



# Do uncertainties in the reconstruction of land cover affect the simulation of temperature and rainfall in the CORDEX region of East Asia?

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# Outline

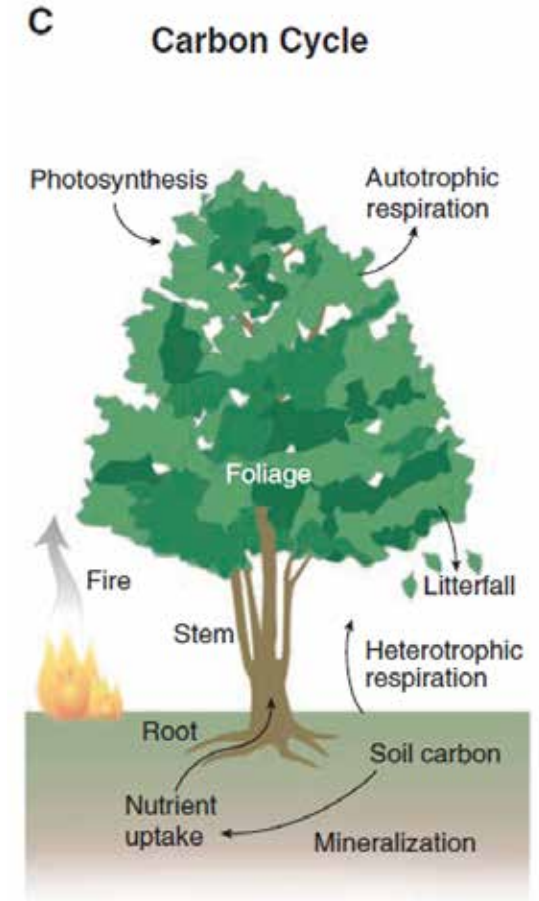
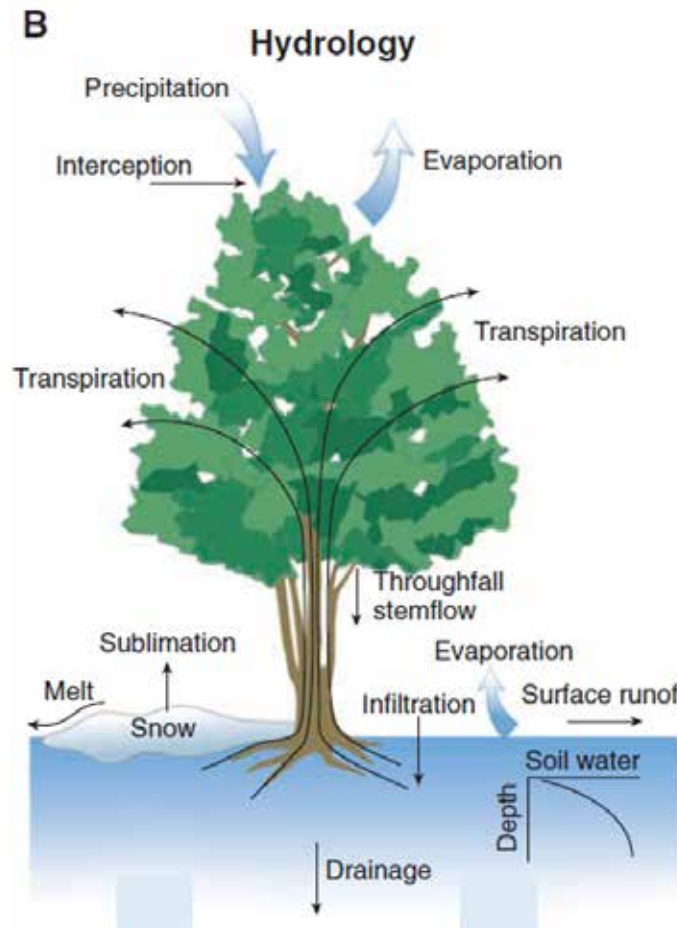
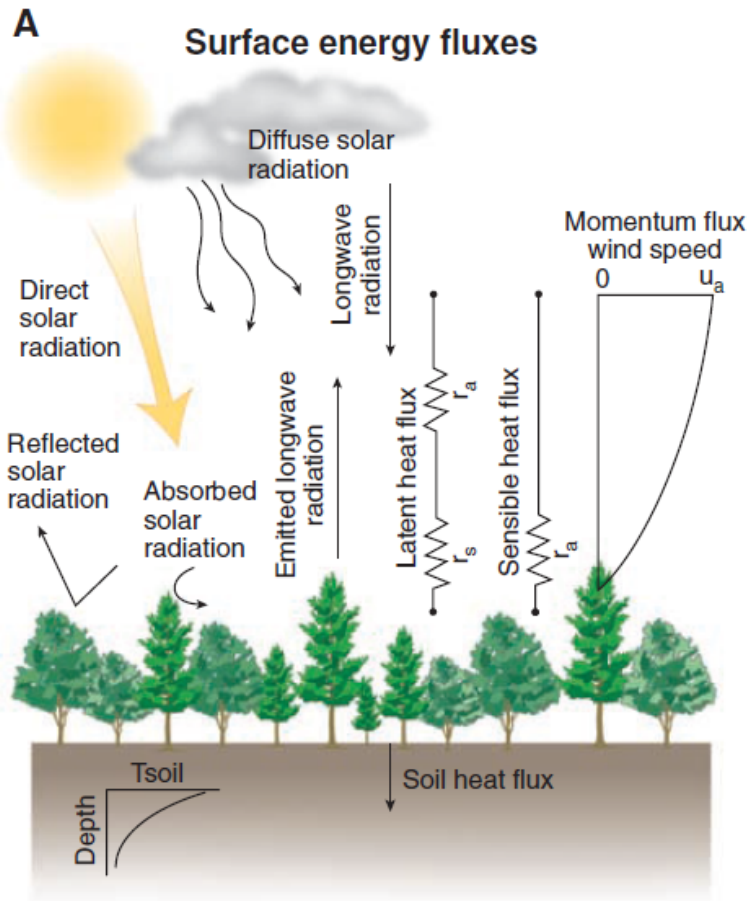
➤ Introduction

➤ Methods

➤ Results

➤ Conclusions

# Land cover is important

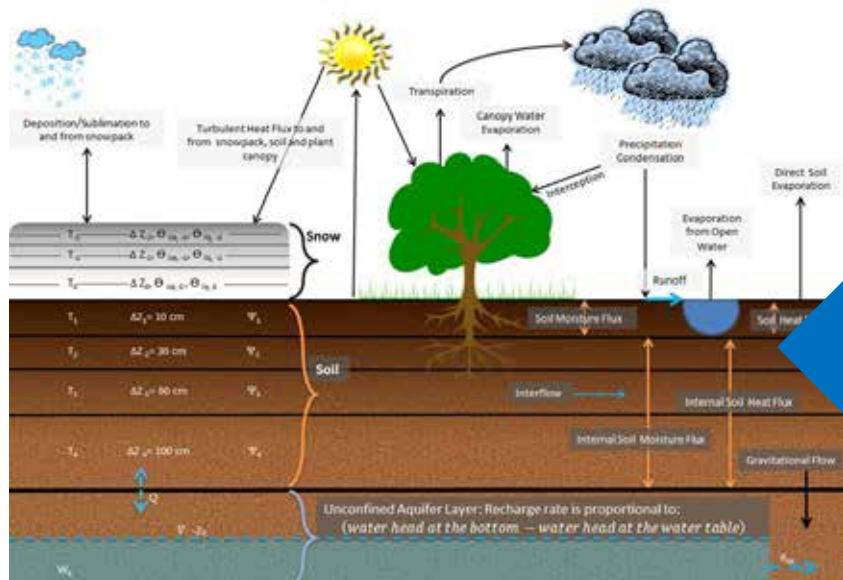


Bonan (2008) *Science*

# Land cover remains uncertain



Coupled model



Satellite observation



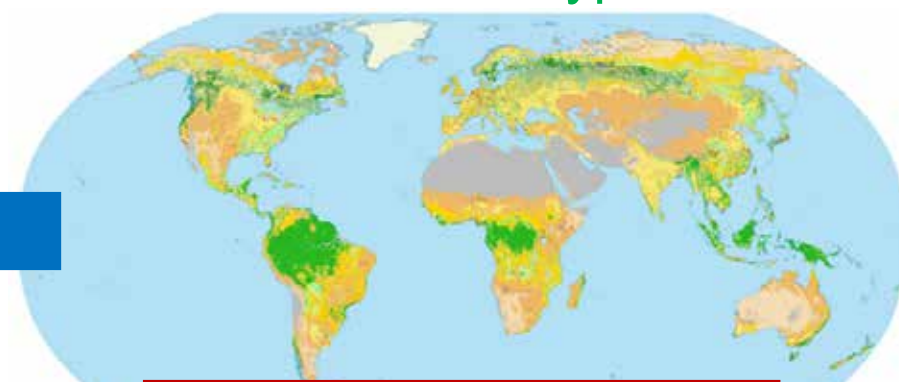
Classification algorithm



+

UNCERTAINTY

Land cover type

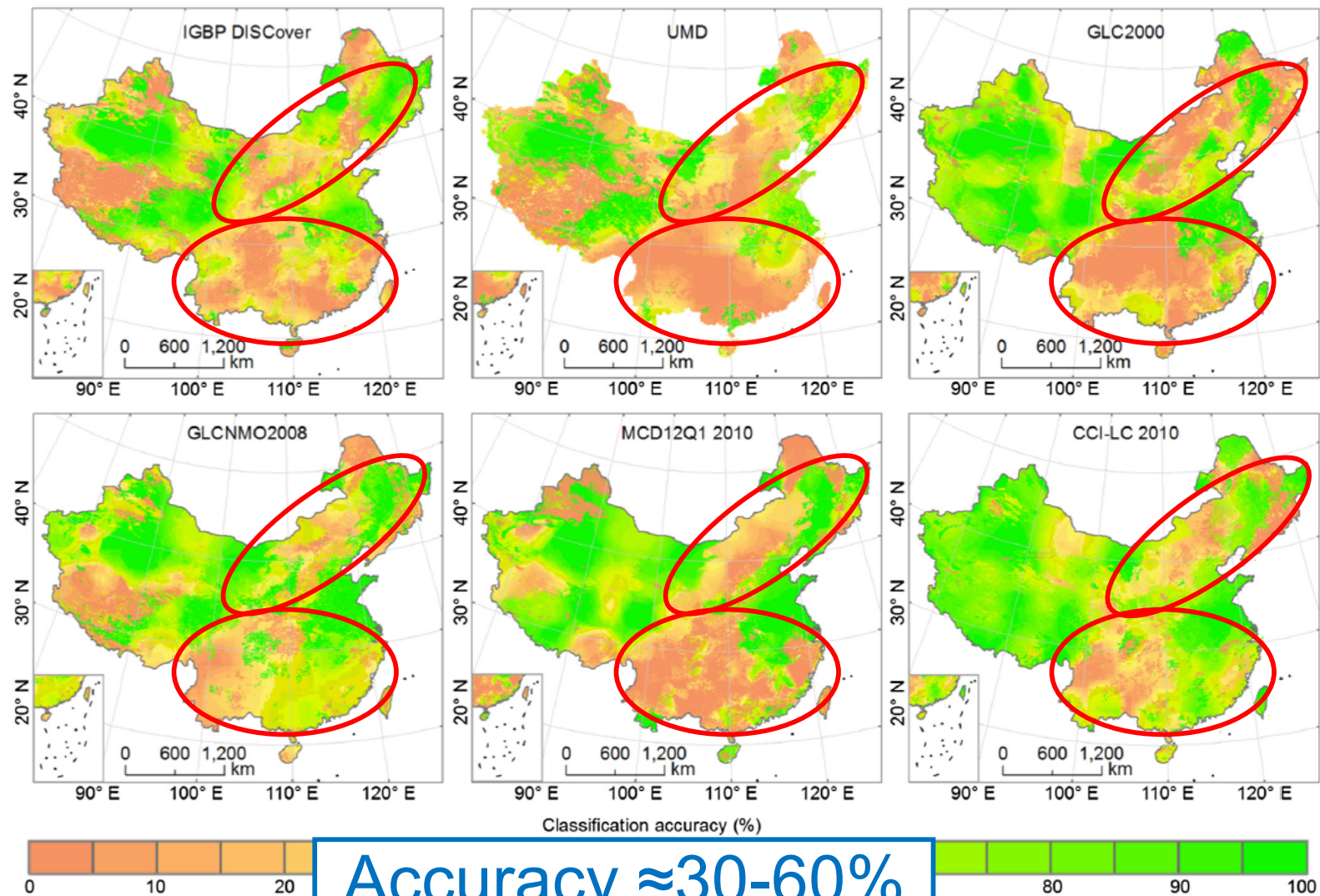


Accuracy  $\approx 60-80\%$

Input



# Large uncertainty over East Asia



Classification accuracy for 6 land cover maps

Yang et al. (2017) *ISPRS J. Photogram*

# Outline

➤ Introduction

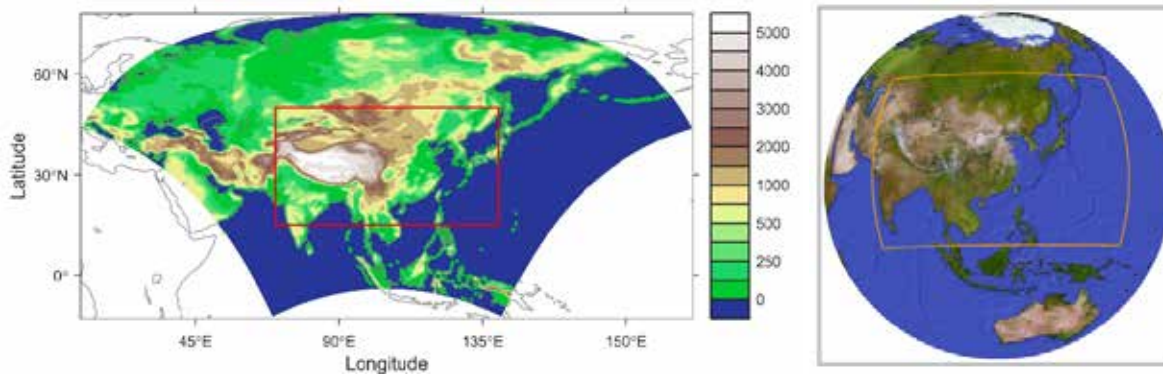
➤ **Methods**

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# Model configuration

## CORDEX-East Asia

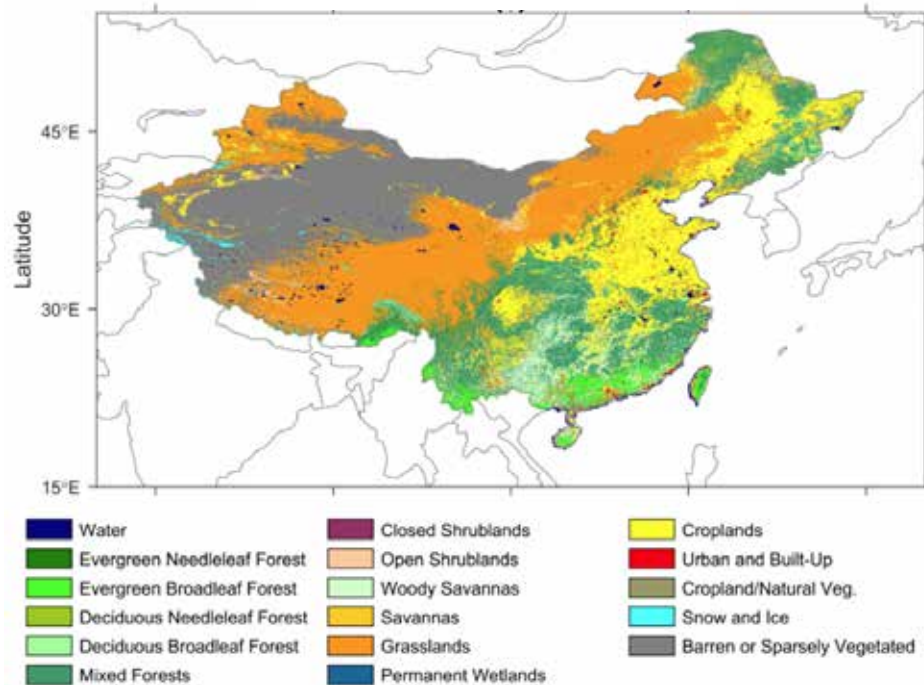


Model	WRF V3.9.1.1
Initial and boundary data	ERA-Interim
Horizontal resolution	50 km
Vertical levels	28
Simulation time	1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015

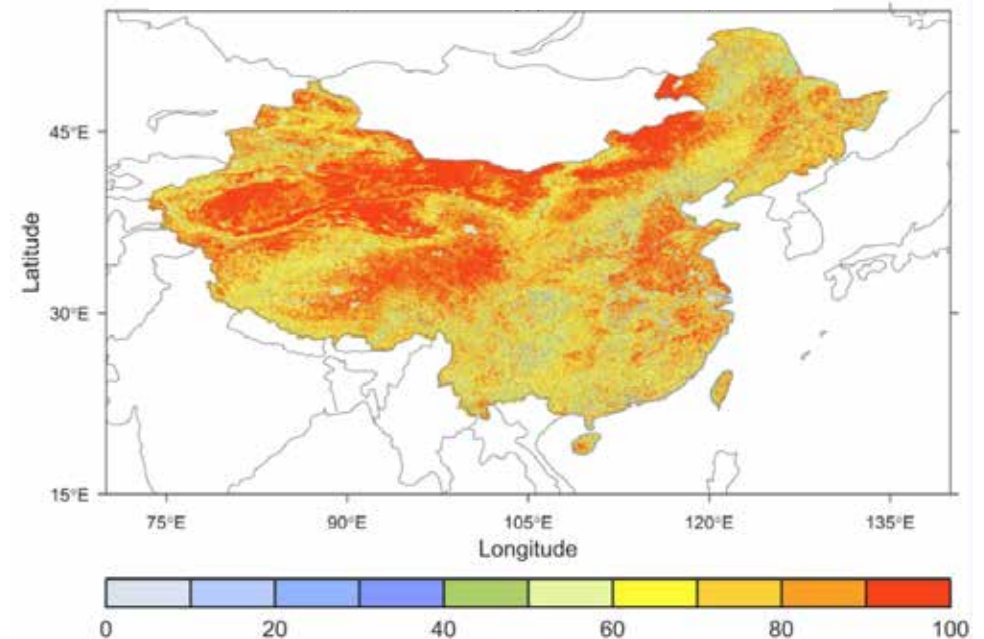
Schemes	Option
PBL	YSU
Convective	Kain-Fritsch
Land surface	Unified Noah
Longwave	CAM
Shortwave	CAM
Microphysics	WSM-6
SST	Update

# Experiment design

Land cover type



Classification confidence



## Experiment

## Land cover

CTL

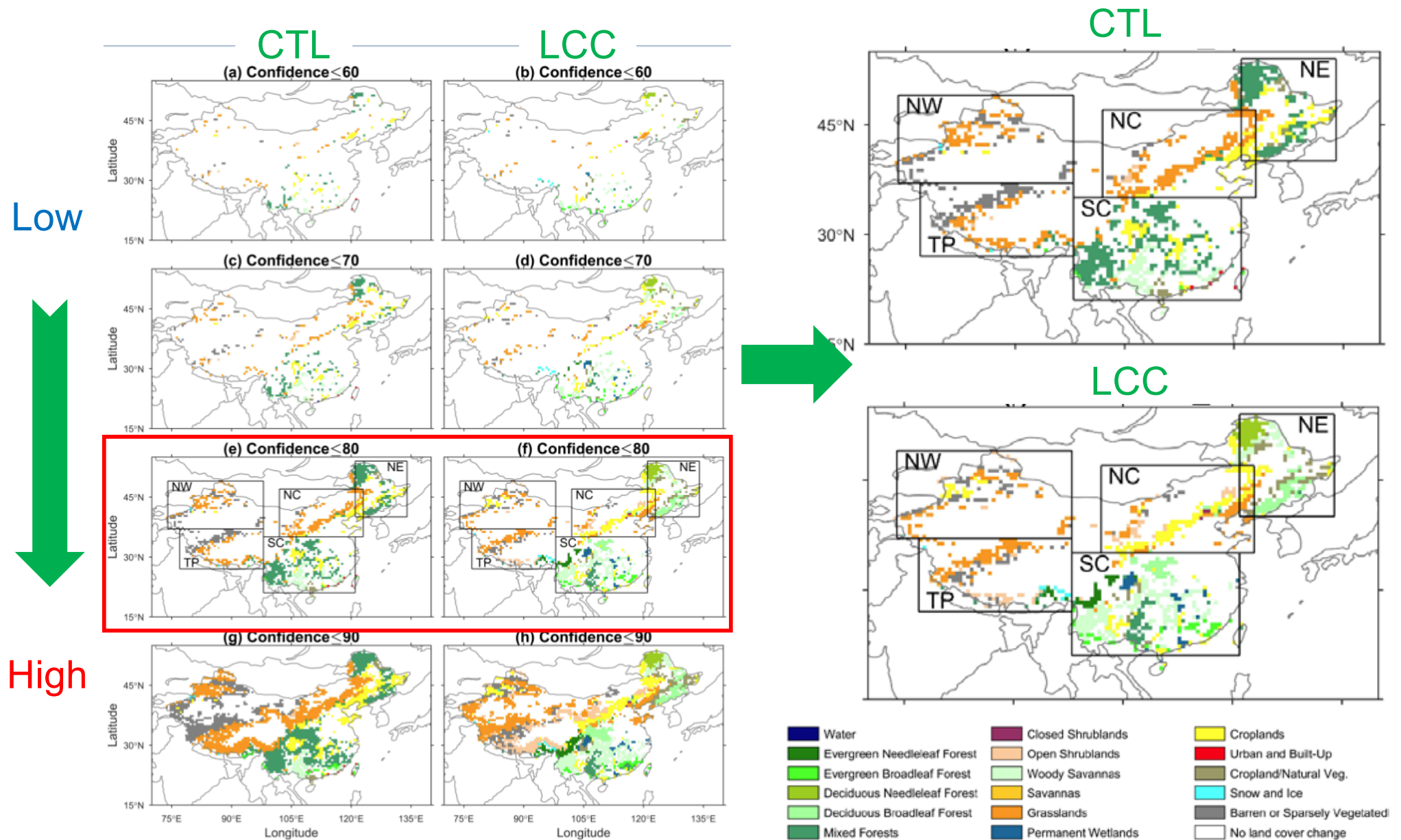
2010 land cover map provided by MODIS

LCC

Same as CTL except replacing the **land cover type** with **secondary land cover type** where the classification confidence below a threshold



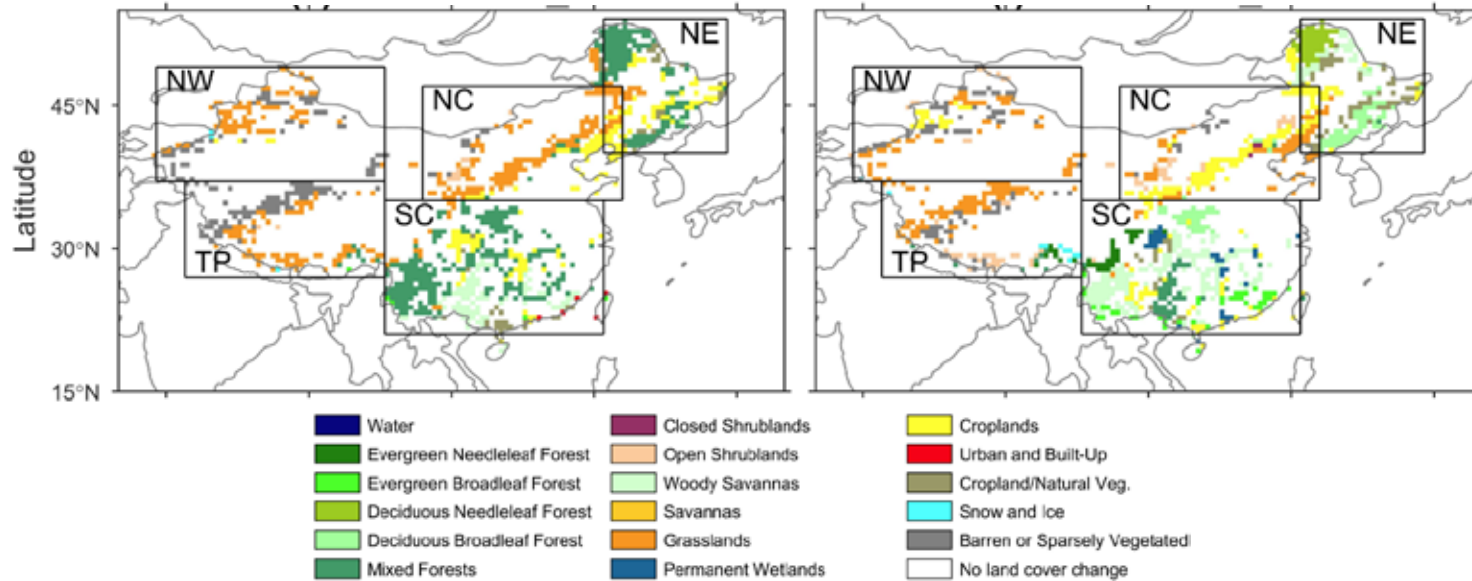
# Experiment design



# Biophysical changes

CTL

LCC

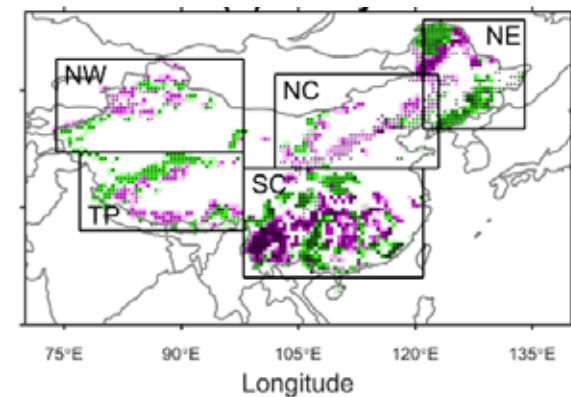
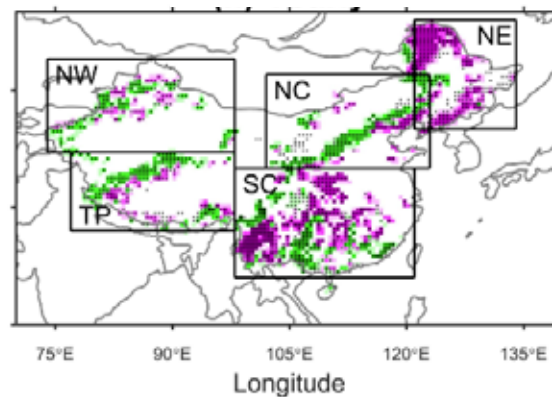
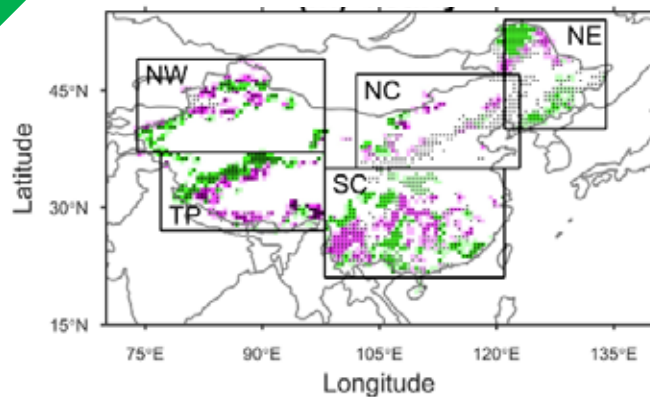


Look-up tables

$\Delta$  albedo

$\Delta$  LAI

$\Delta$  Z0



# Outline

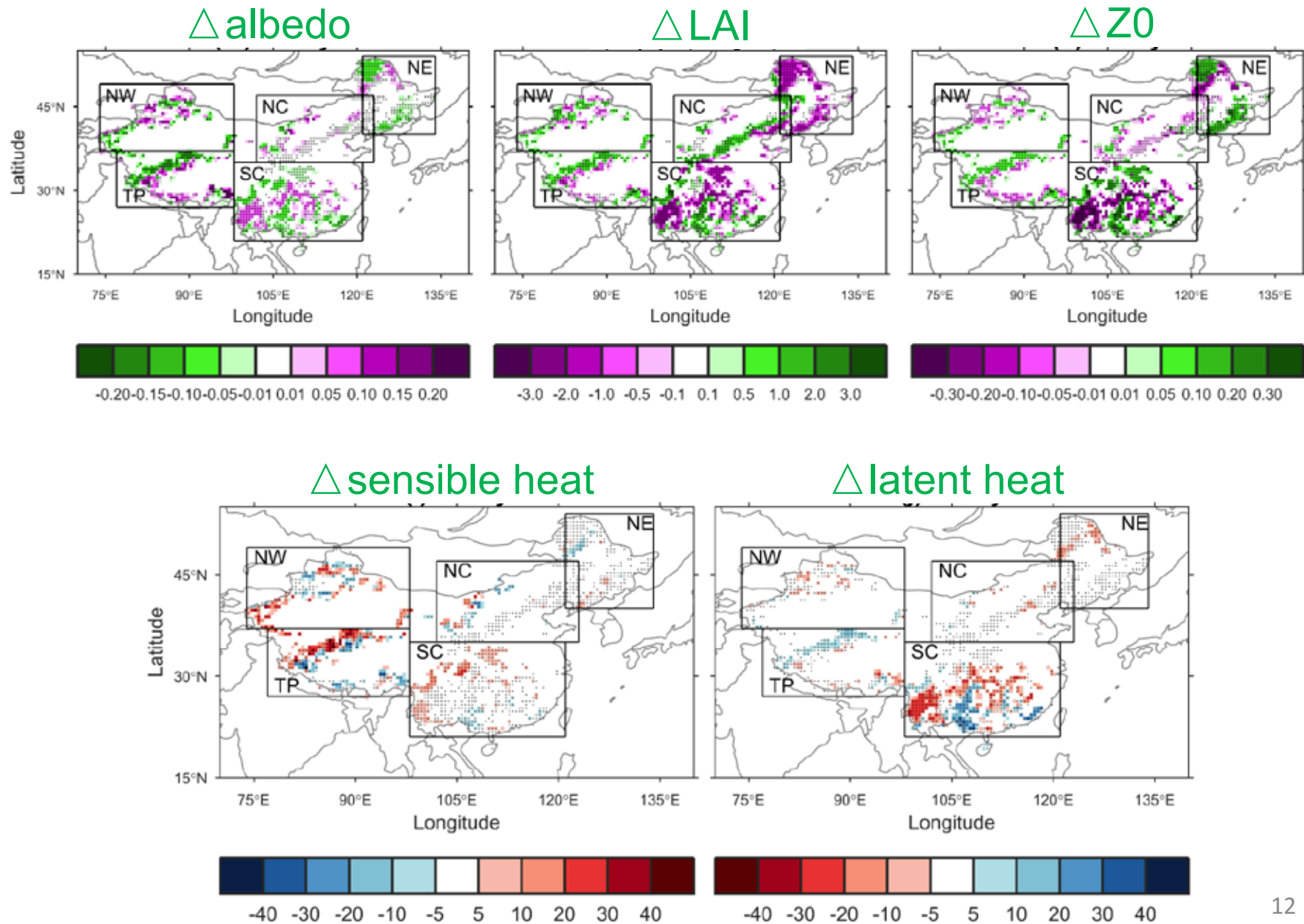
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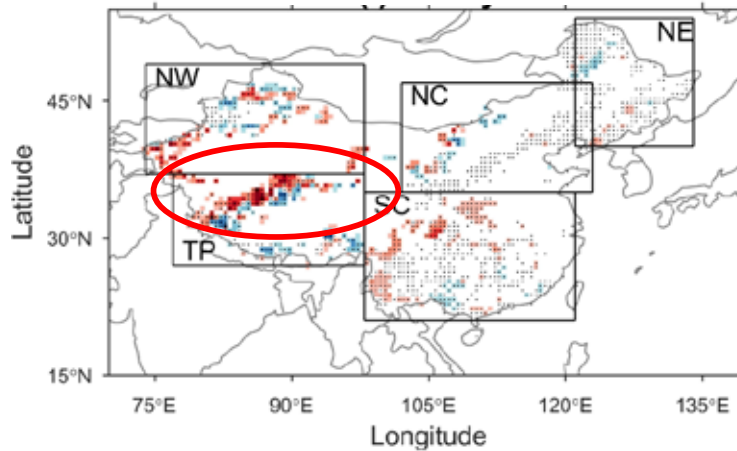
➤ Conclusions

# Surface fluxes changes

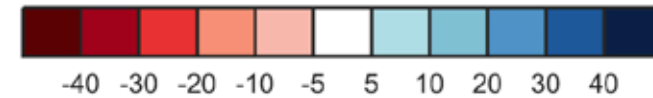
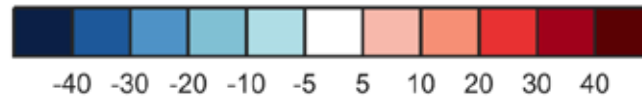
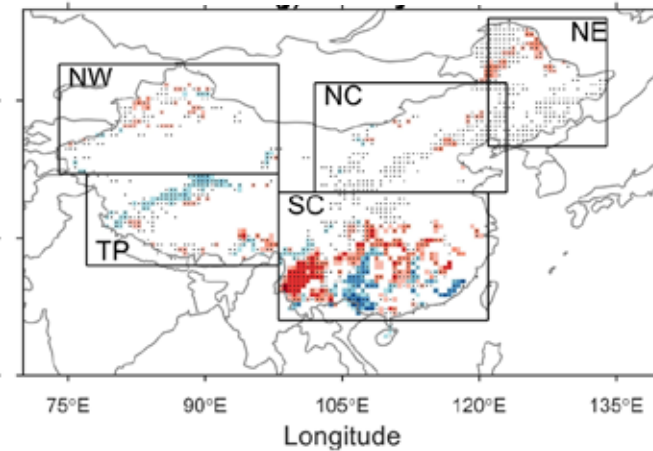


# Temperature and rainfall changes

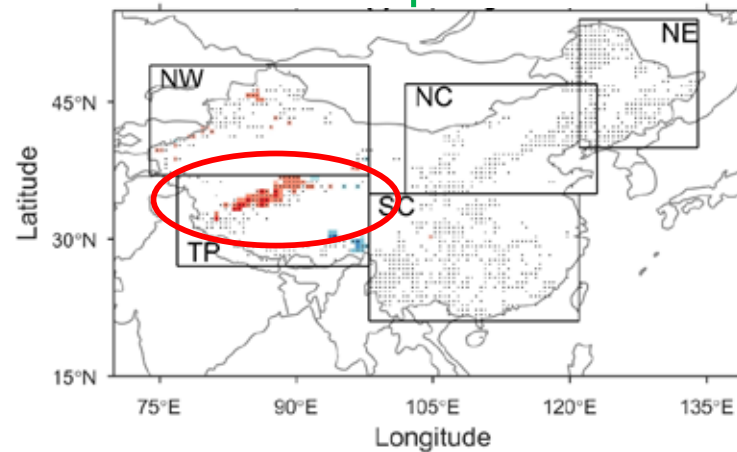
$\Delta$  sensible heat



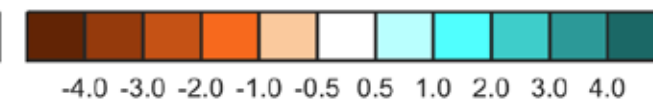
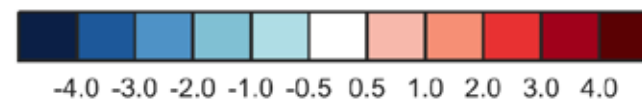
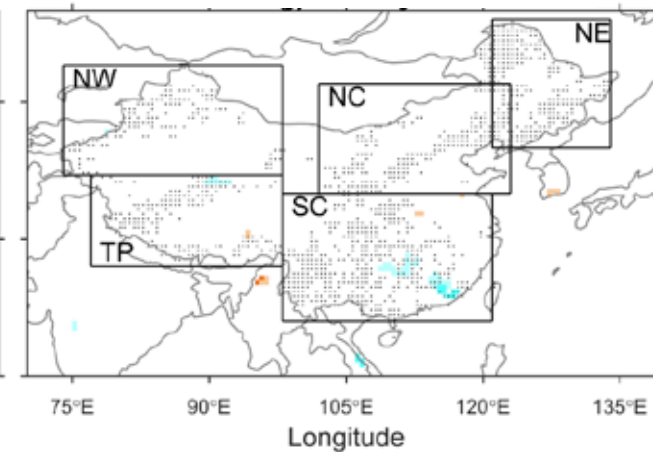
$\Delta$  latent heat



$\Delta$  temperature

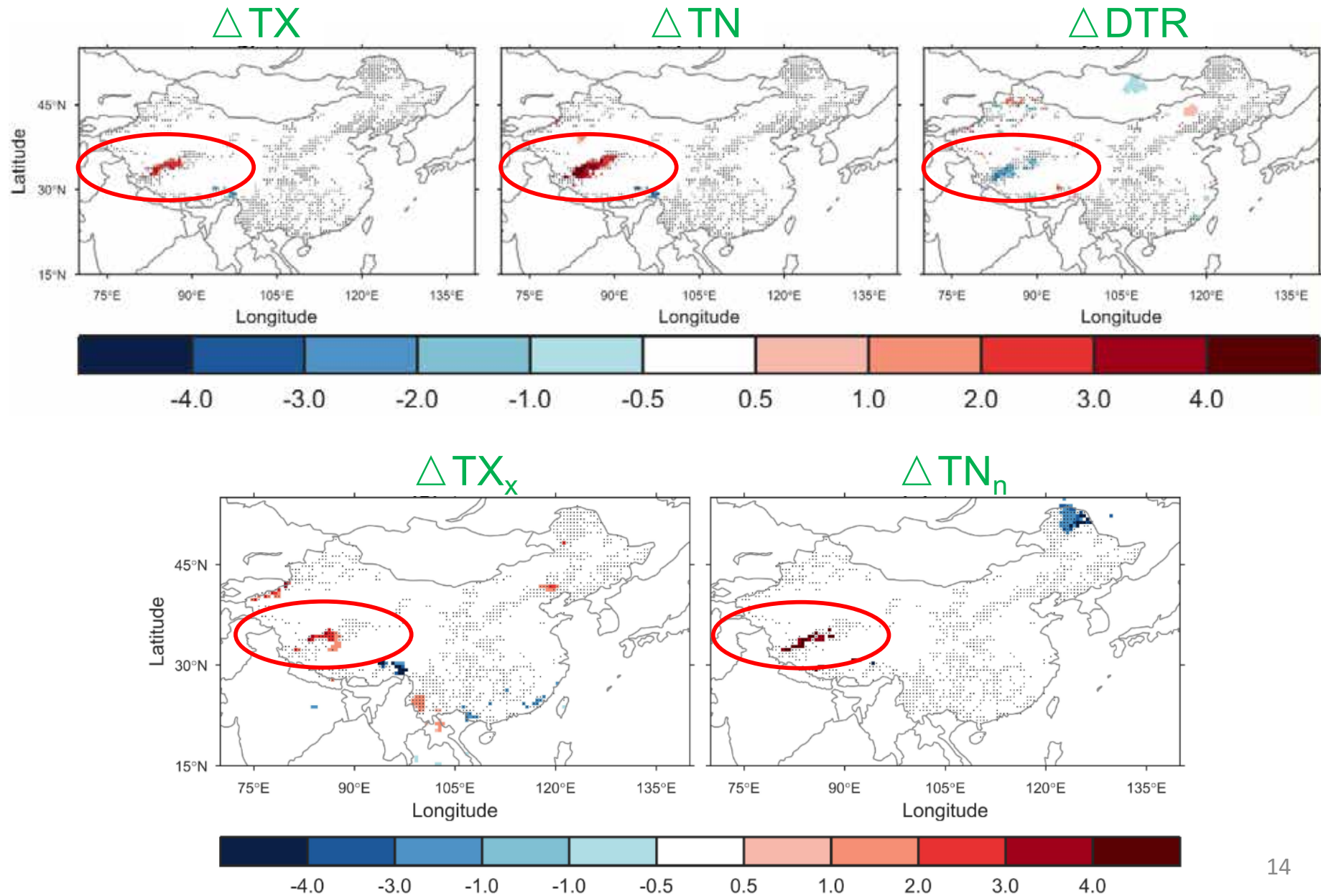


$\Delta$  rainfall





# Temperature extremes changes



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# Main conclusions

- Uncertainties in remotely sensed land cover **have a discernible impact** on the **albedo, leaf area index, and roughness length**
- Uncertainties in land cover **affect** the simulation of **sensible** and **latent heat fluxes** in some regions depending on how the biogeophysical characteristics change
- Uncertainties in land cover **have negligible impacts** on the simulation of **air temperature** and **rainfall** in most regions of East Asia

# Thanks for your attention!

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Webpage: [https://www.researchgate.net/profile/Jun\\_Ge24/stats](https://www.researchgate.net/profile/Jun_Ge24/stats)

Ge, J. Pitman, A. J., Guo, W. D., Wang, S. Y. and Fu, C. B. (2019). Do uncertainties in the reconstruction of land cover affect the simulation of air temperature and rainfall in the CORDEX region of East Asia? *Journal of Geophysical Research-Atmospheres*. <https://doi.org/10.1029/2018JD029945>.