



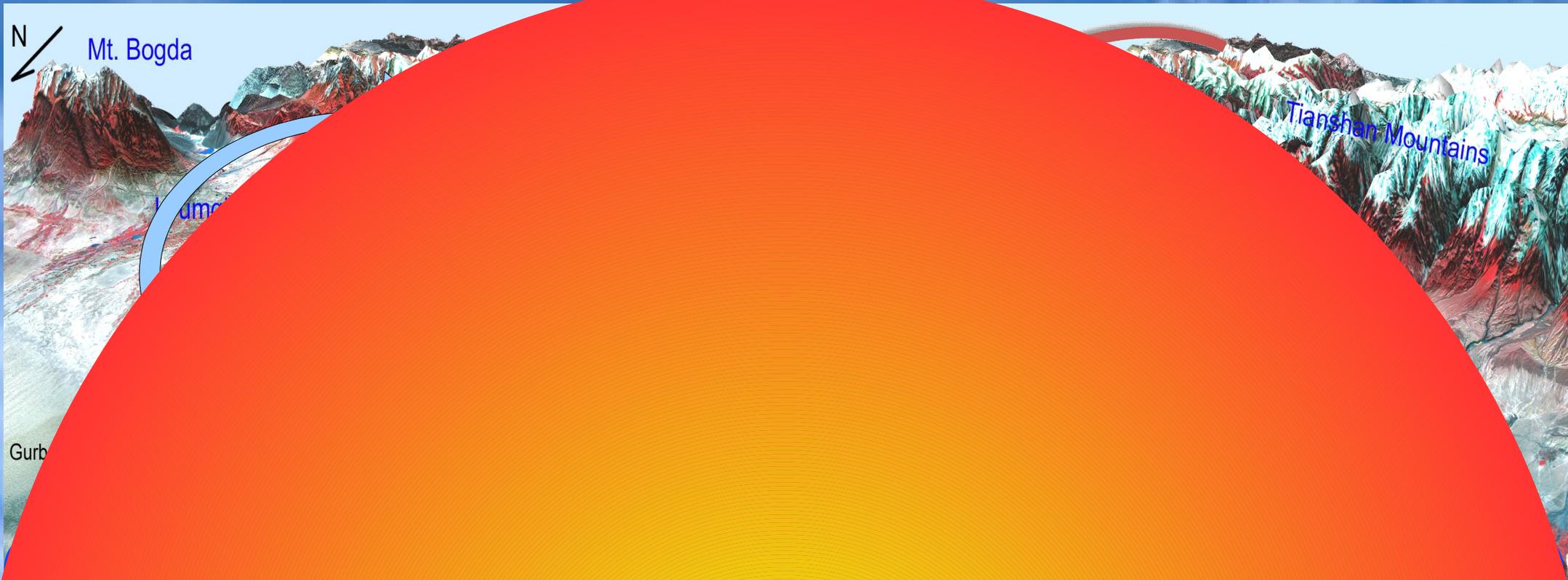
# Interaction between oasis, desert and urban areas within an arid mountains-desert system in Xinjiang

Rafiq Hamdi,  
Peng Cai, Heuli He, Miao Zhang, Prof. Luo Geping

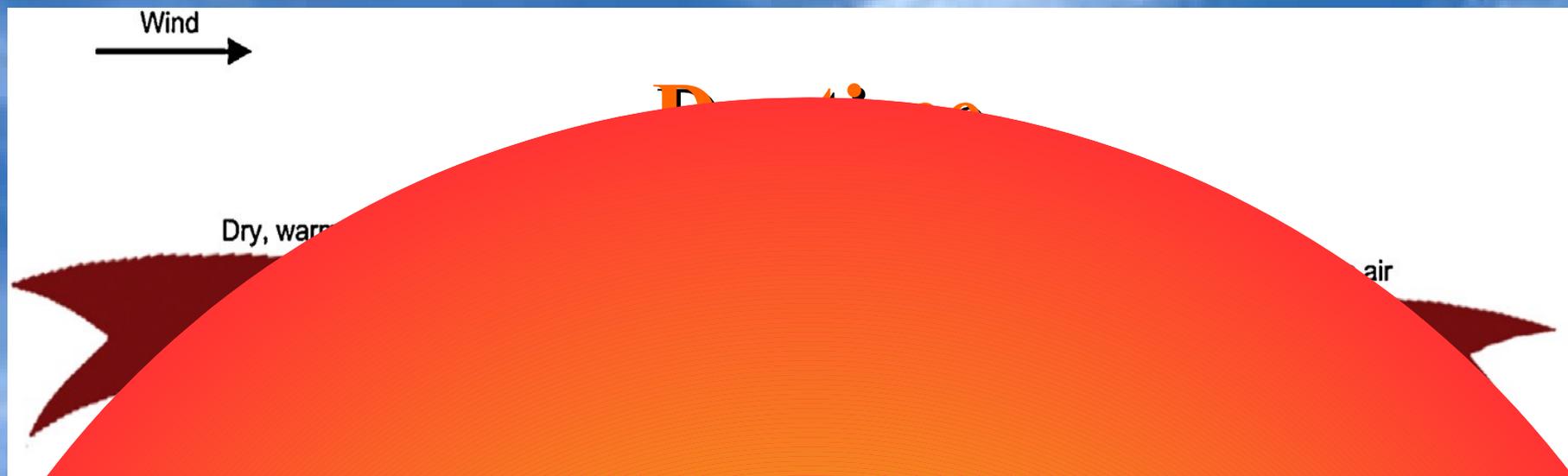
Royal Meteorological Institute, Brussels, Belgium.



# Mountain-Plain Circulation: MPC



# Oasis Breeze Circulation: OBC



# Urban Breeze Circulation: UBC

## Daytime



**At the RMI, ALARO-0, is a version of the ARPEGE-ALADIN operational LAM with a revised and modular structure of the physical parametrizations (Gerard et al. 2009).**

**A specific approach is adopted, with an integrated sequential treatment of resolved condensation, deep convection, and microphysics together with other variables. this new version allows for the production of consistent and accurate results down to less than 4 km.**

**A version at ~4km**



## Tiling

One important feature of the externalized surface: each grid cell is divided into 4 elementary units called tiles according to the fraction of covers in the grid cell

orographic friction

**Snow processes :**  
Bulk to detailed  
snow processes  
models

**Land surface**  
energy  
Hydro

**Lakes :**  
Surface flux  
Bulk



## INLINE MODE

Surfex output as surface boundary conditions for atmospheric radiation and turbulent scheme.

albedo  
emissivity  
radiative temperature  
momentum flux  
sensible heat  
latent heat  
CO<sub>2</sub> flux  
che

atmospheric forcing  
radiative flux

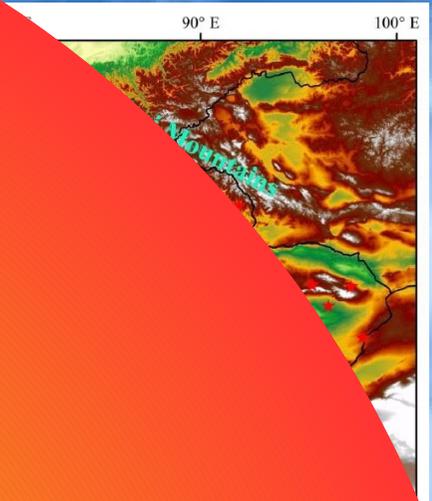


# Regional climate simulations using ALARO-SURFEX: Summers 2001-2013

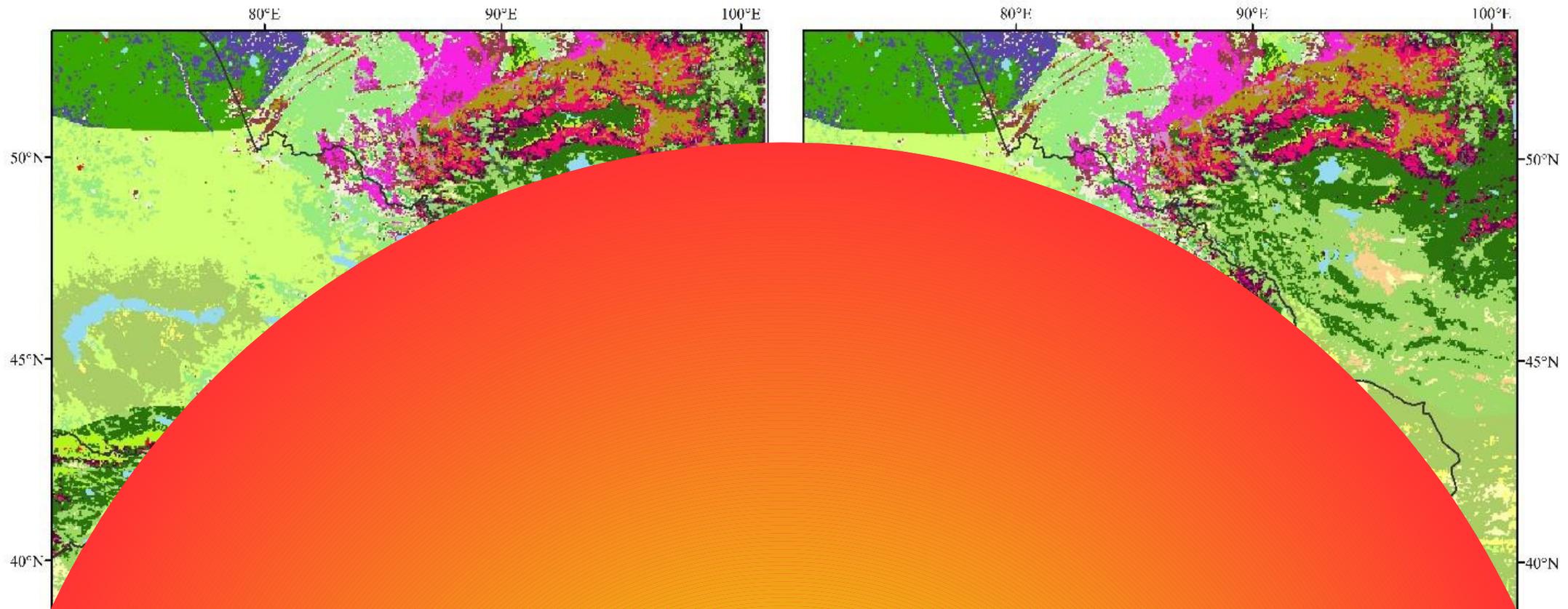
50 km ALARO

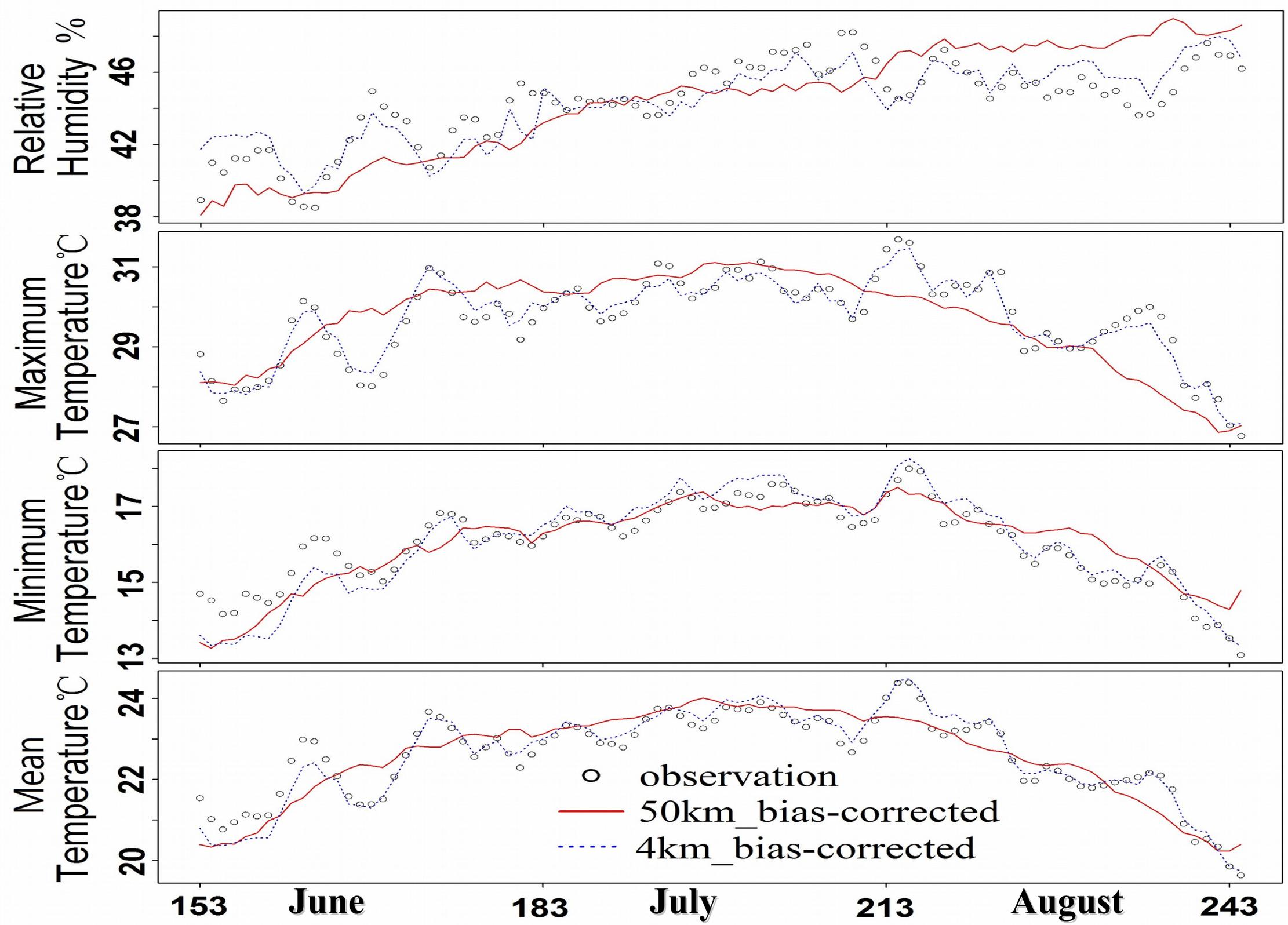
50 km ALARO+SURFEX

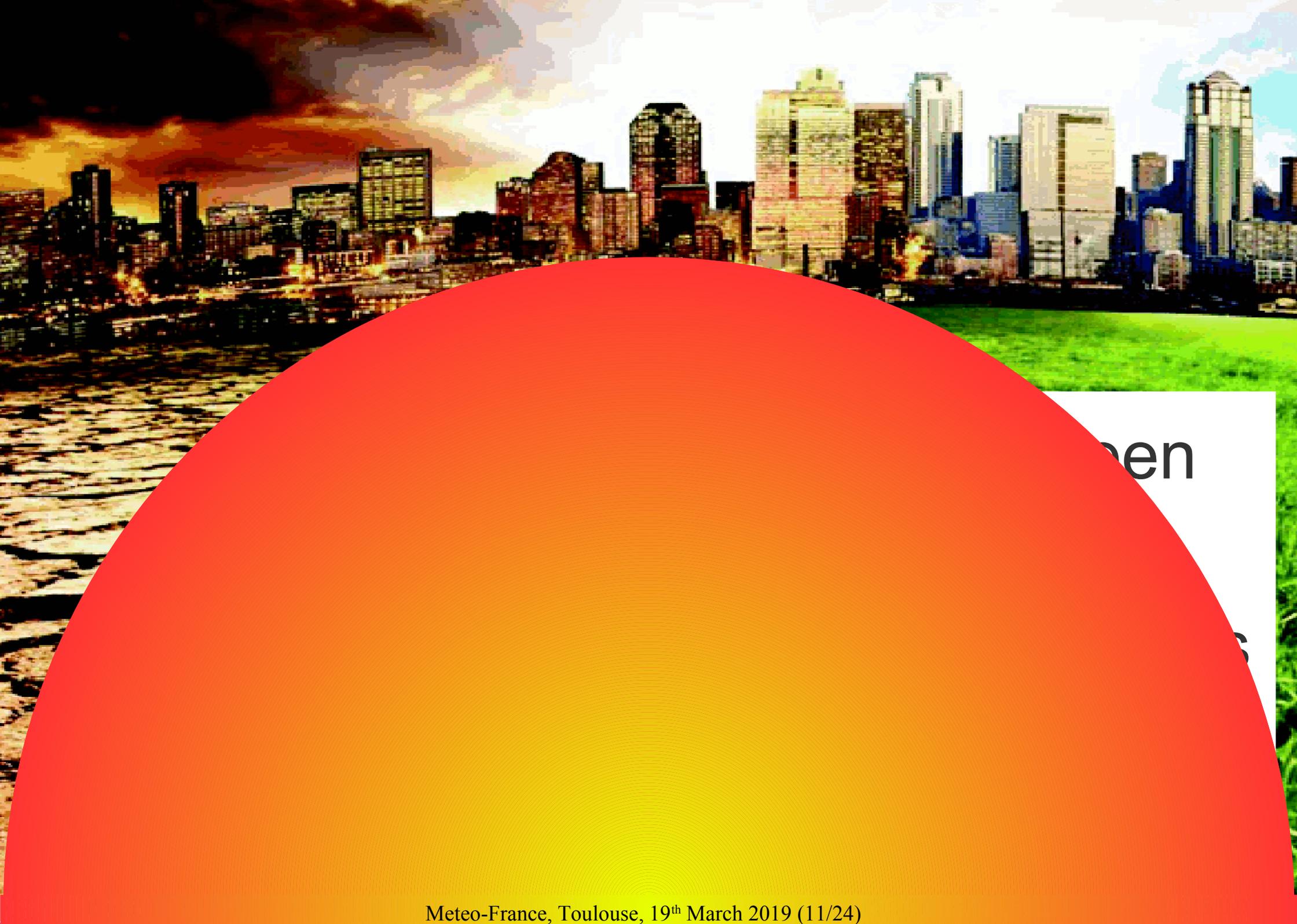
ERA-Interim



# ECOCLIMAP Versus XIEG land-use land cover data base

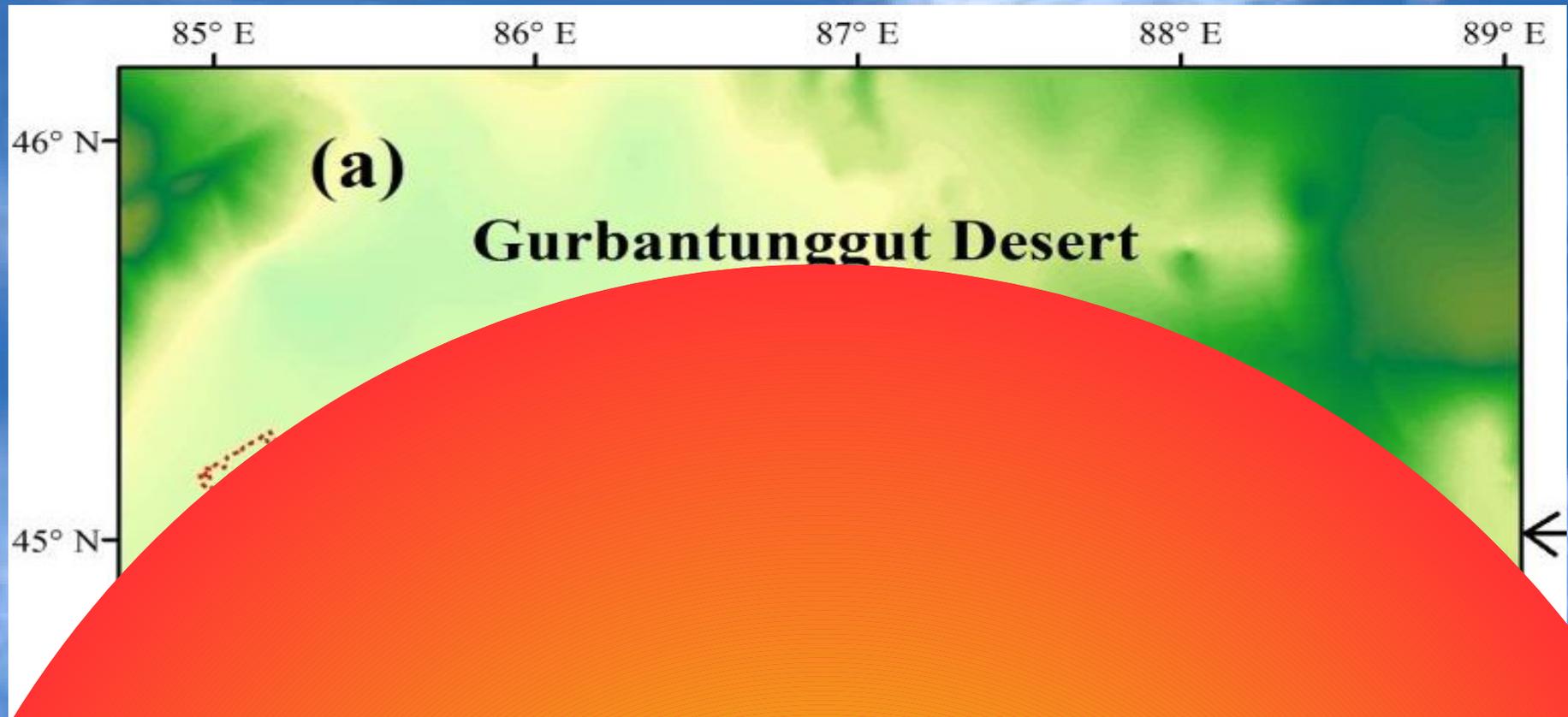




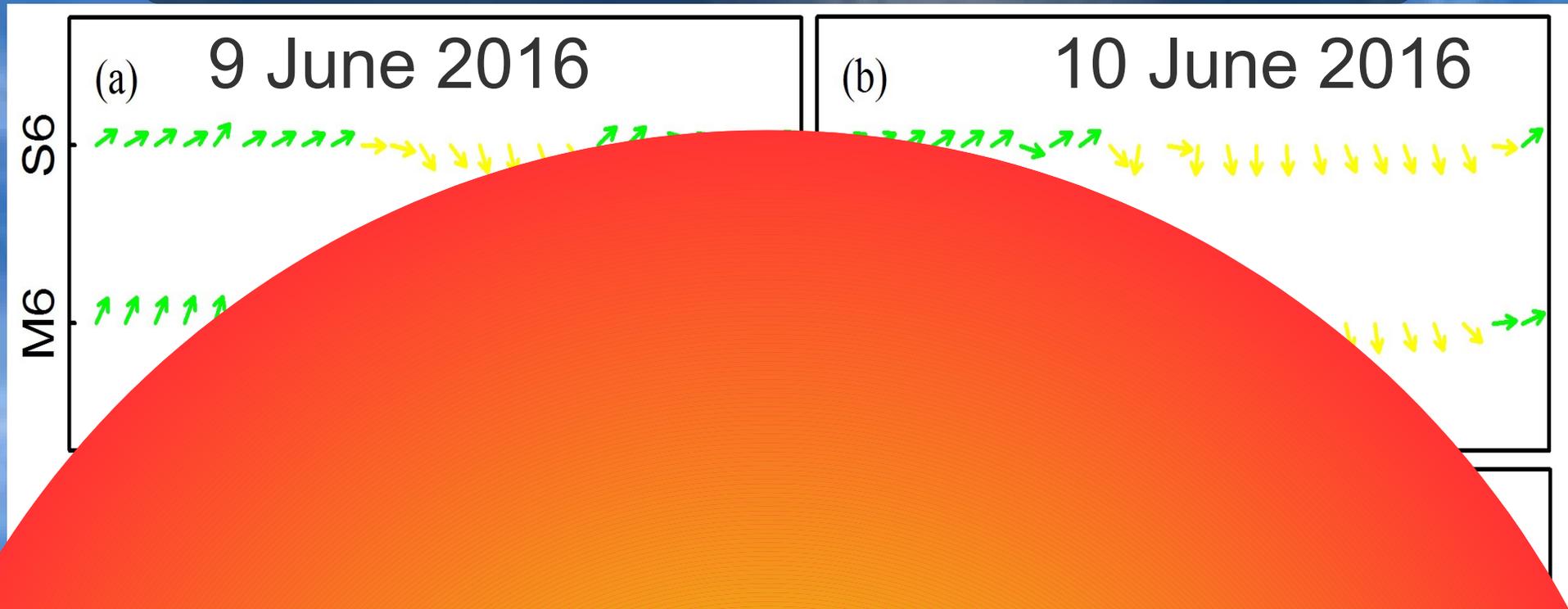


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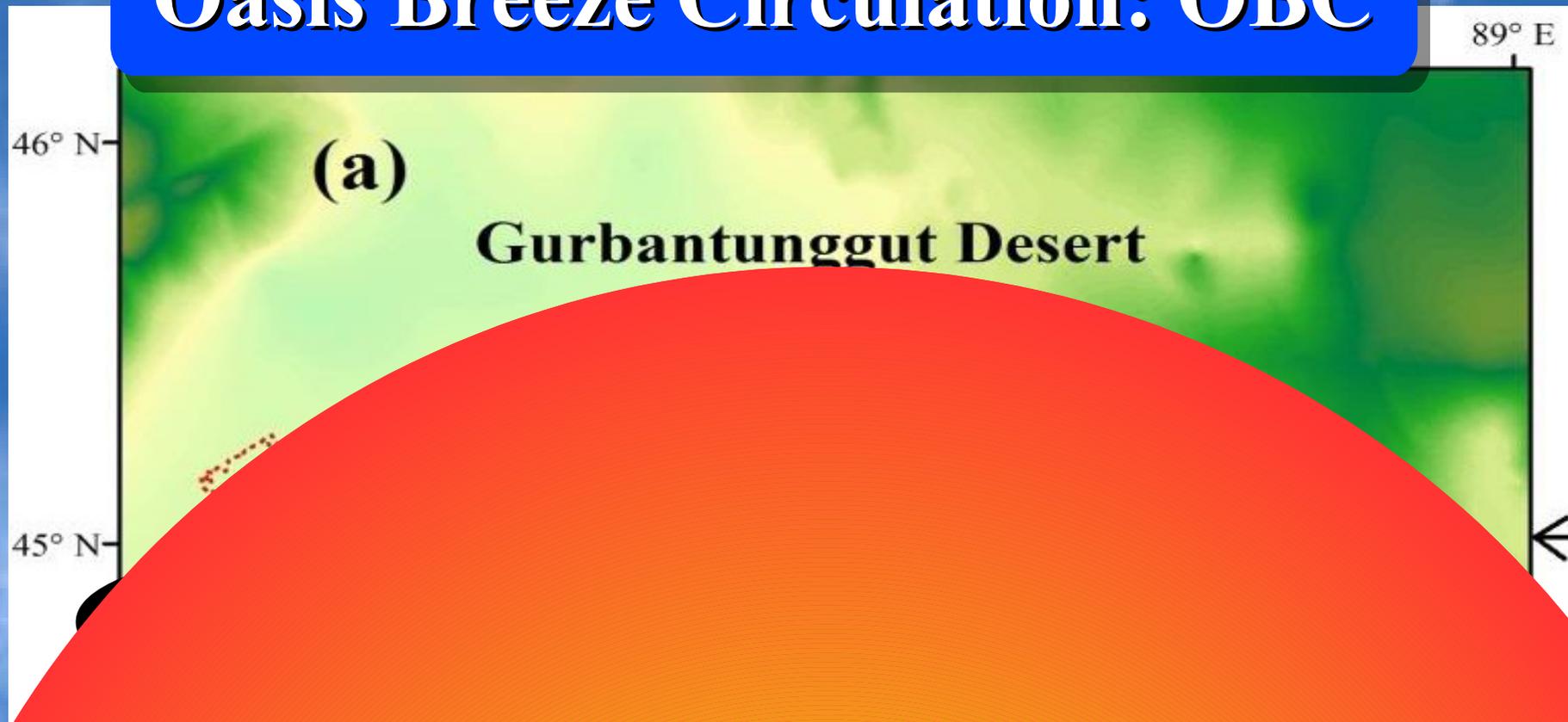
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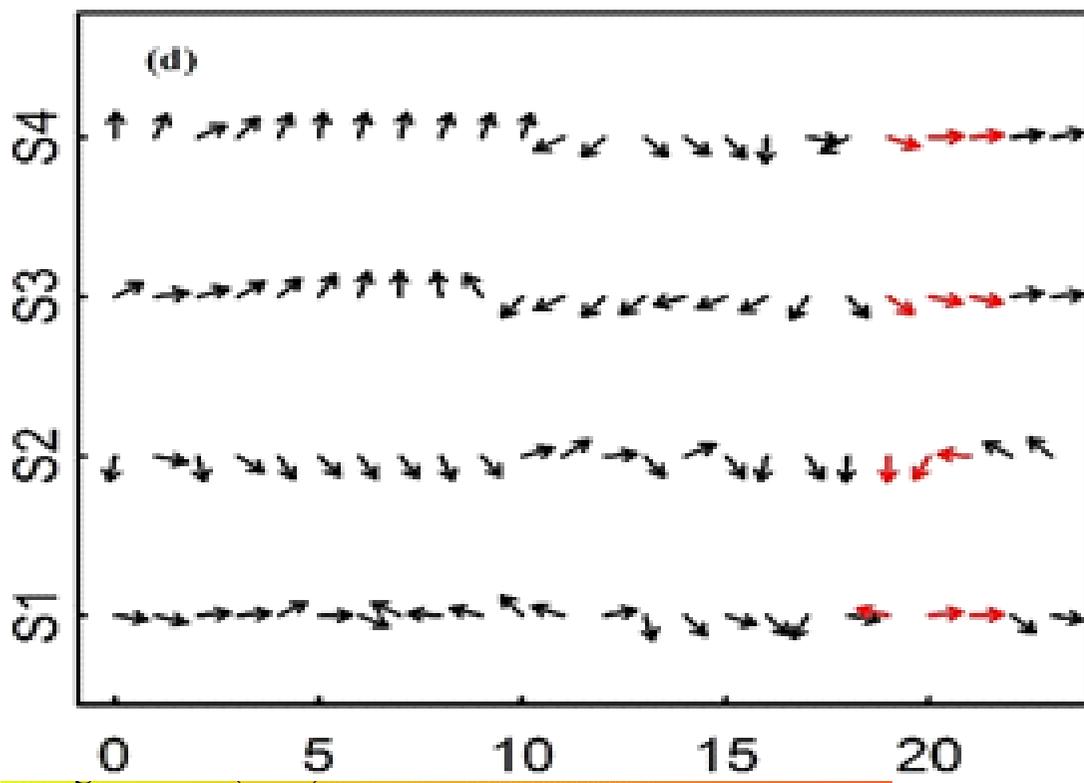
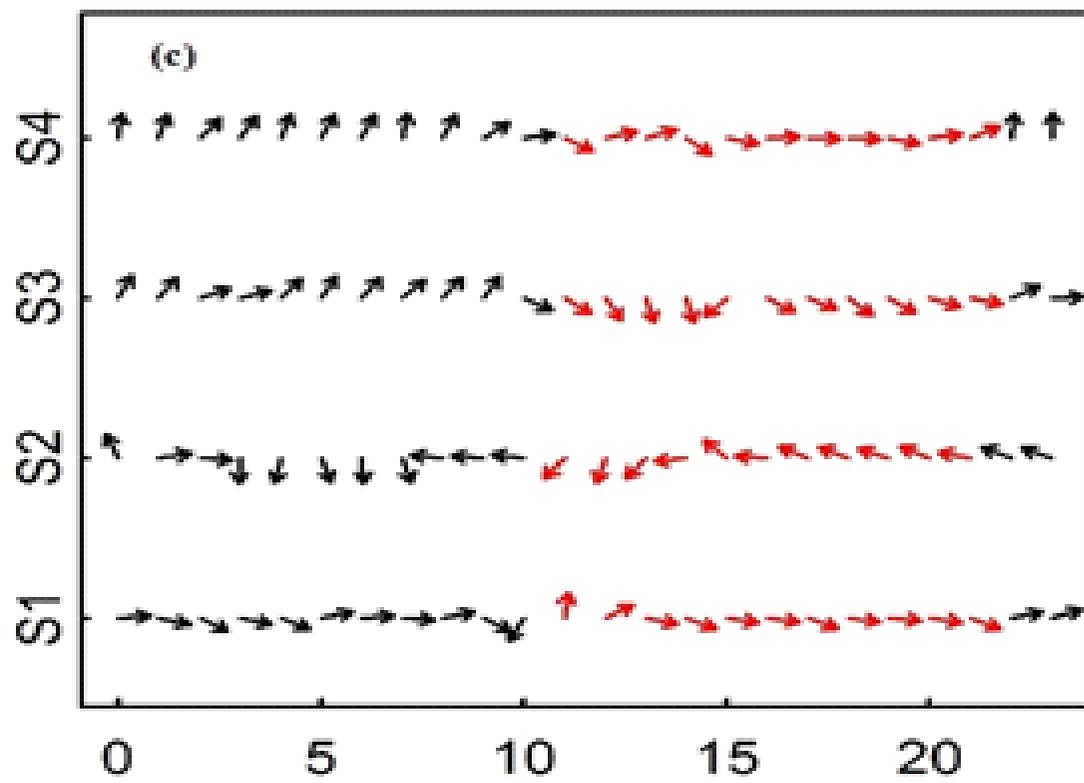
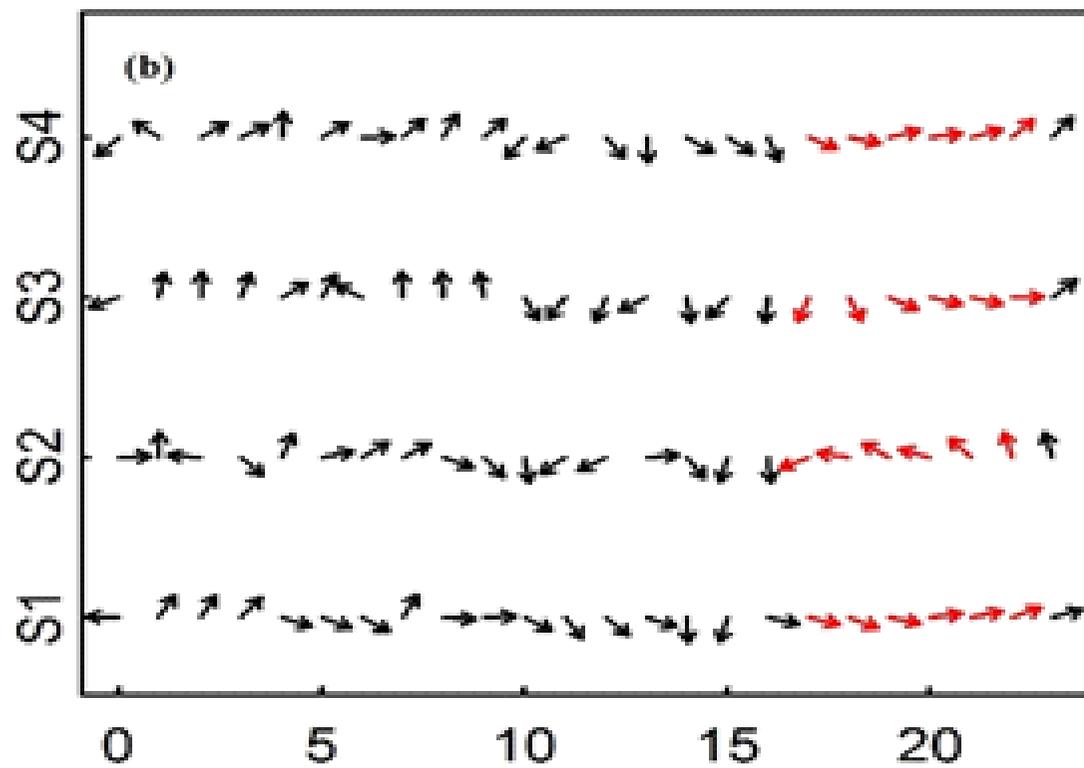
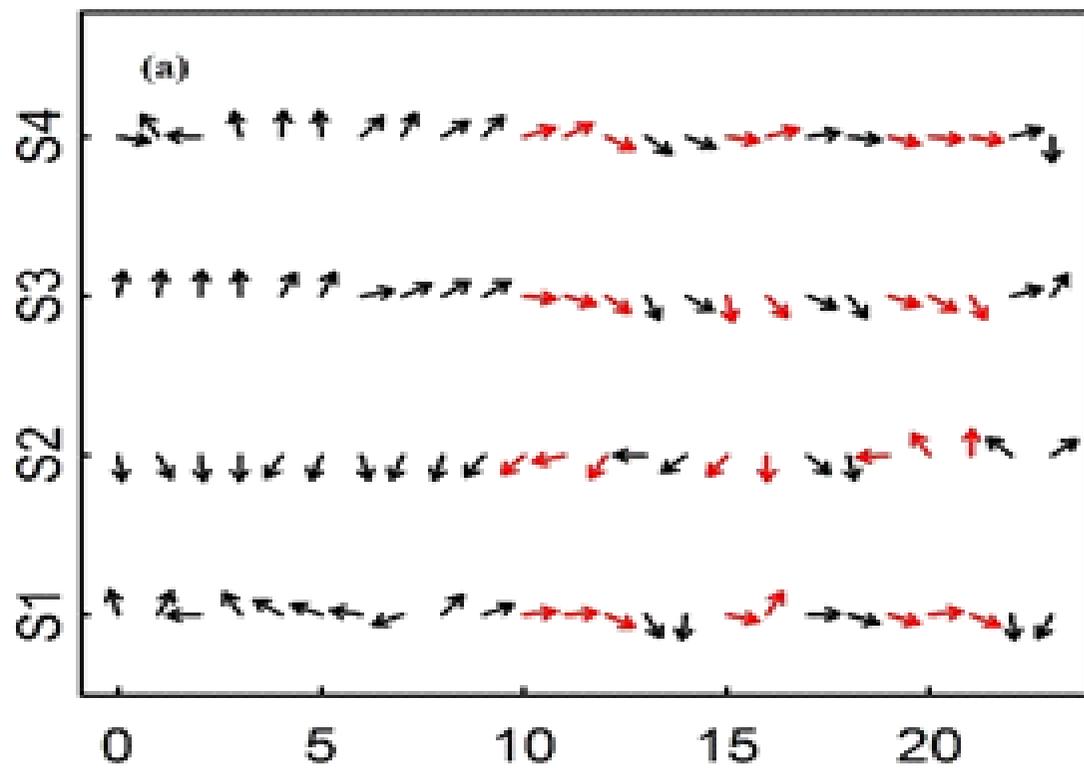


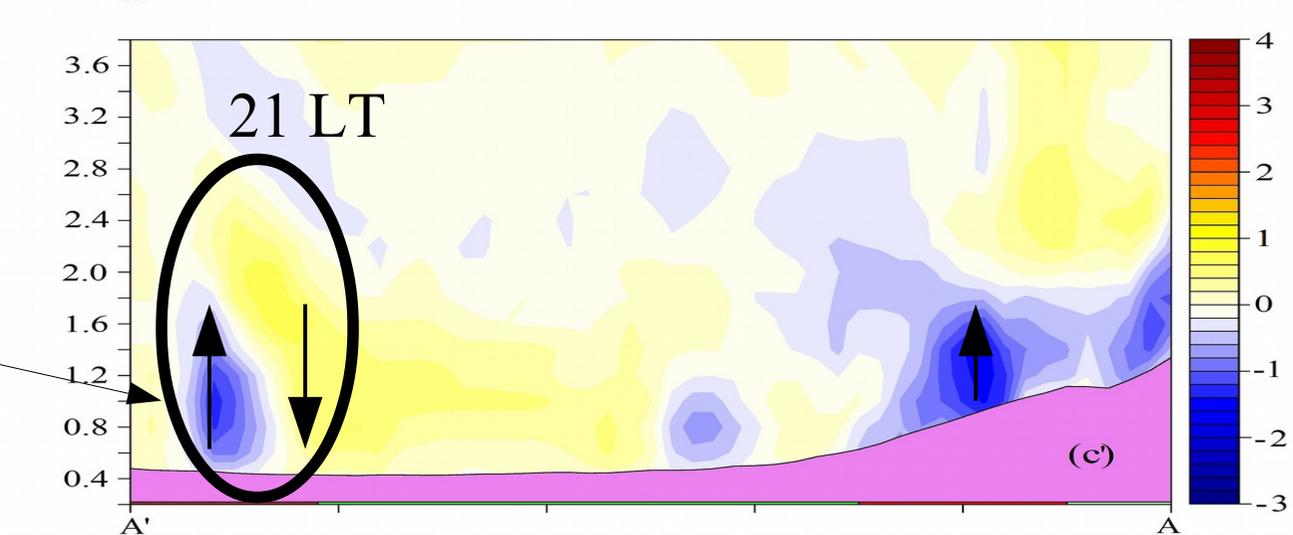
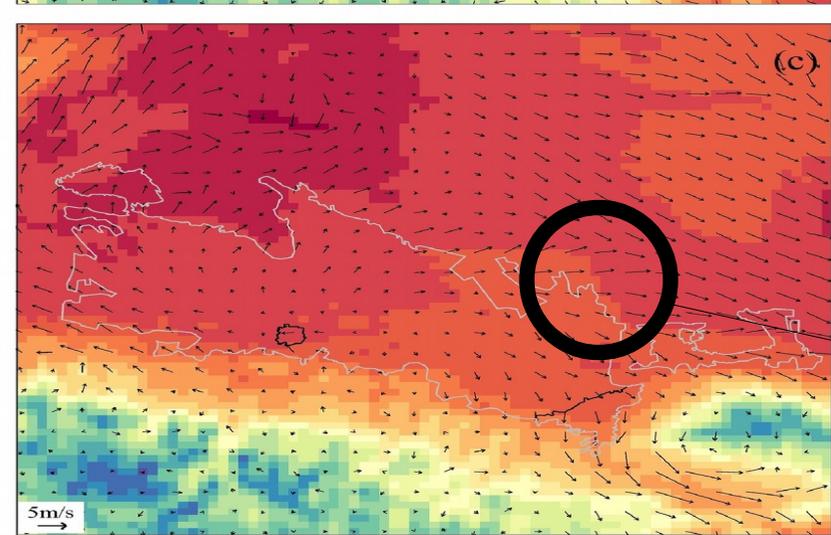
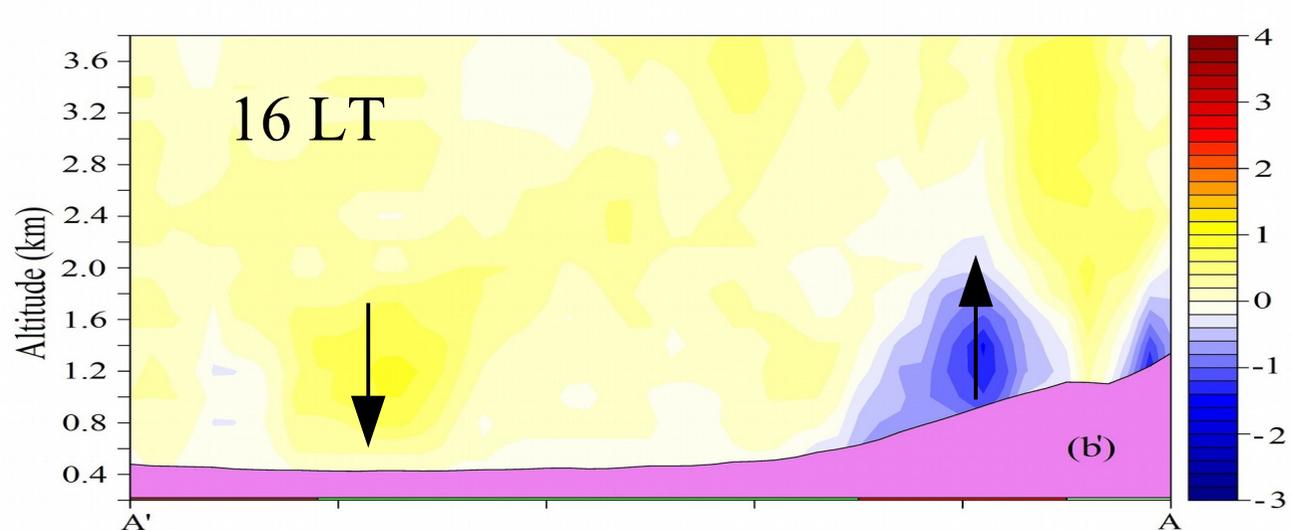
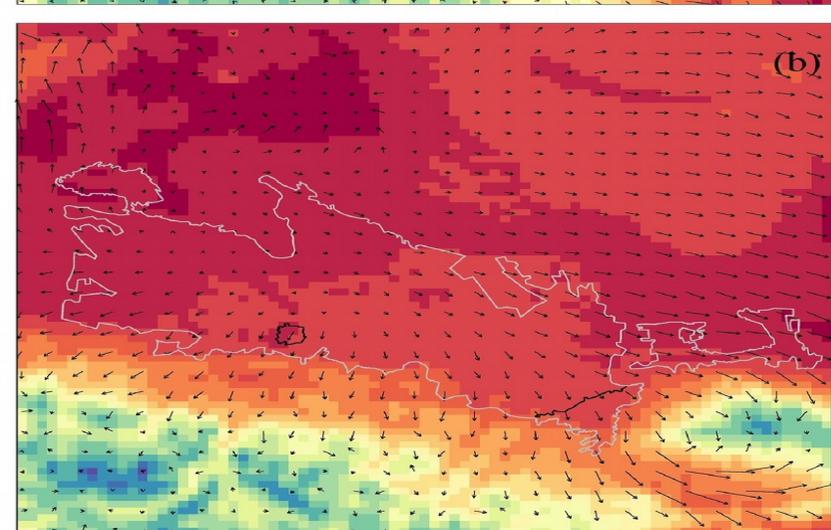
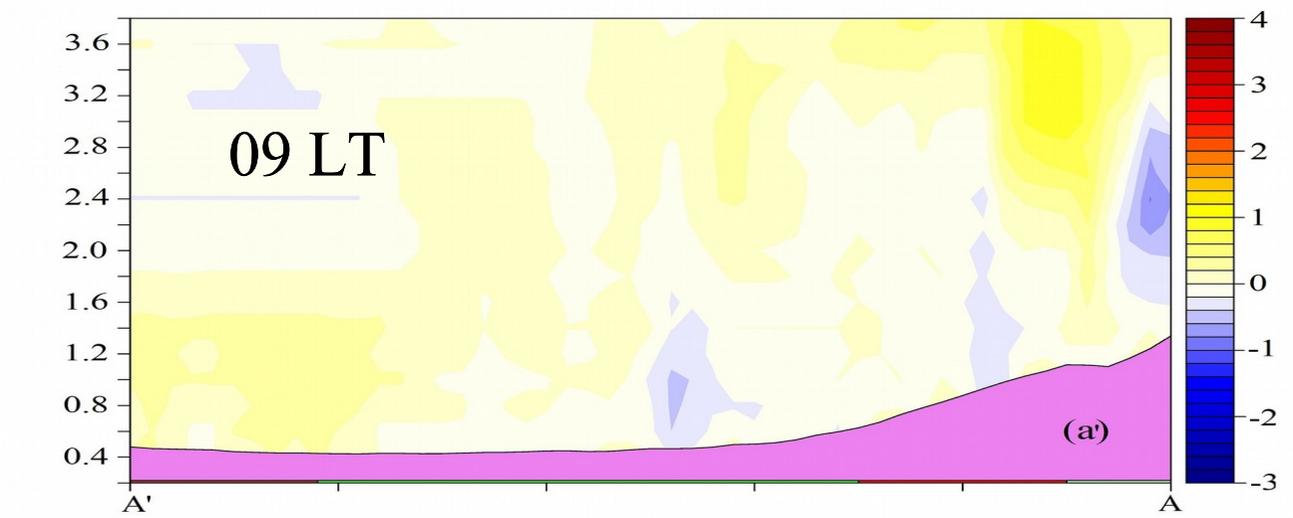
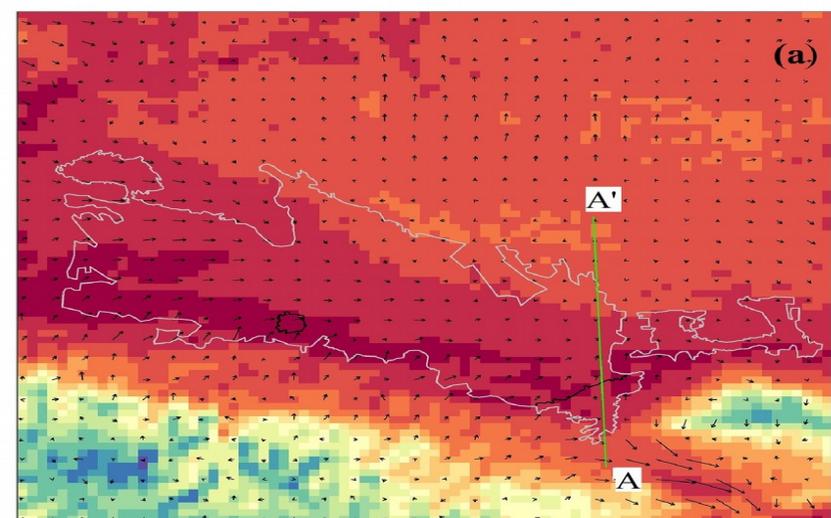
# Mountain-Plain Circulation: MPC



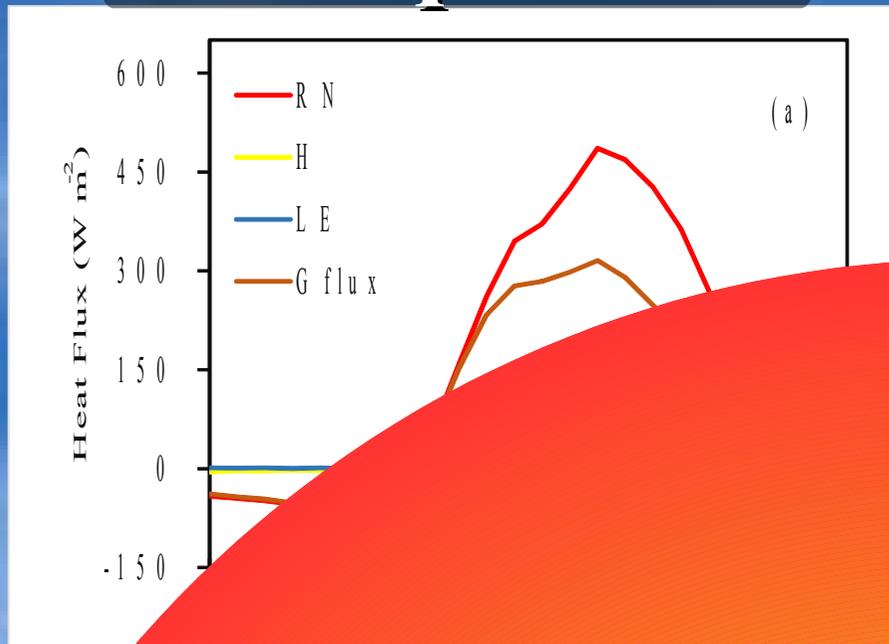
# Oasis Breeze Circulation: OBC



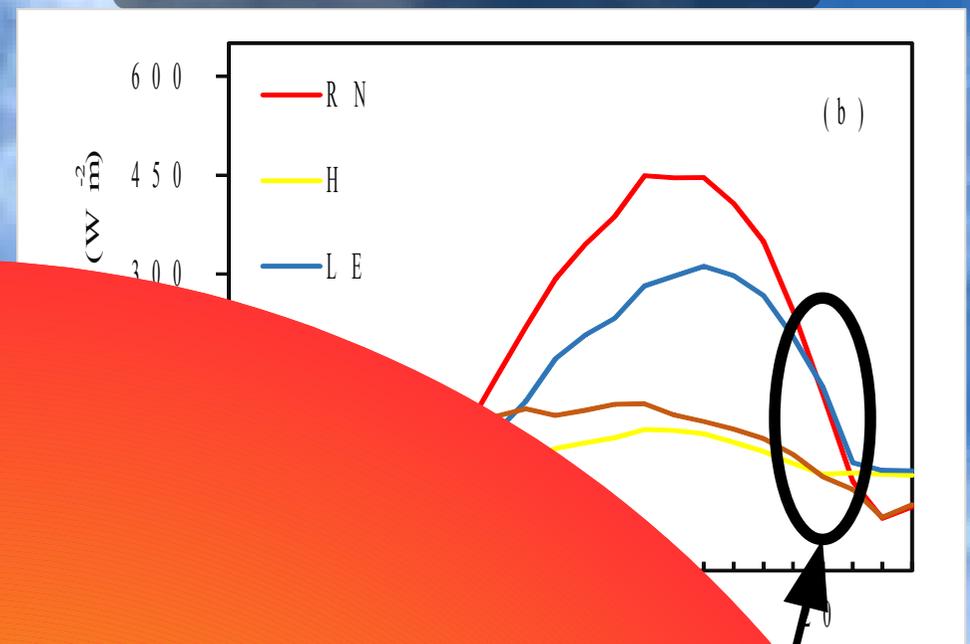


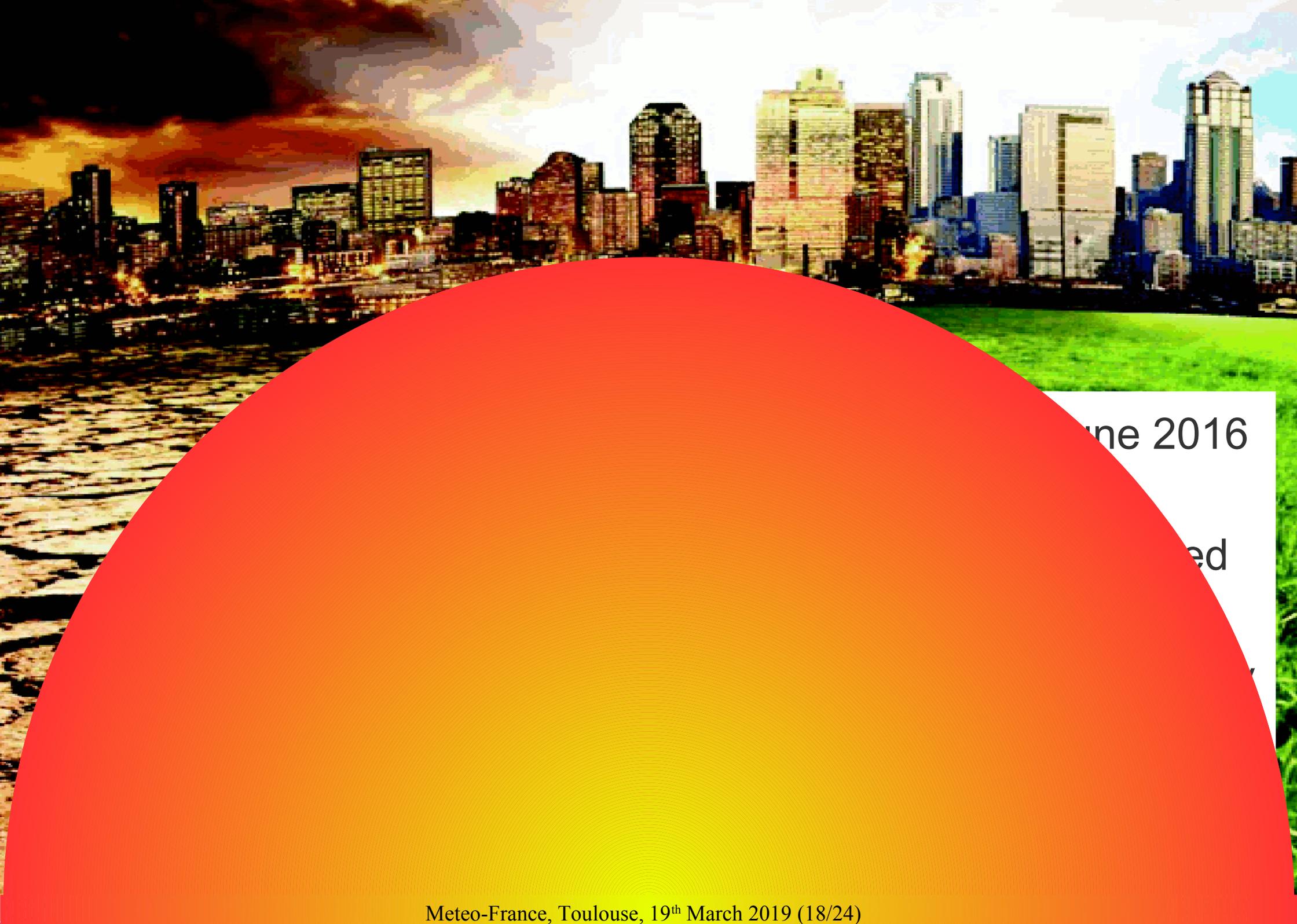


# Urumqi center



# Oasis center





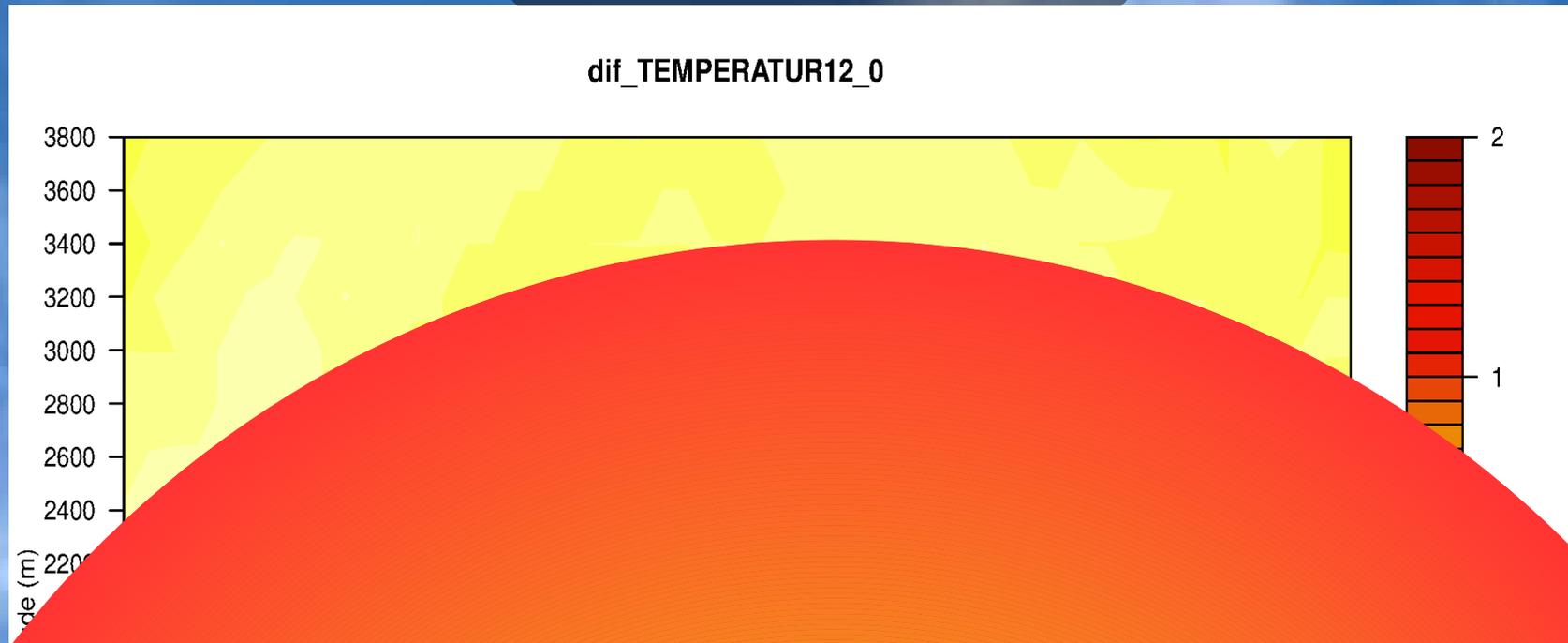
June 2016

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# 2 - 3 : OBC

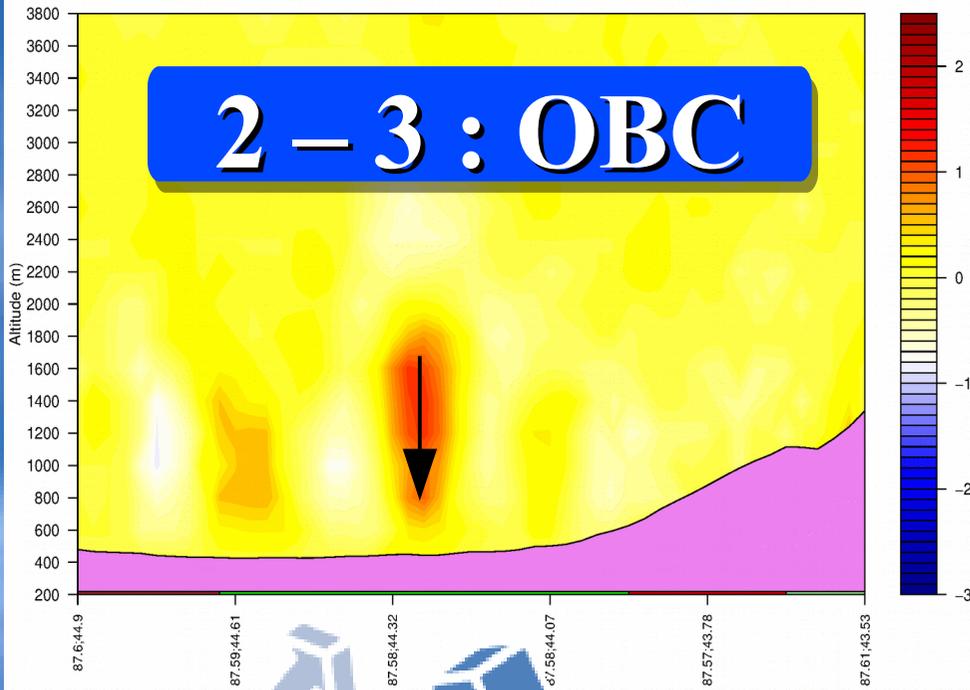


# 1 - 2 : UBC



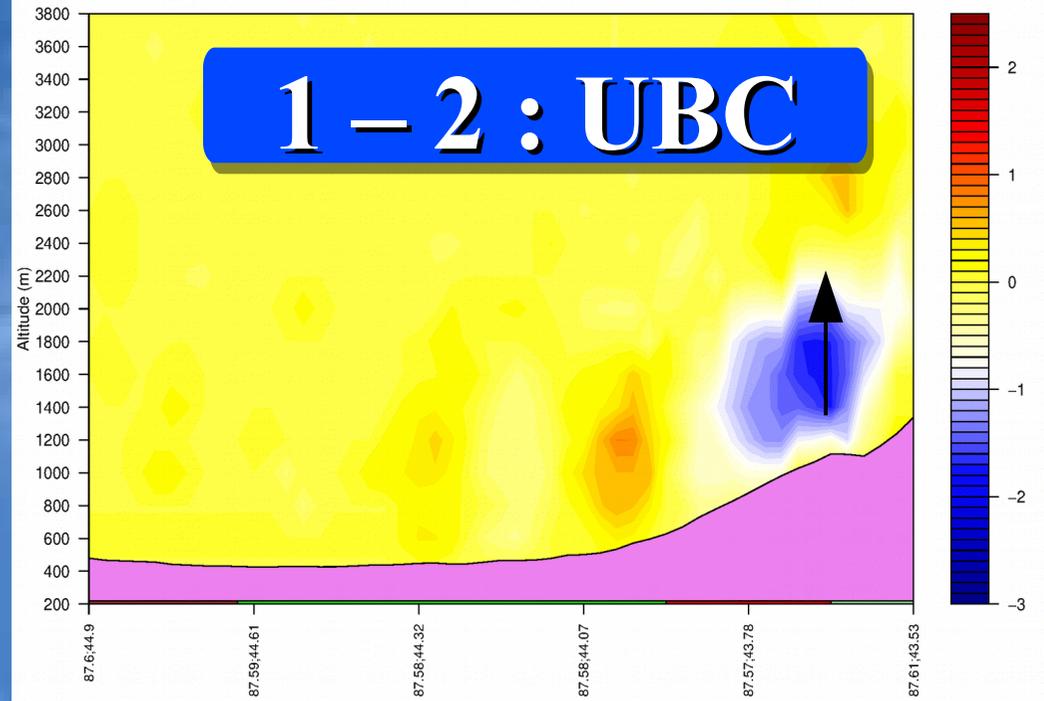
dif\_VITESSE\_VE12\_19

2 - 3 : OBC



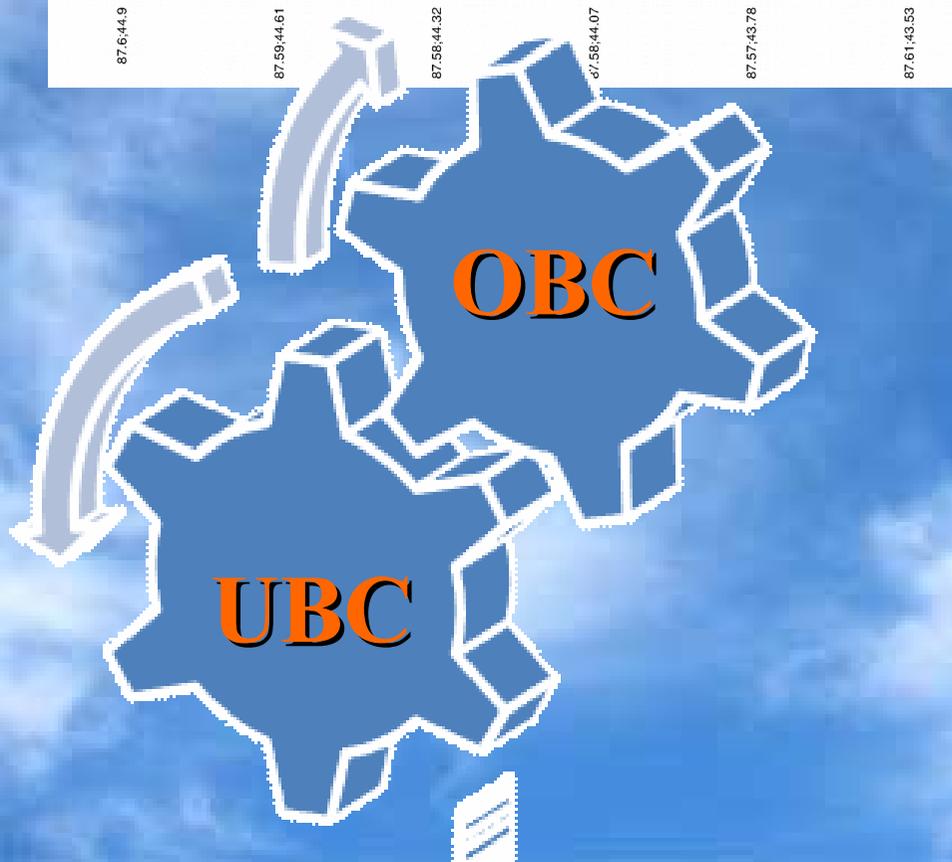
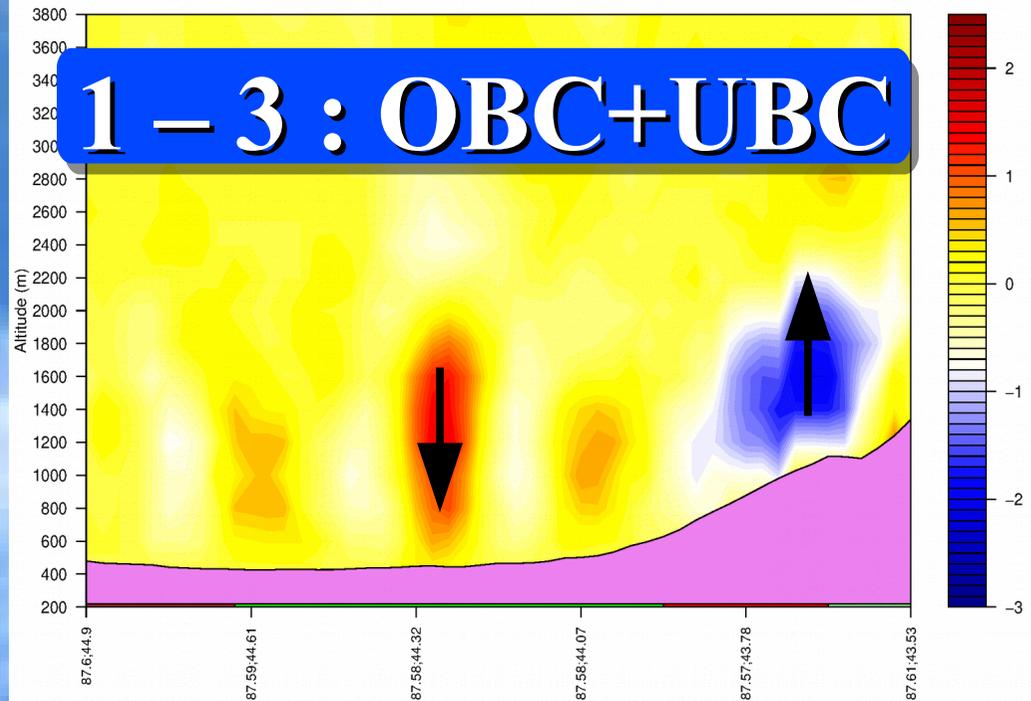
dif\_VITESSE\_VE12\_19

1 - 2 : UBC



dif\_VITESSE\_VE12\_19

1 - 3 : OBC+UBC



# Key messages

1. ALARO is validated over Xinjiang at 50km and 4km using updated land-use land cover database.

2. High resolution simulation of the regional climate in the north of Ti

3. Oasis impact on the atmosphere and the surface energy fluxes

4

Y

# Key messages

5. there is a synergistic interaction between Oasis Breeze Circulation and Urban Breeze Circulation from 16LT onwards. The interaction is stronger with maximum effect at 19LT.

6. Oasis expansion in Urumqi and Sheherzadeh

7. During effect

8

U

# Key messages

9. the oasis cold island is symmetric to the UHI with bigger values during the night than during the day and the temperature expansion is more during the night with a slight decrease during the day.

10. A temperature inversion is observed during the night and early morning.



# Thank you

# 谢谢



中国科学院  
CHINESE ACADEMY OF SCIENCES