

# Land surface Interactions with the Atmosphere over the Iberian Semi-arid Environment (LIAISE): 1st modelling intercomparison

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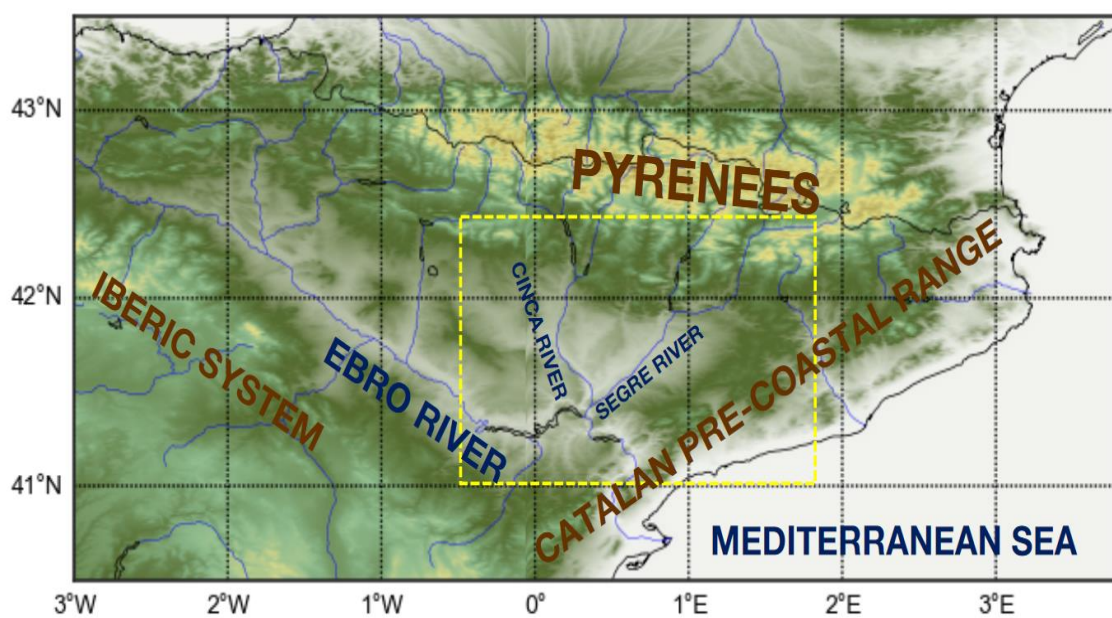
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# Eastern Ebro Subbasin

**Complex terrain**

✓ Topography

✓ Soil uses

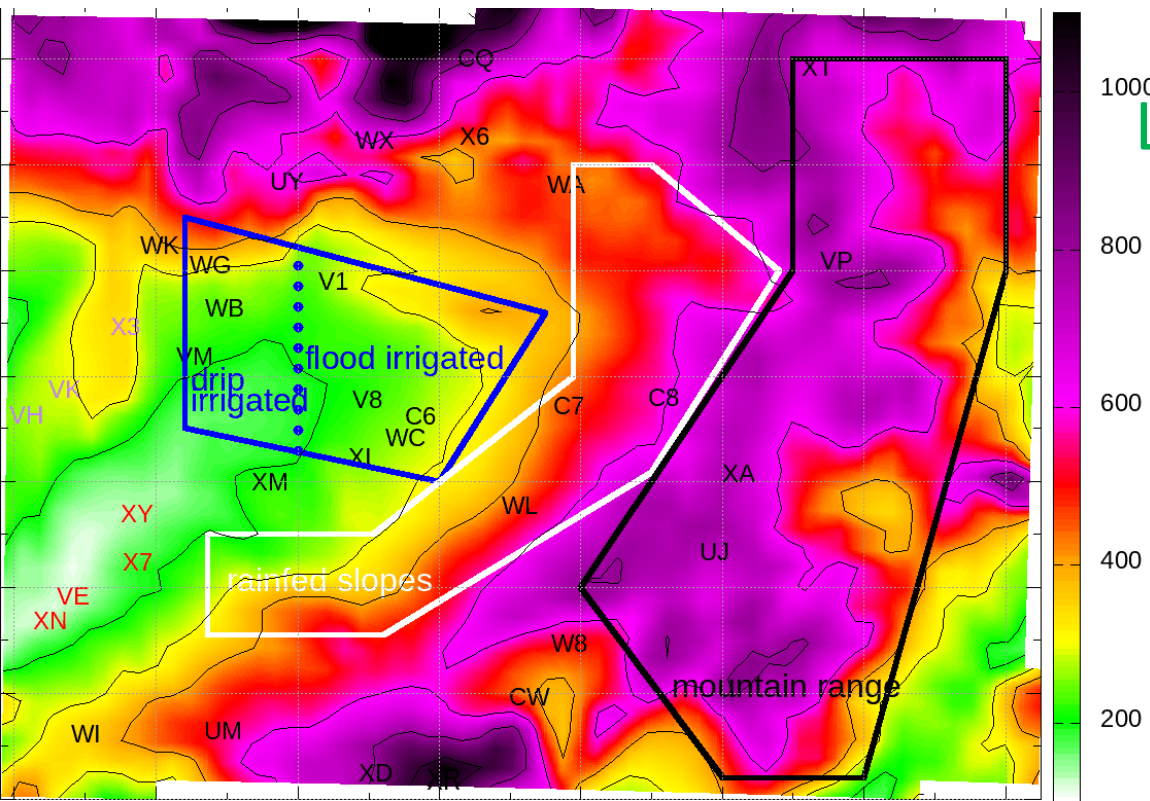


**Heterogeneities**

(circulations)

Local, basin, meso-synop

(Grau et al., 2022)



# *The 1st mesoscale intercomparison case*

## **16-18 July 2016**

- \* clear skies, A conditions
- \* locally/basin/mesoscale generated winds (interact)

**Models**

**MesoNH (MNH)**

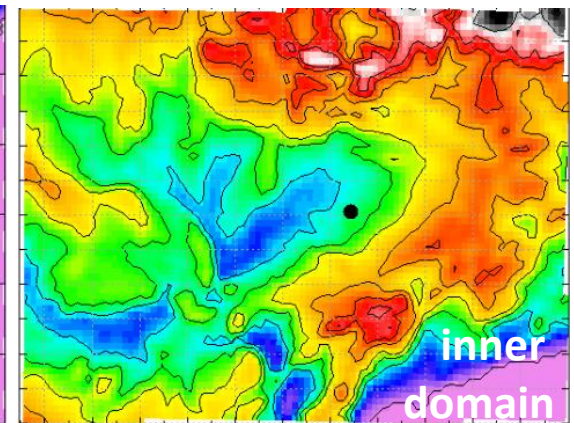
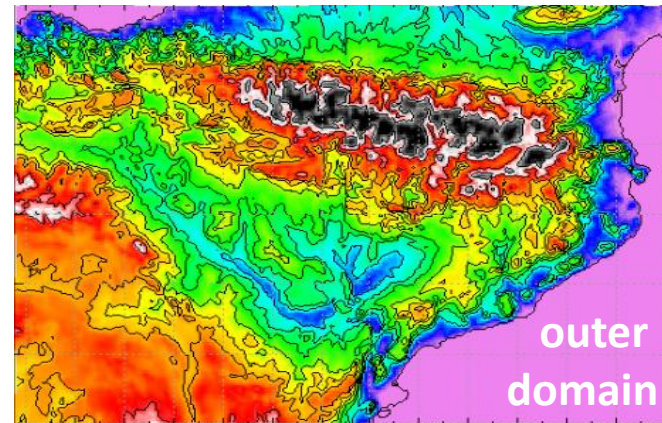
**MOLOCH (MOL)**

**Unified Model (UM)**

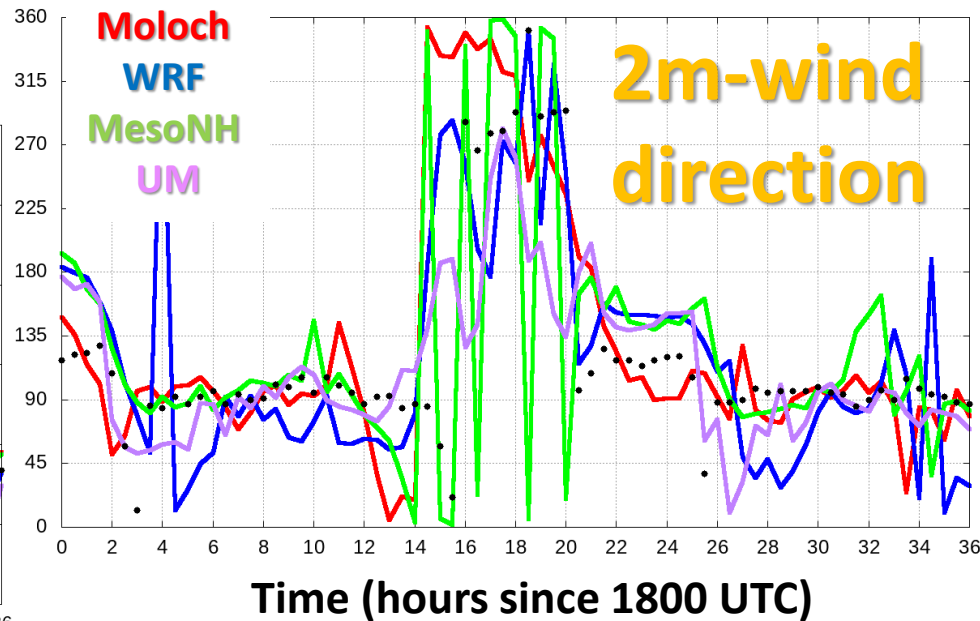
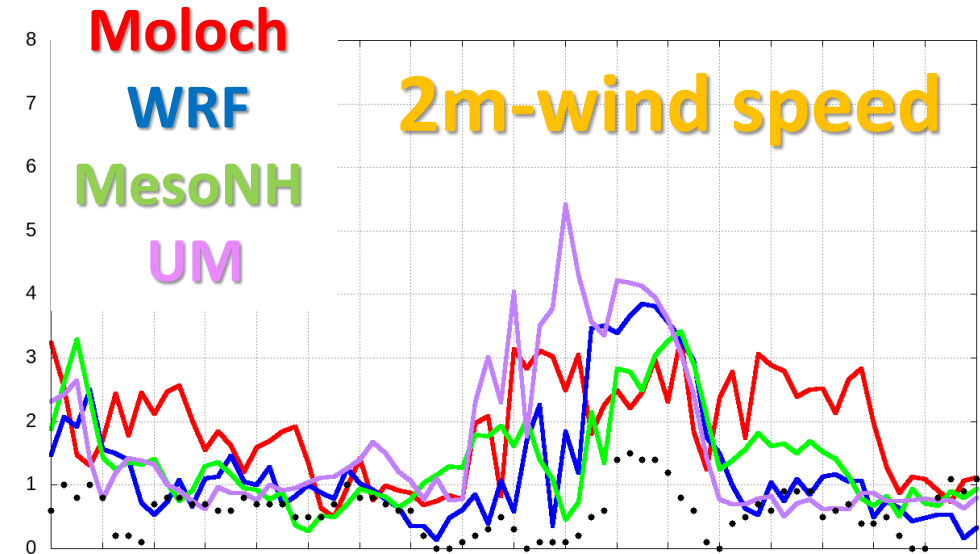
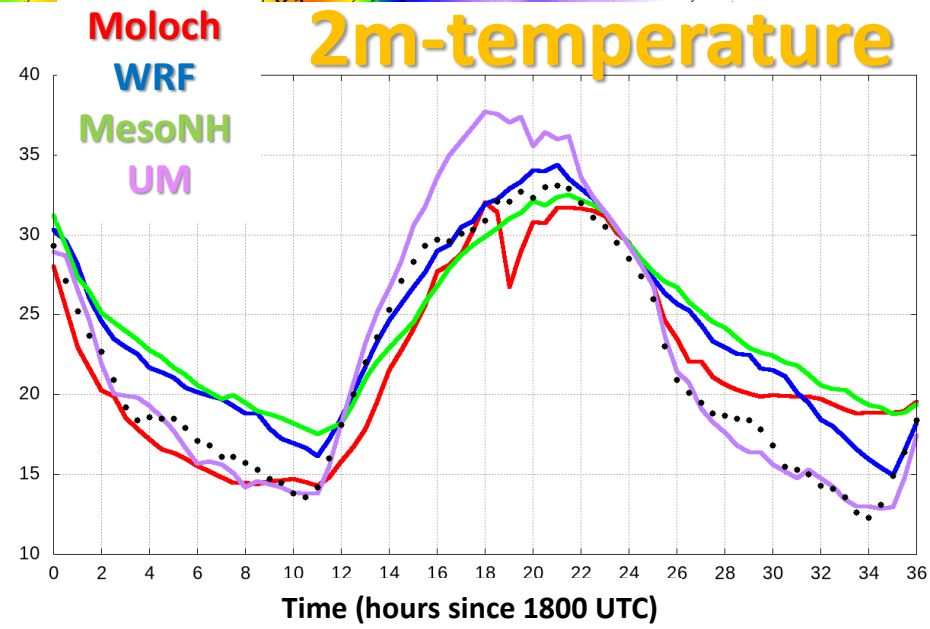
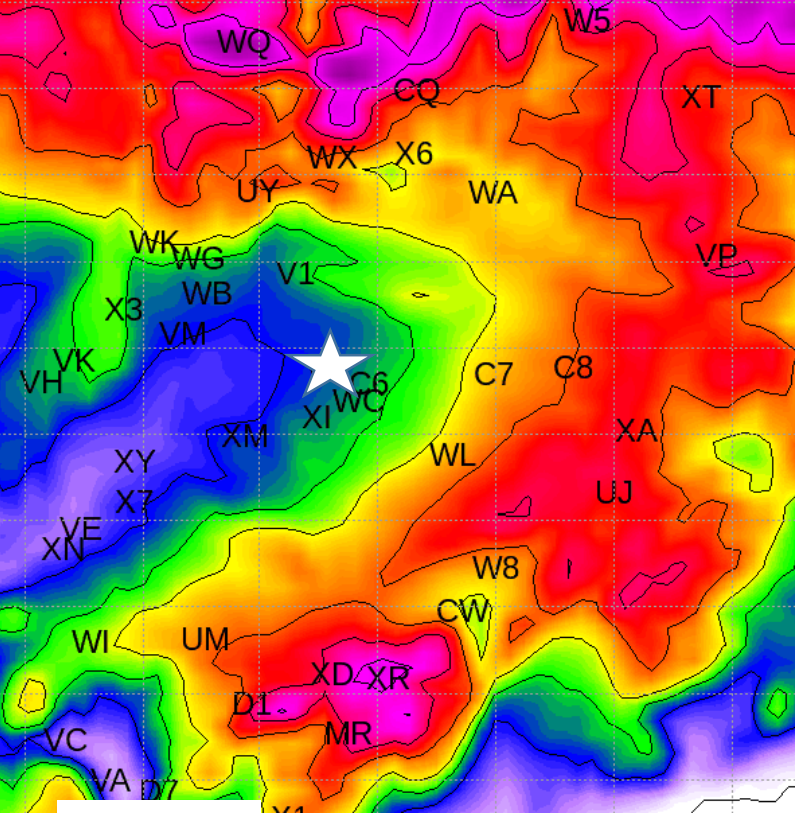
**WRF**

## **Model setup**

- 36h run (from 16 July at 1800 UTC to 18 July at 0600UTC)
- 2 nested domains (1-way): 2km x 2 km and 400m x 400m resolution (540 x 450 gridpoints)
- Vertical resolution (2m and stretched above, 85 levels)
- Initial/Lateral BC: ECMWF
- Differences: Turbulence, Radiation (5min), Surface

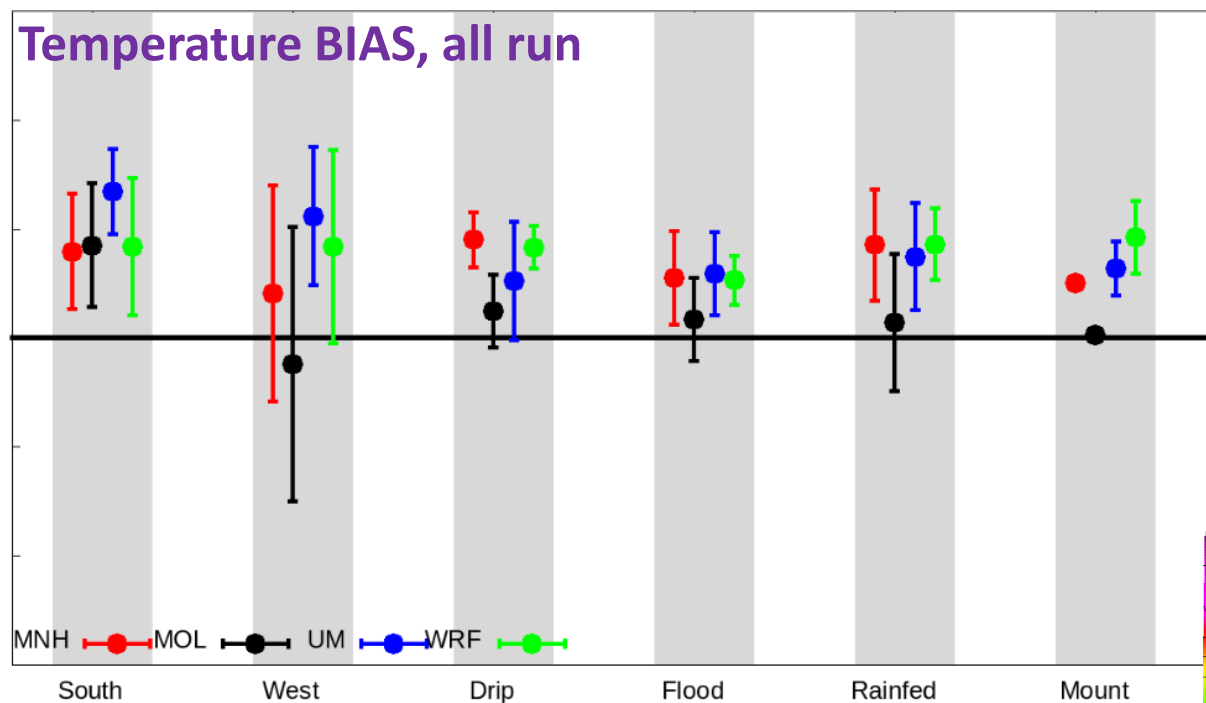


# Validation using AWS El Poal (V8) - FLOOD

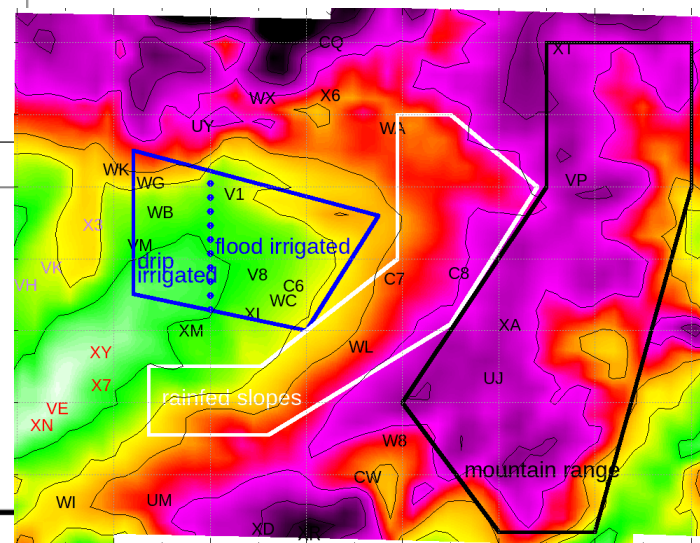
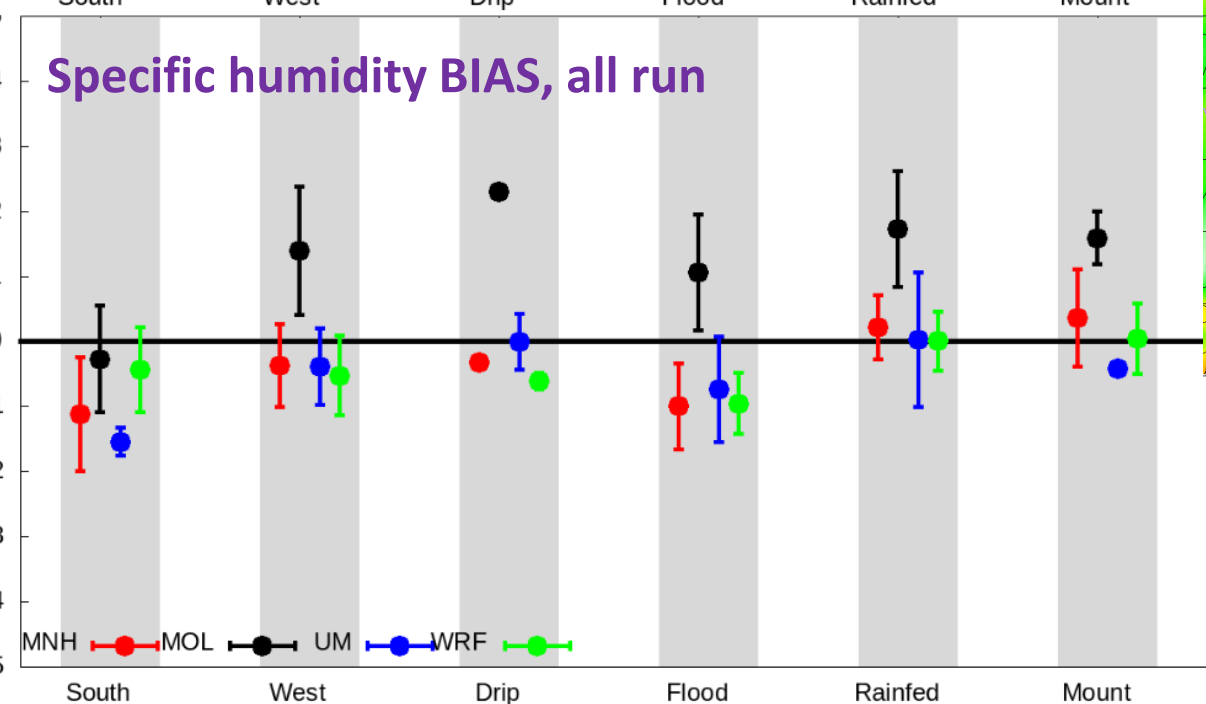


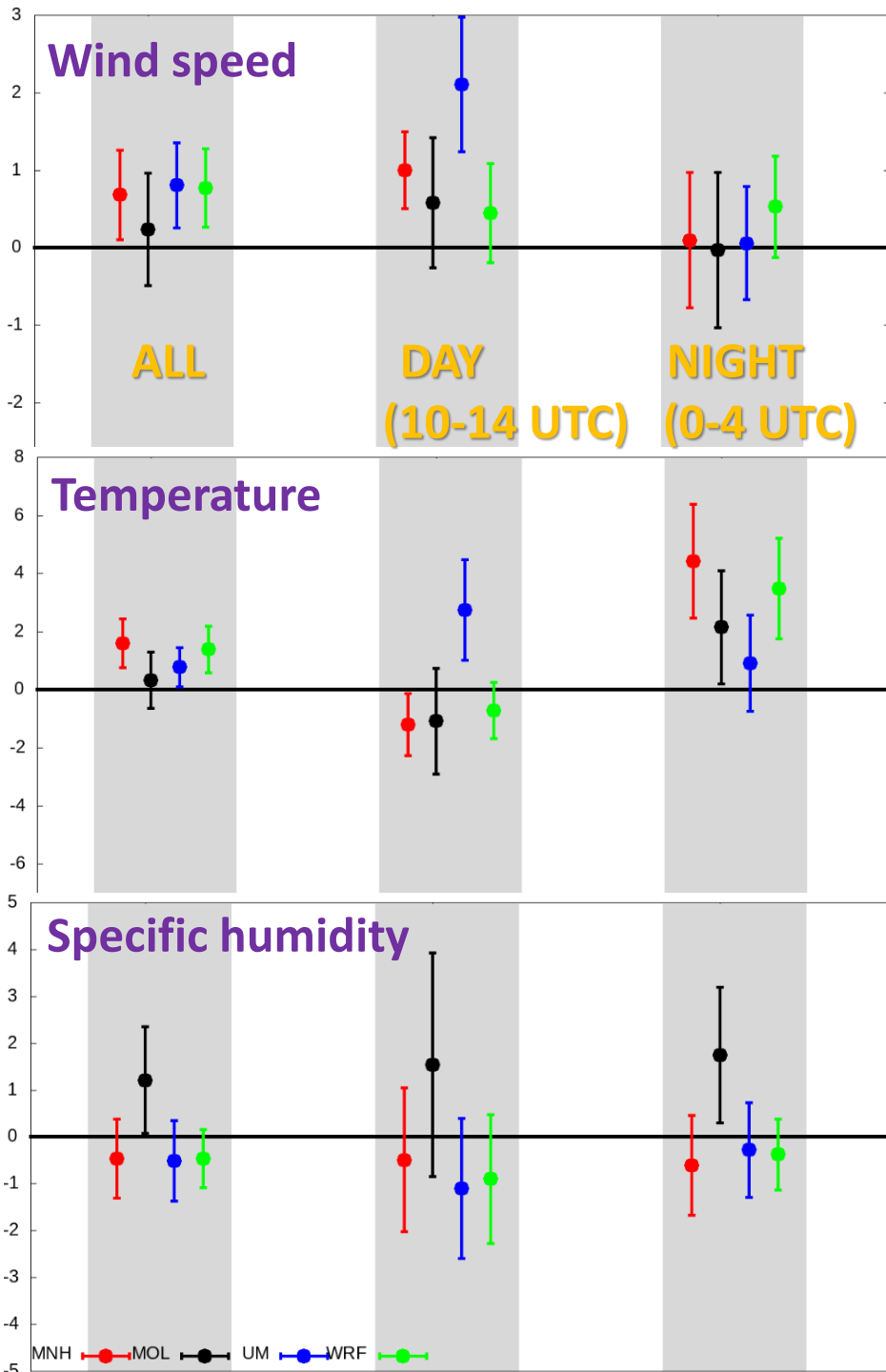
**MesoNH**  
**Moloch**  
**UM**  
**WRF**

Temperature BIAS, all run



Specific humidity BIAS, all run



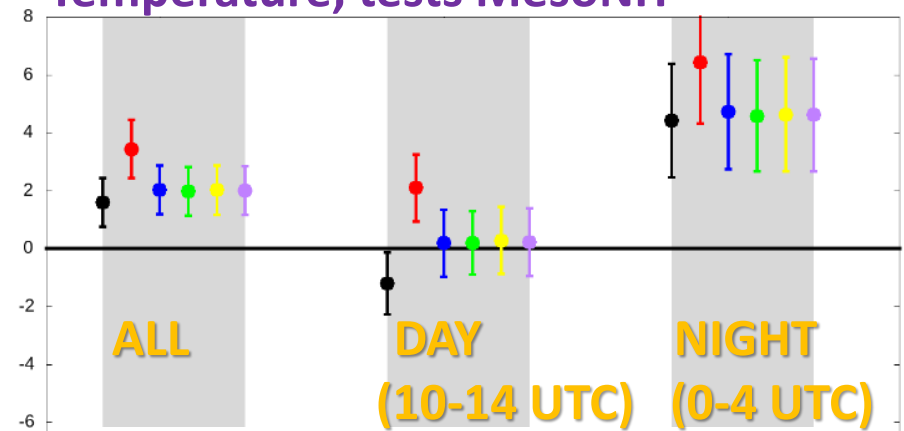


**Mean BIAS (model-obs)**

**MesoNH Moloch**

**UM WRF**

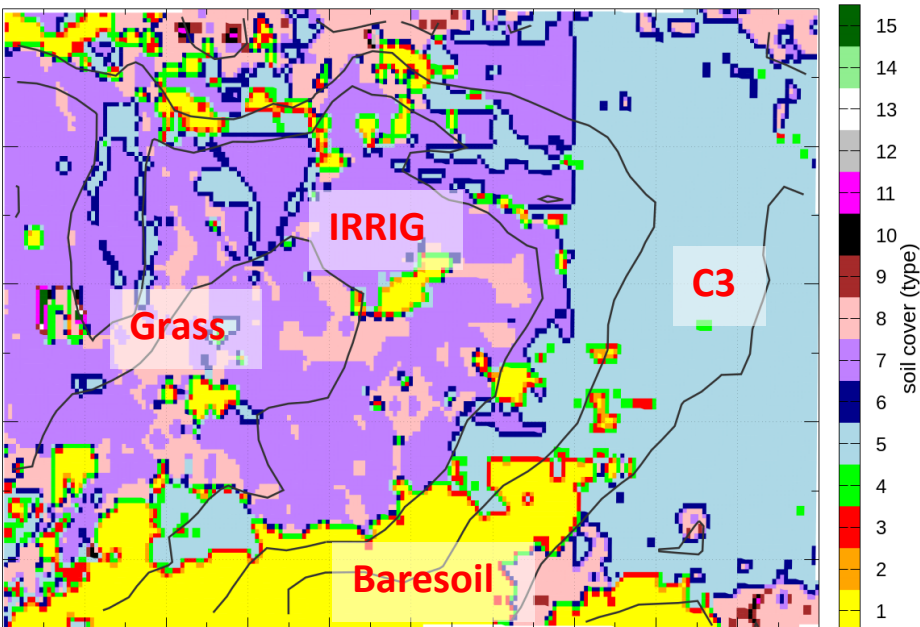
**Temperature, tests MesoNH**



**Default Arome Inland water SEB**

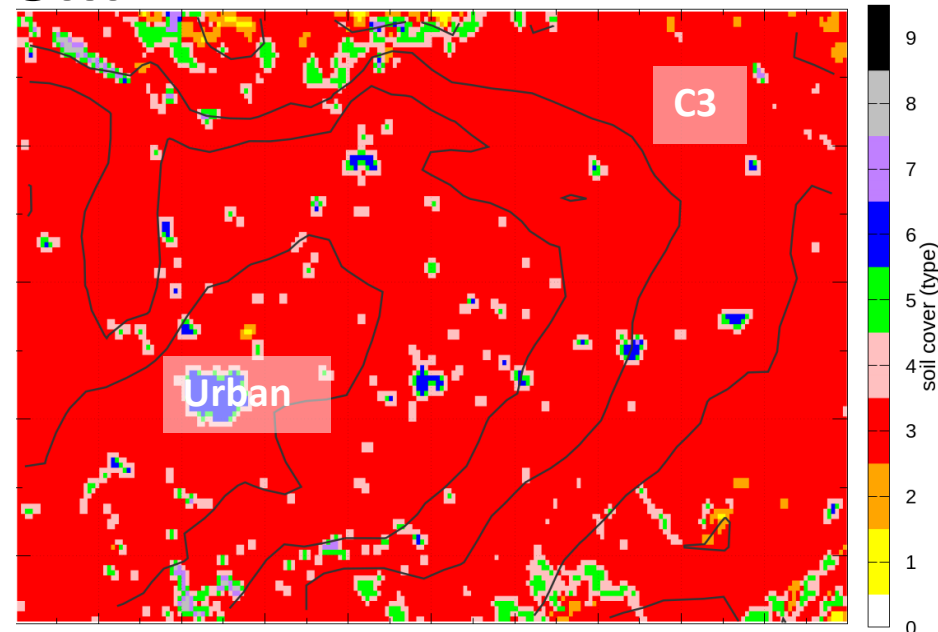
**Transfer function ALL**

# MesoNH

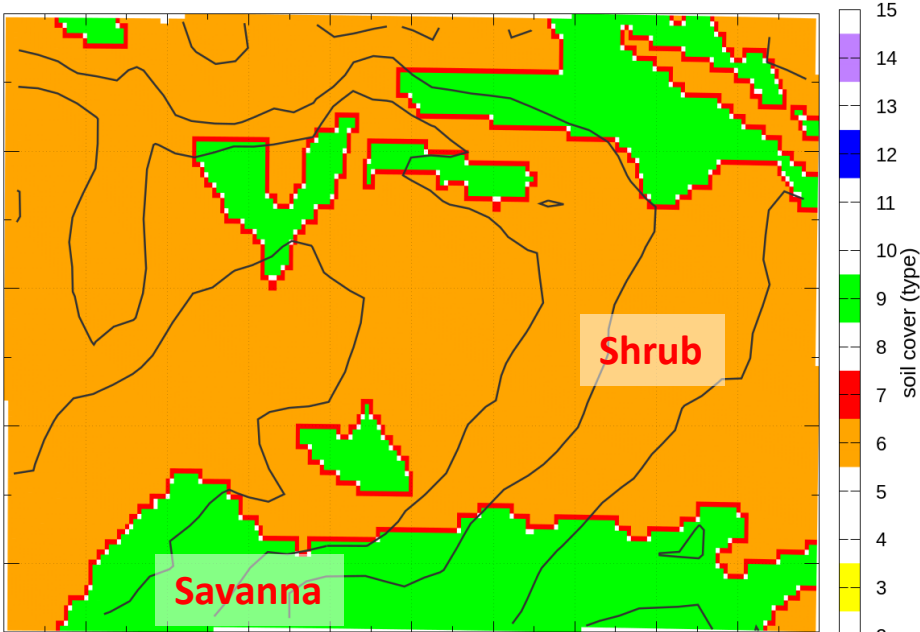


# Variability of the surface cover

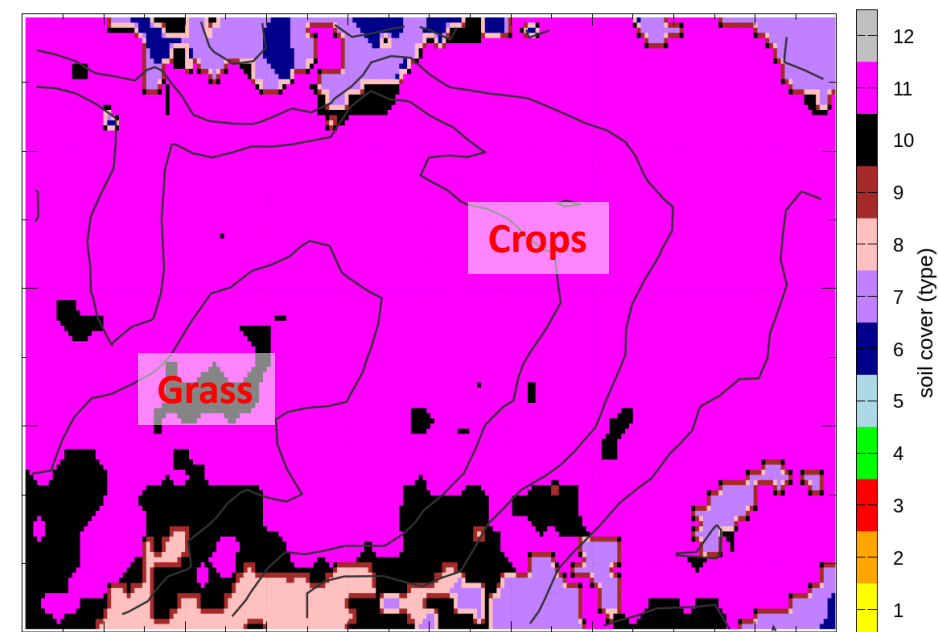
## UM



## WRF



## MOLOCH



# Summary

- **Results (known features):** models are able to reproduce the general patterns of the region BUT:
  - ✓ **Models tend to overestimate wind speed** (daytime)
  - ✓ **Difficulties in reproducing nocturnal calm conditions & cooling**
- Models are not able to reproduce the heterogeneities:
  - ✓ **Surface model** (processes included, irrigation)
  - ✓ **Surface parameters & initialitation**  
(irrigated, rainfed,... zones)
  - ✓ **Parameterizations** (turbulence, advection, radiation)
- **Sensitivity tests**
  - ✓ **Initial and lateral BC** (GFS, AROME, UM), **Surface features**