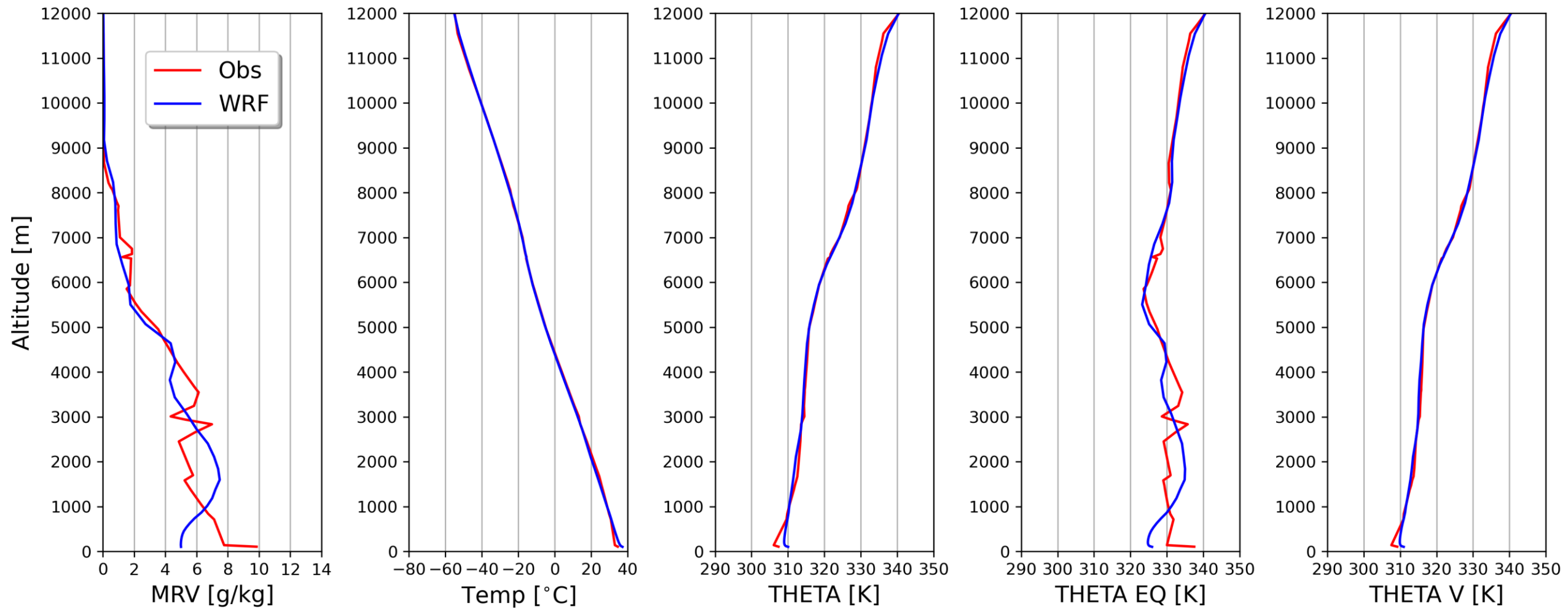
- High levels of atmospheric instability prior to the fires' ignition and throughout the afternoon. Several downbursts observed in the centre and south of Portugal and Spain
- Fire transports moisture into higher levels of the atmosphere and convective clouds are generated at the fire front
- At 19:00 a pirocumulus associated to high vertical wind and moisture transport develops, and accelerates the surface wind behind the fire front.
- WRF fire is able to fairly reproduce the evolution of the fire front until first explosive phase.

## Acknowledgements

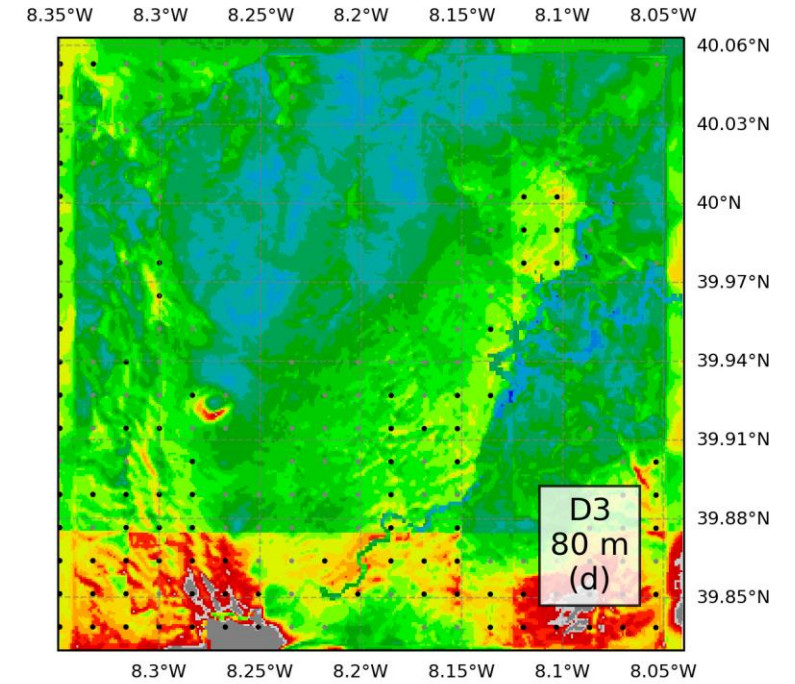
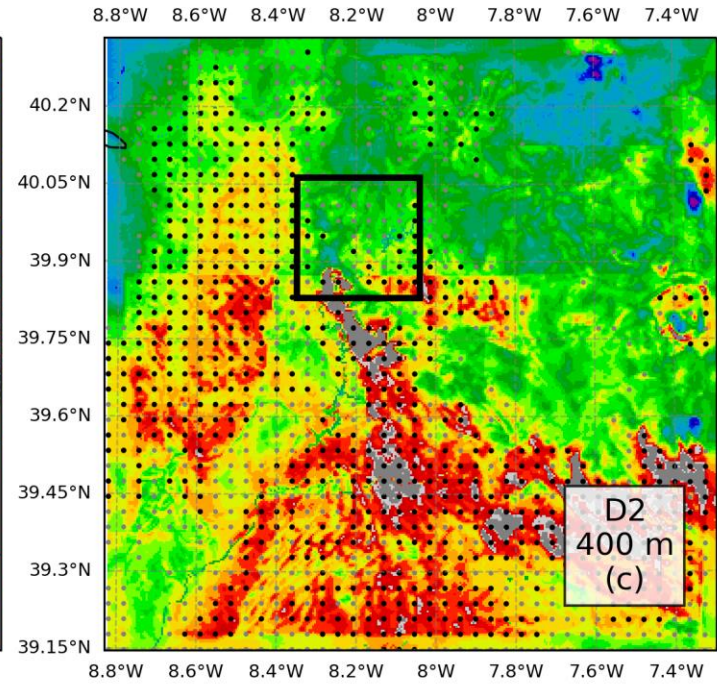
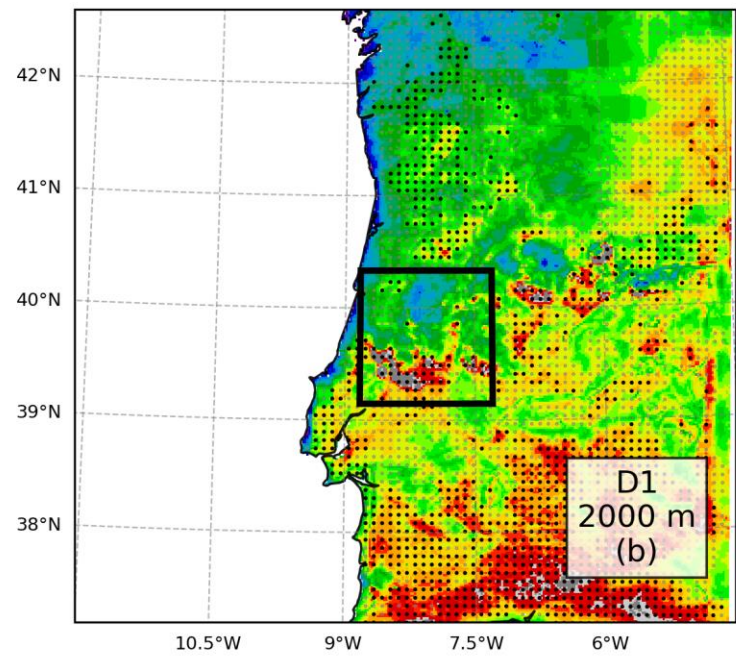
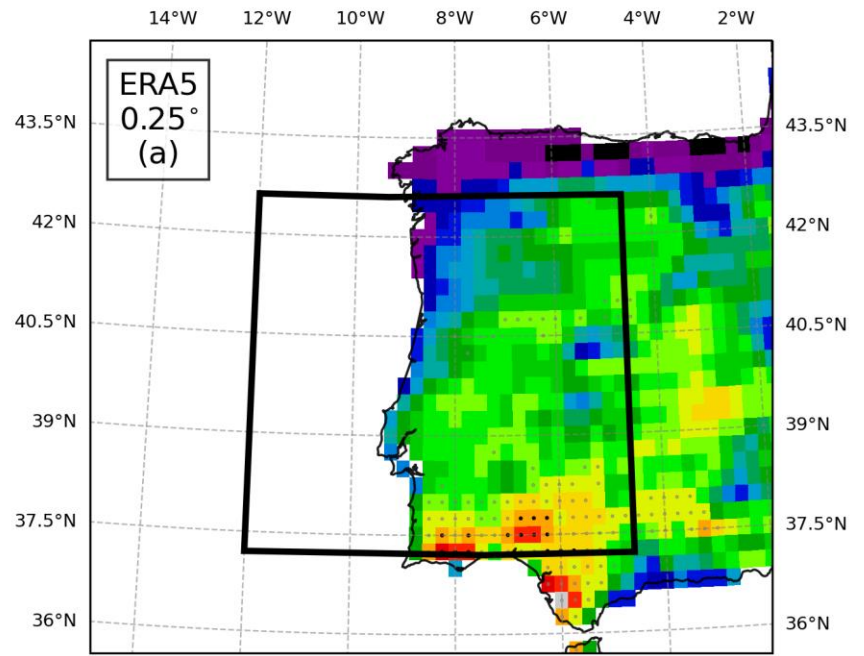
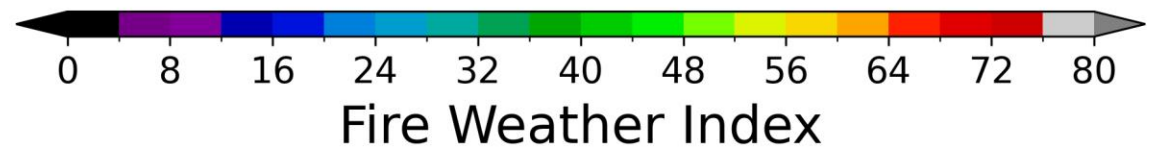
The authors would like to acknowledge the financial support from Fundação para a Ciência e a Tecnologia, I.P./MCTES through national funds (PIDDAC) – UIDB/50019/2020 – Instituto Dom Luiz and from the project LEADING (PTDC/CTA-MET/28914/2017).

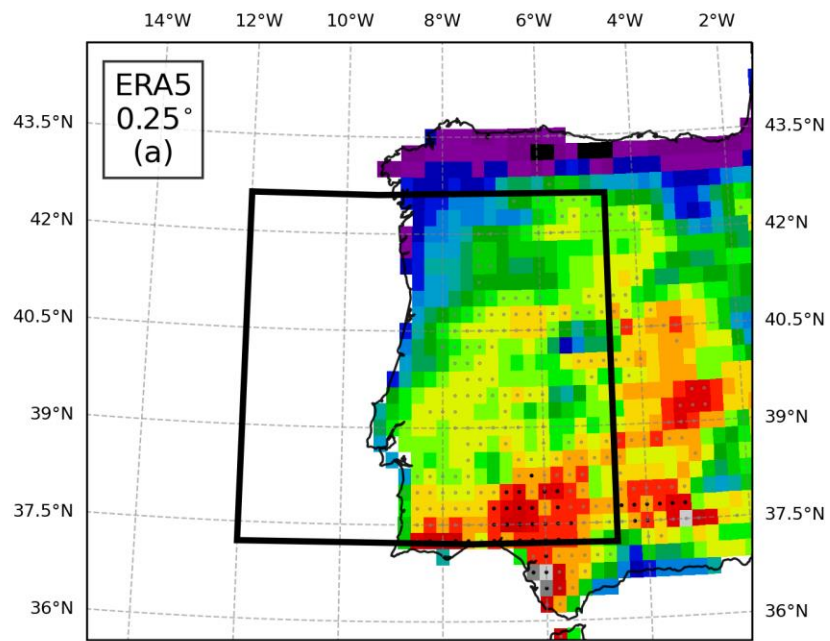
The authors would also like to acknowledge the EEA-Financial Mechanism 2014-2021 and the Portuguese Environment Agency

# Radiosond at 12:00 UTC (d01 - 2 km res.)

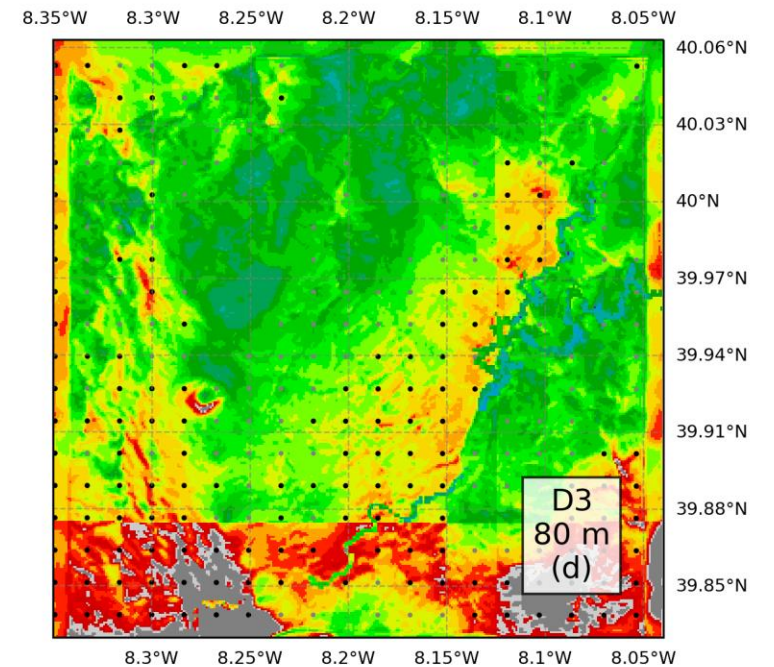
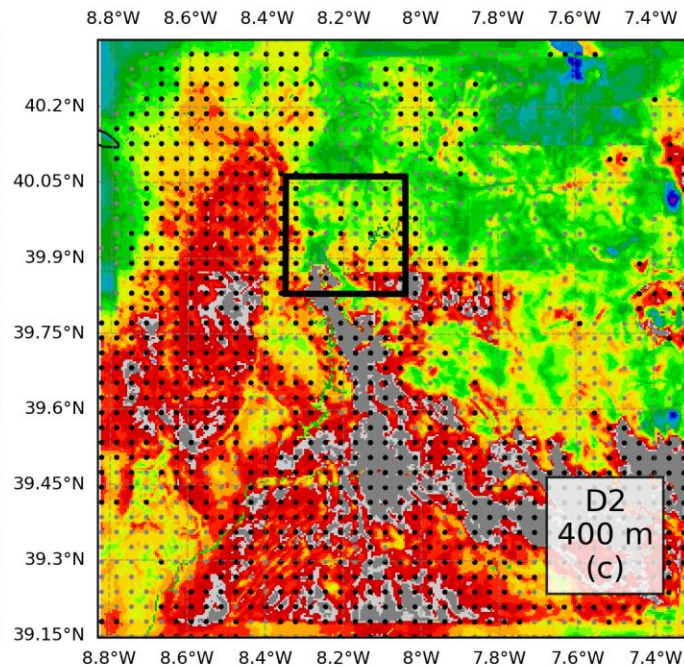
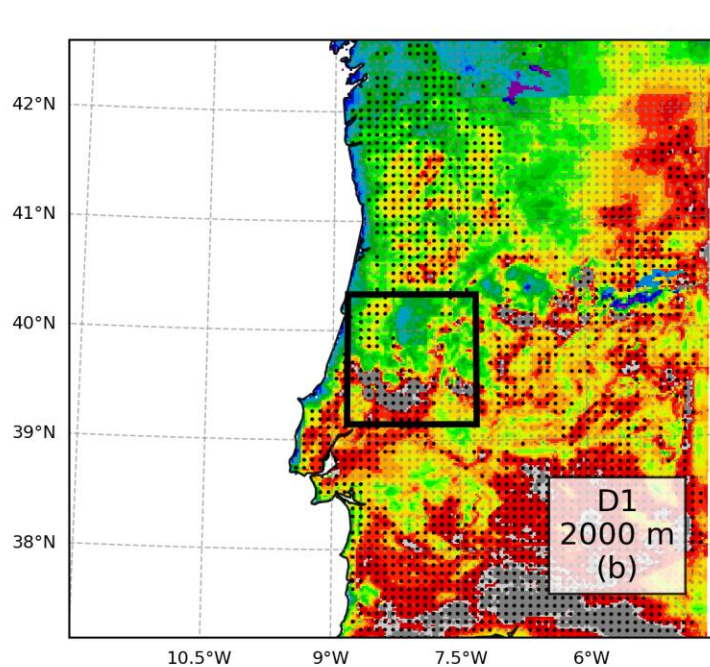
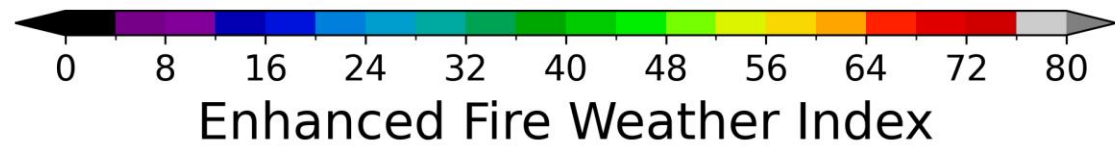


17<sup>th</sup> of June 2017

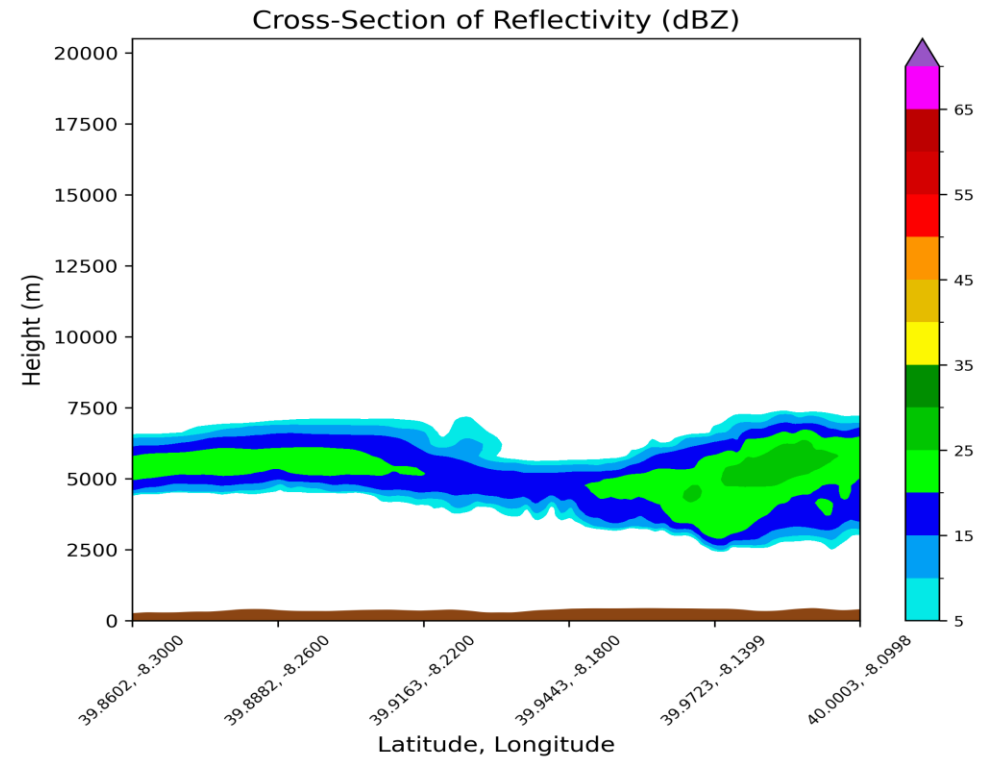
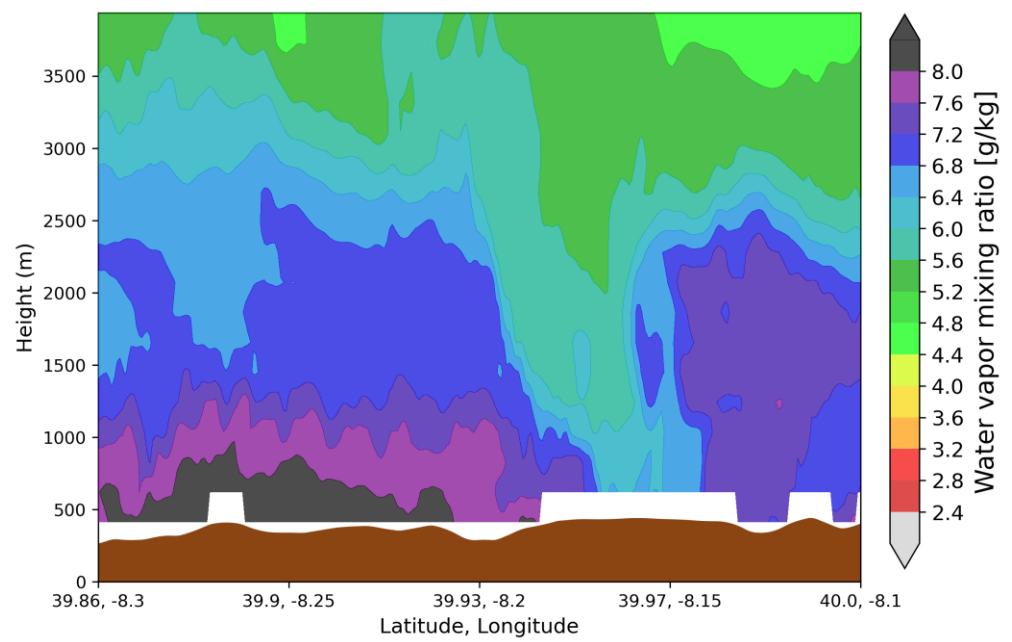
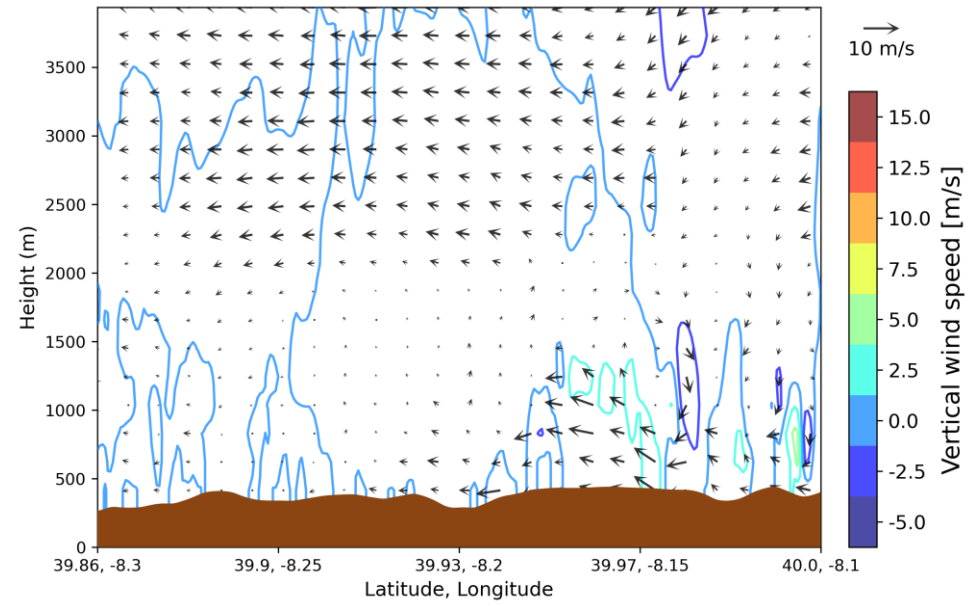
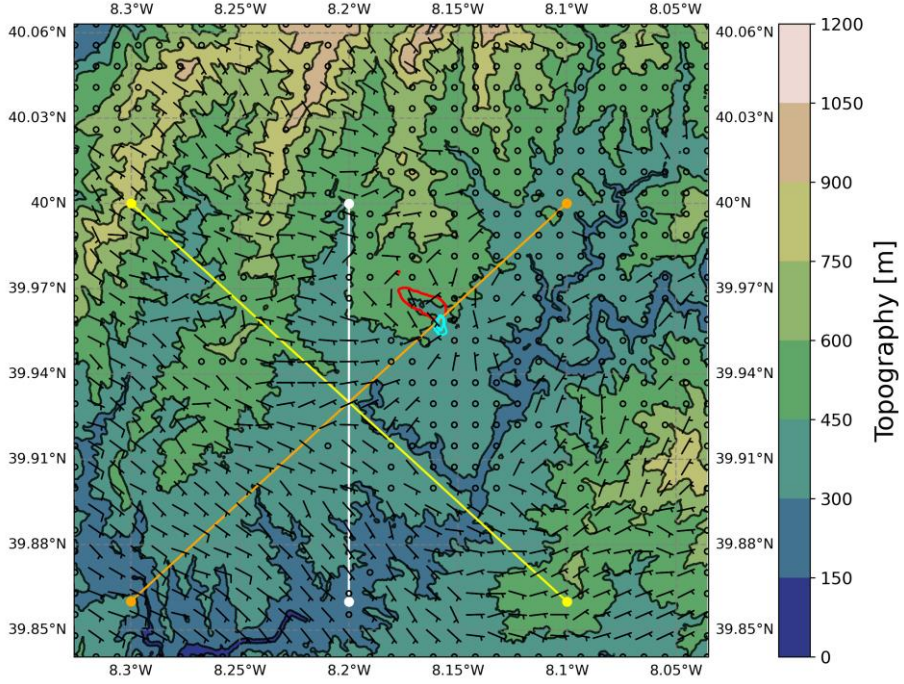




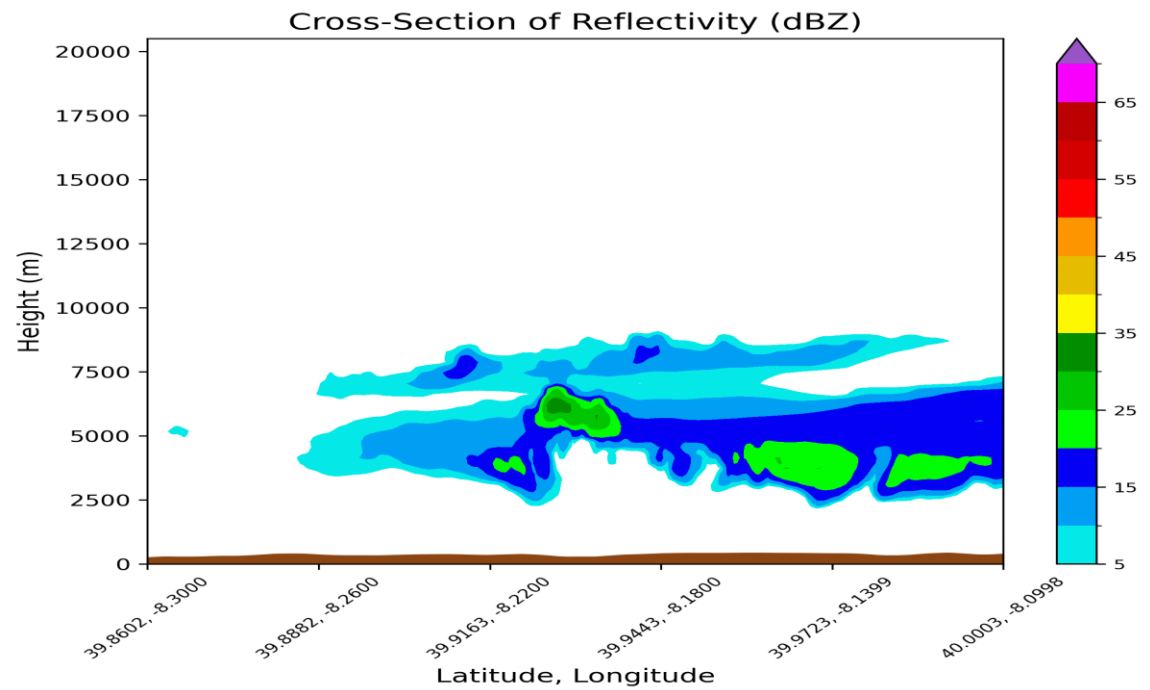
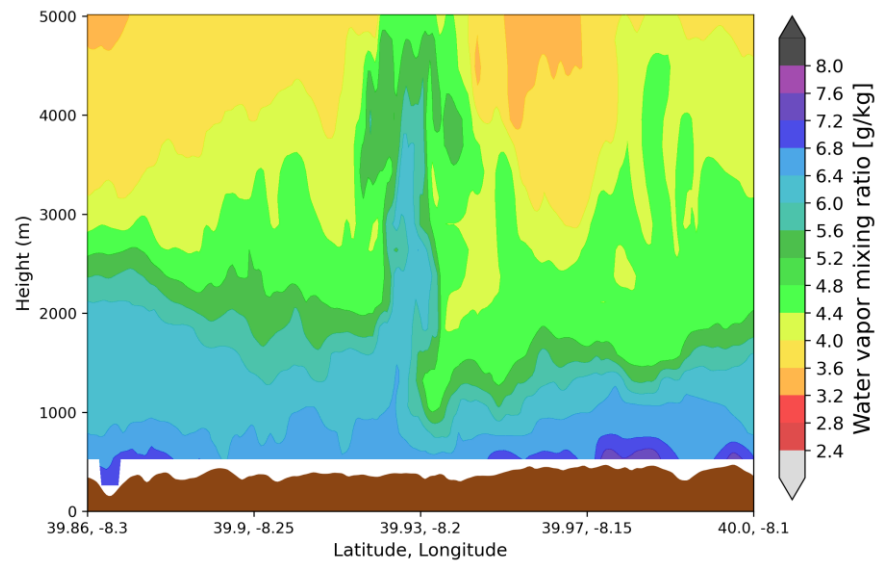
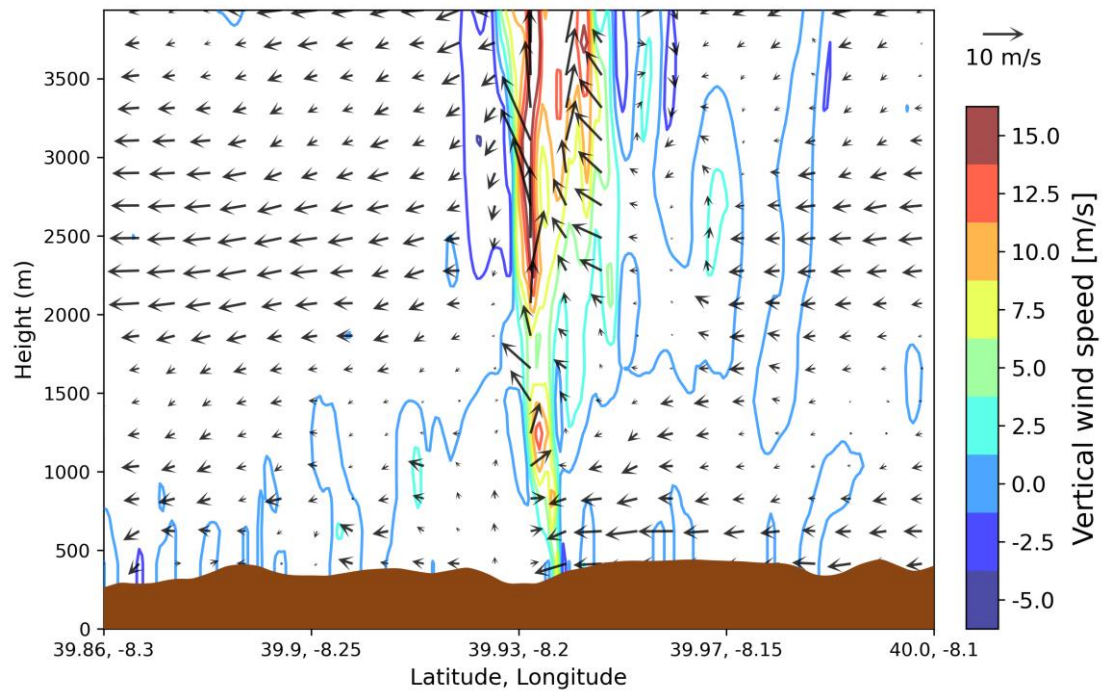
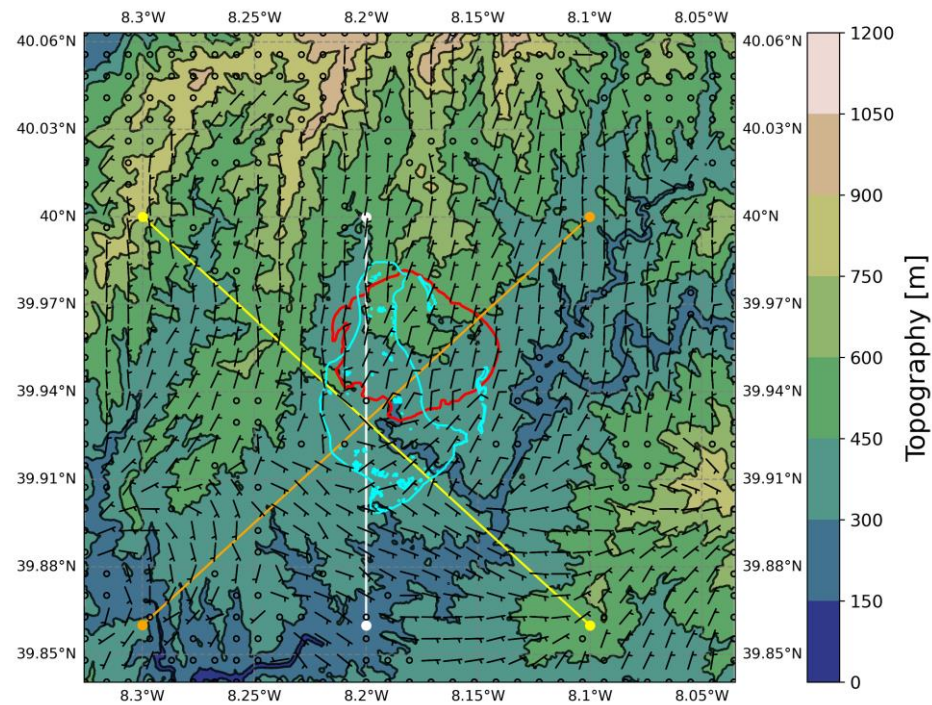
17<sup>th</sup> of June 2017



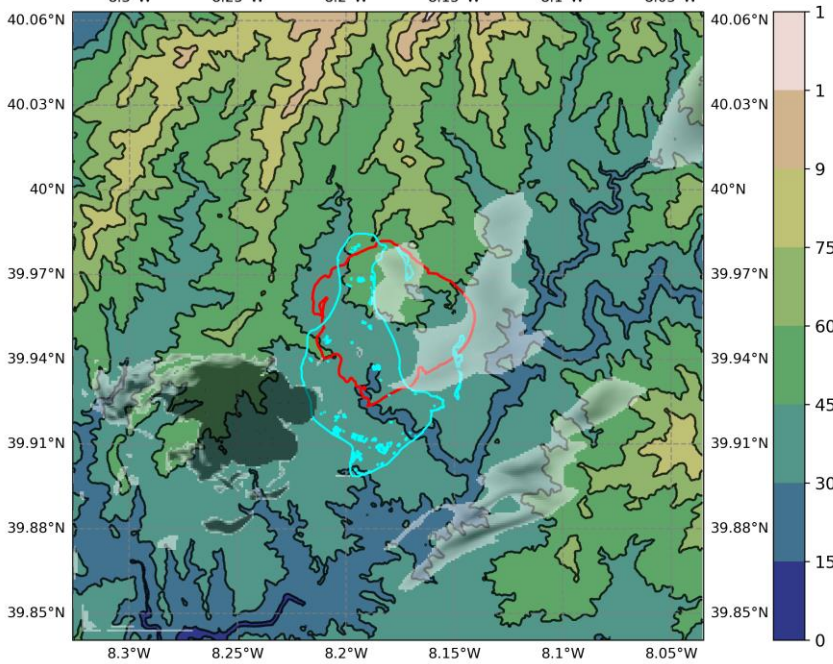
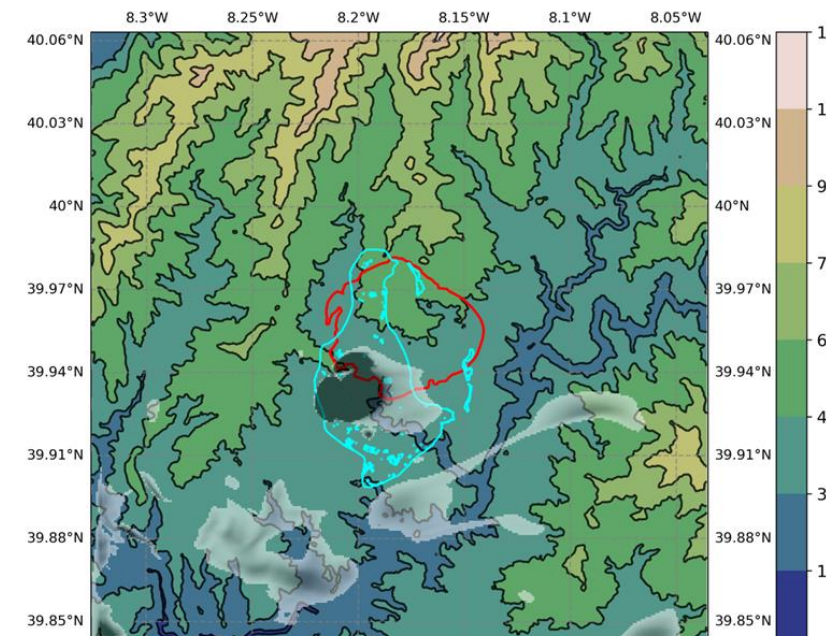
WRF Sfire



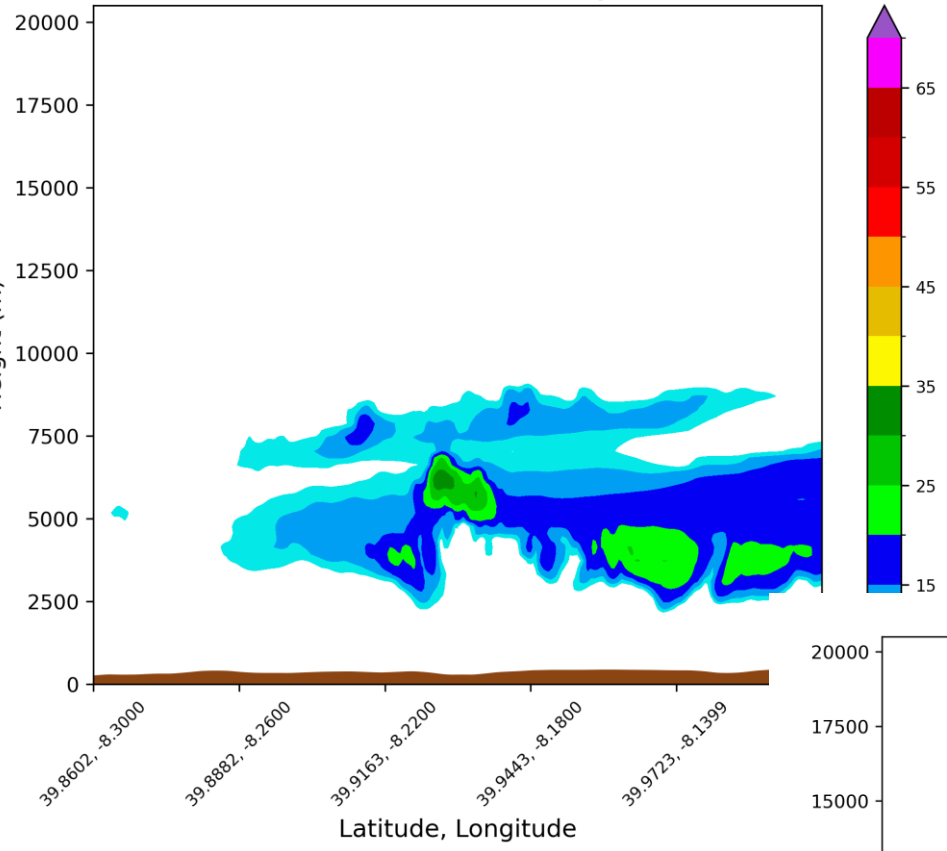
19:30







Cross-Section of Reflectivity (dBZ)



Cross-Section of Reflectivity (dBZ)

