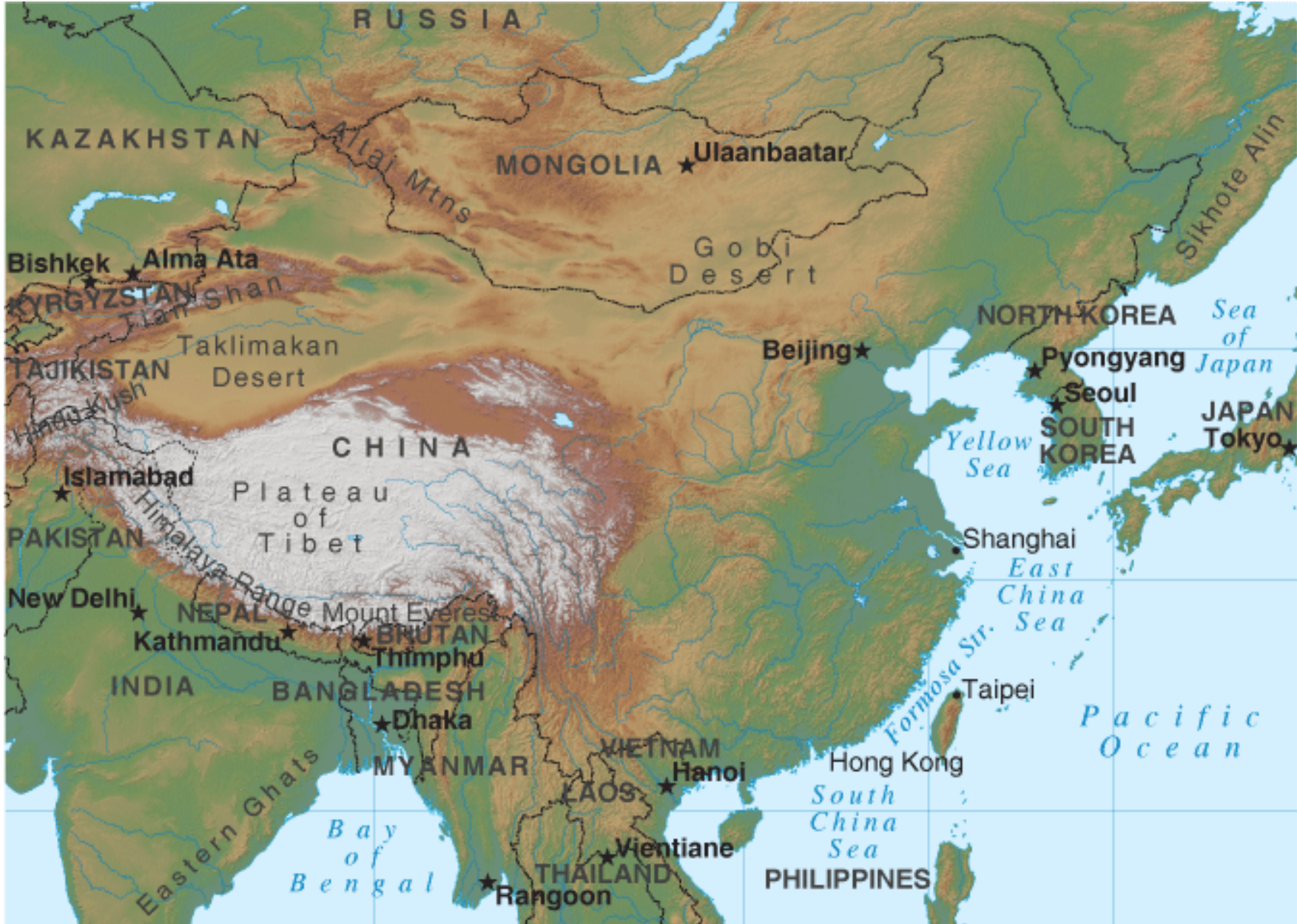


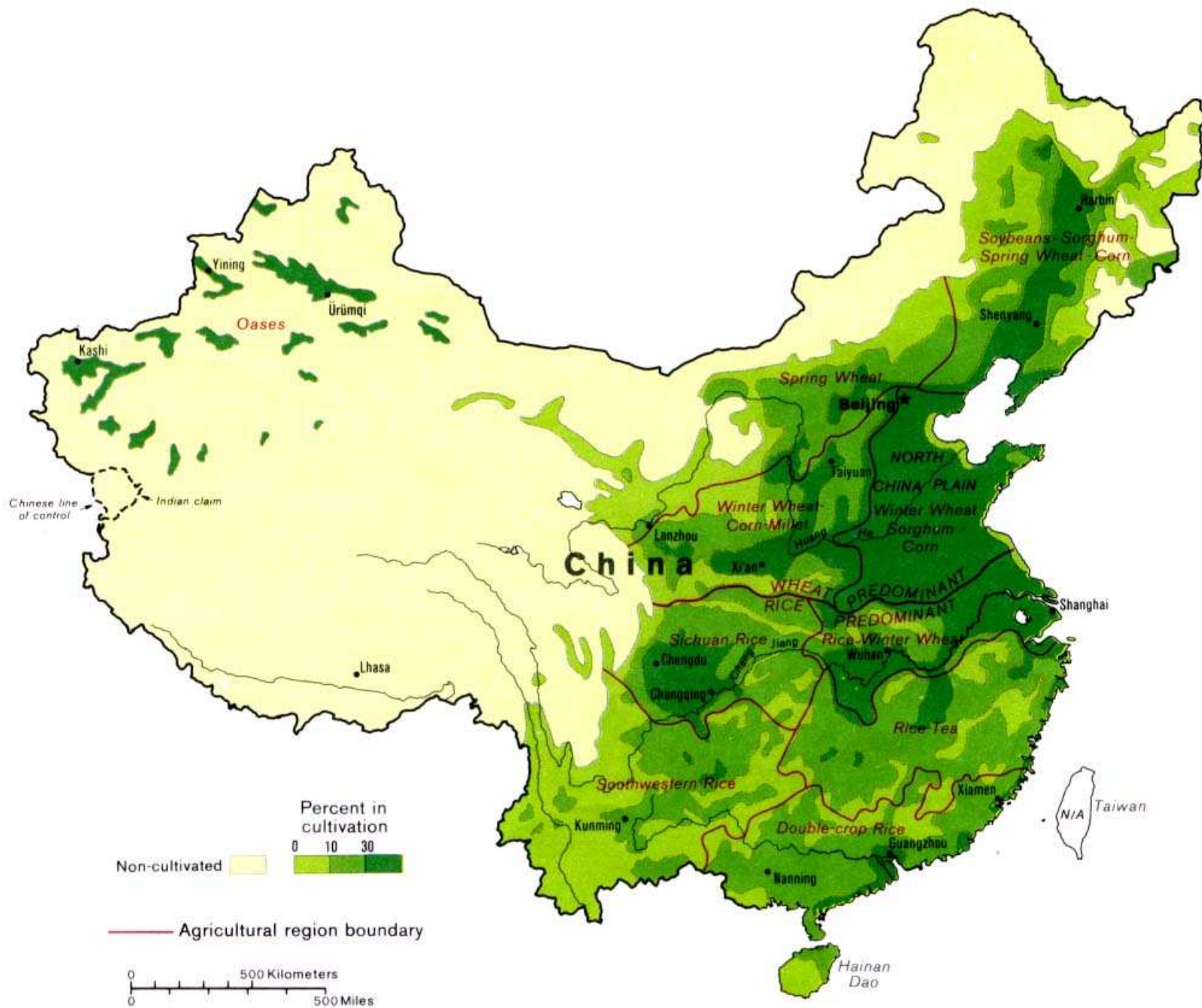
A numerical study on climate effect of the urbanization in the Yangtze River Delta

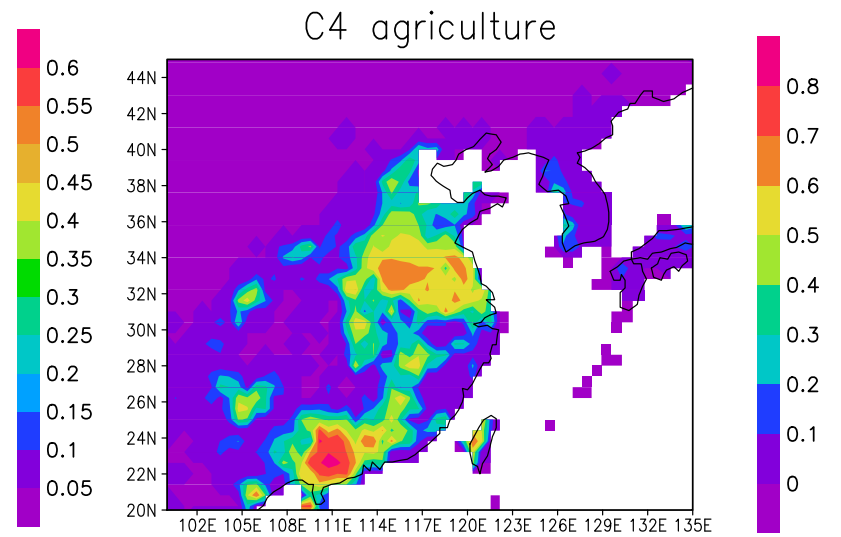
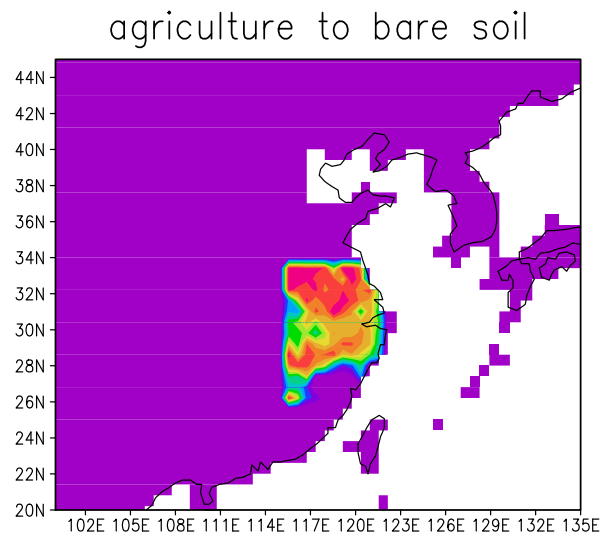
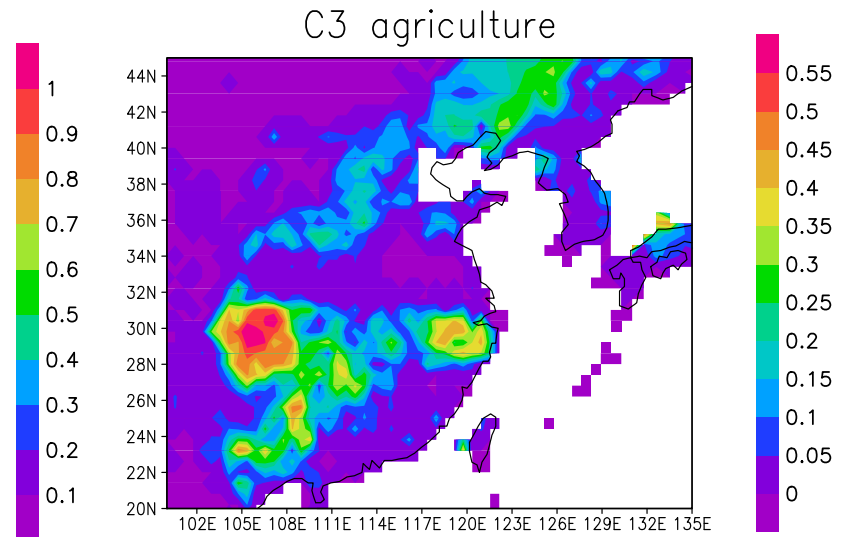
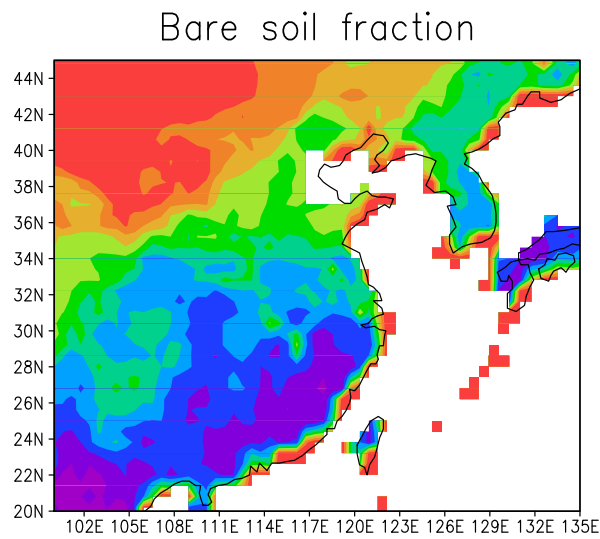
Laurent Li

Laboratoire de Météorologie Dynamique, CNRS, Paris, France

Zhenfei Hua and Zhihong Jiang
NUIST, Nanjing, China



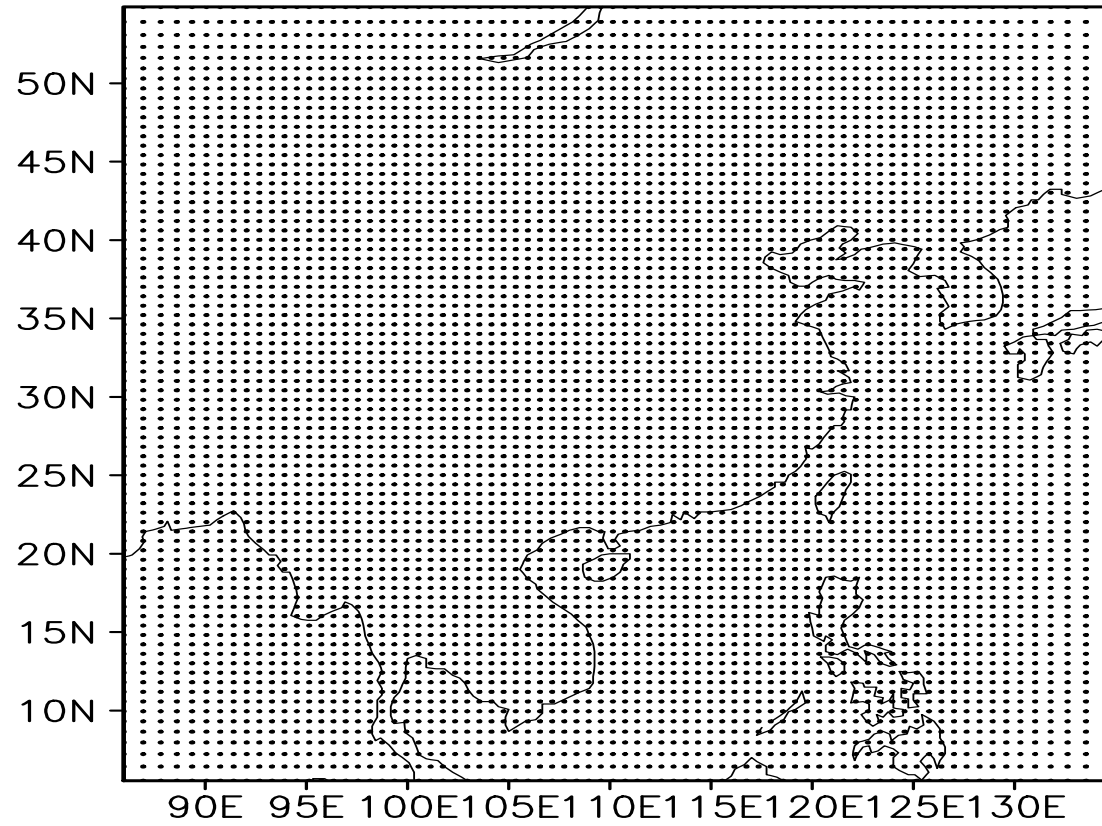




Fractions of bare soil, C3 and C4 agriculture; Changes from Agriculture to bare-soil

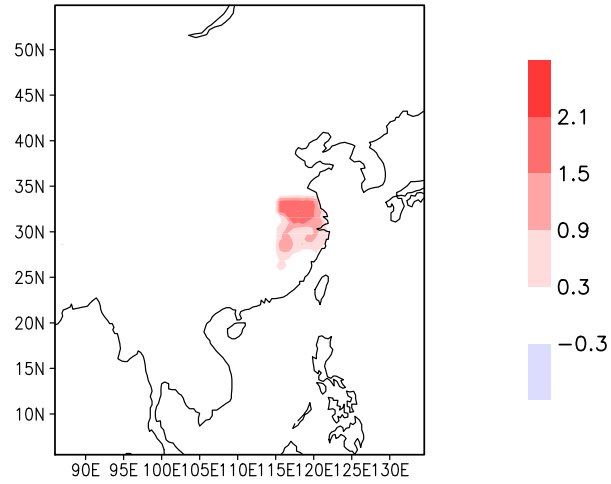
LMDZ-regional : lon(77) x lat(80), about 50 km

Model Grid



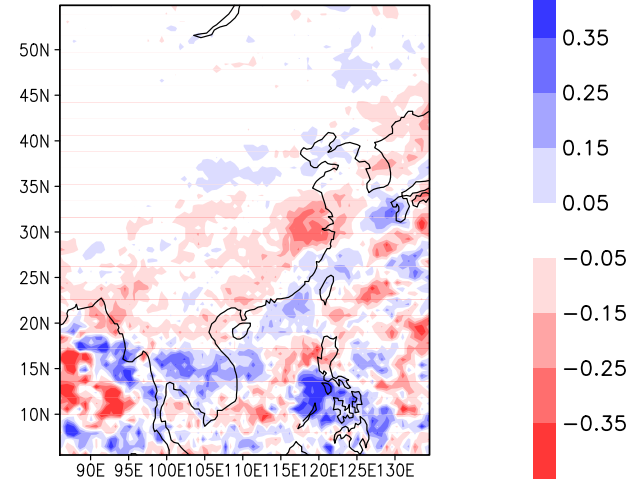
Changes in surf air temp

Annual-mean tas Delta (K)

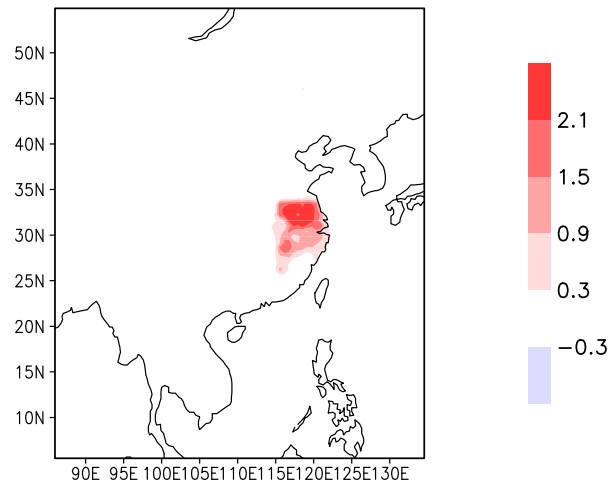


Changes in precipitation

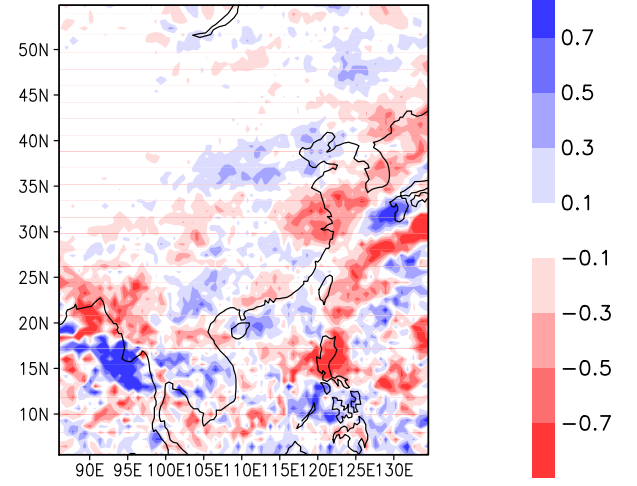
Annual-mean pr Delta (mm/day)



JJA-mean tas Delta (K)

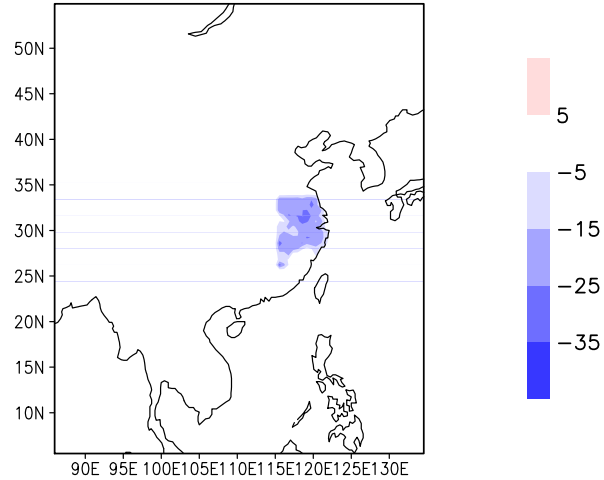


JJA-mean pr Delta (mm/day)



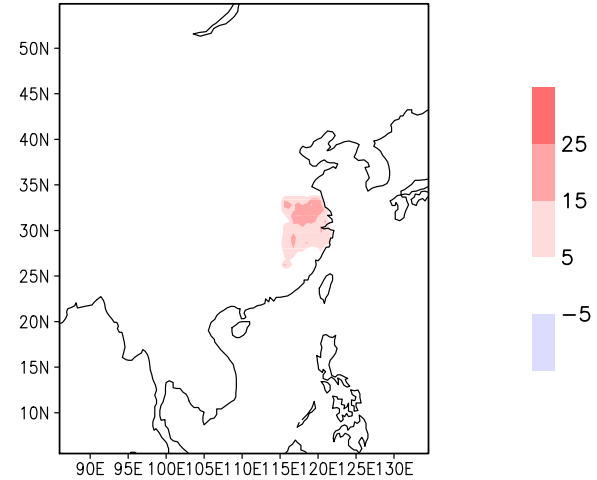
Changes in Latent heat flux

Annual-mean hfls Delta (W/m²)

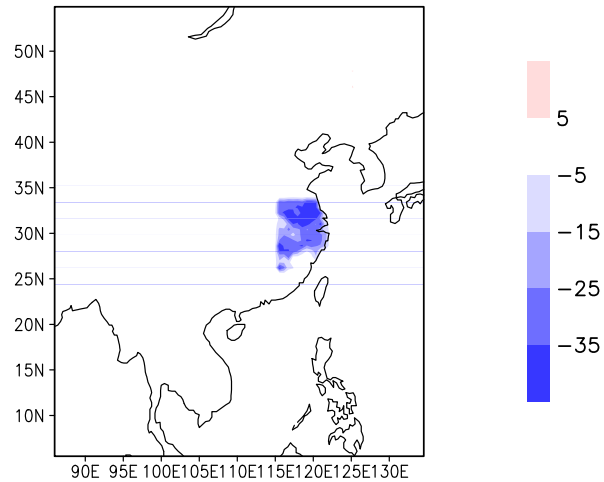


Changes in Sensible heat flux

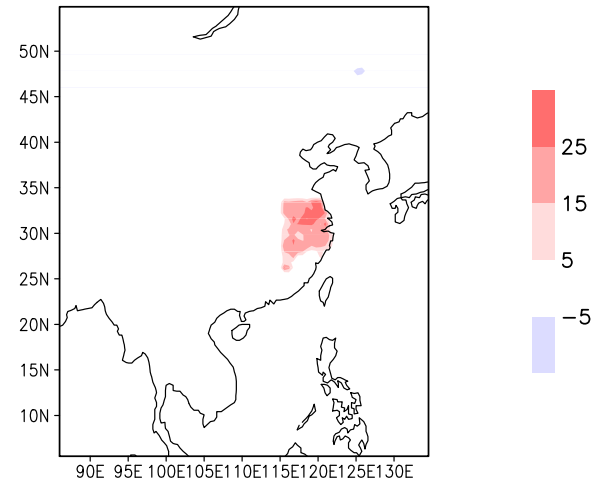
Annual-mean hfss Delta (W/m²)



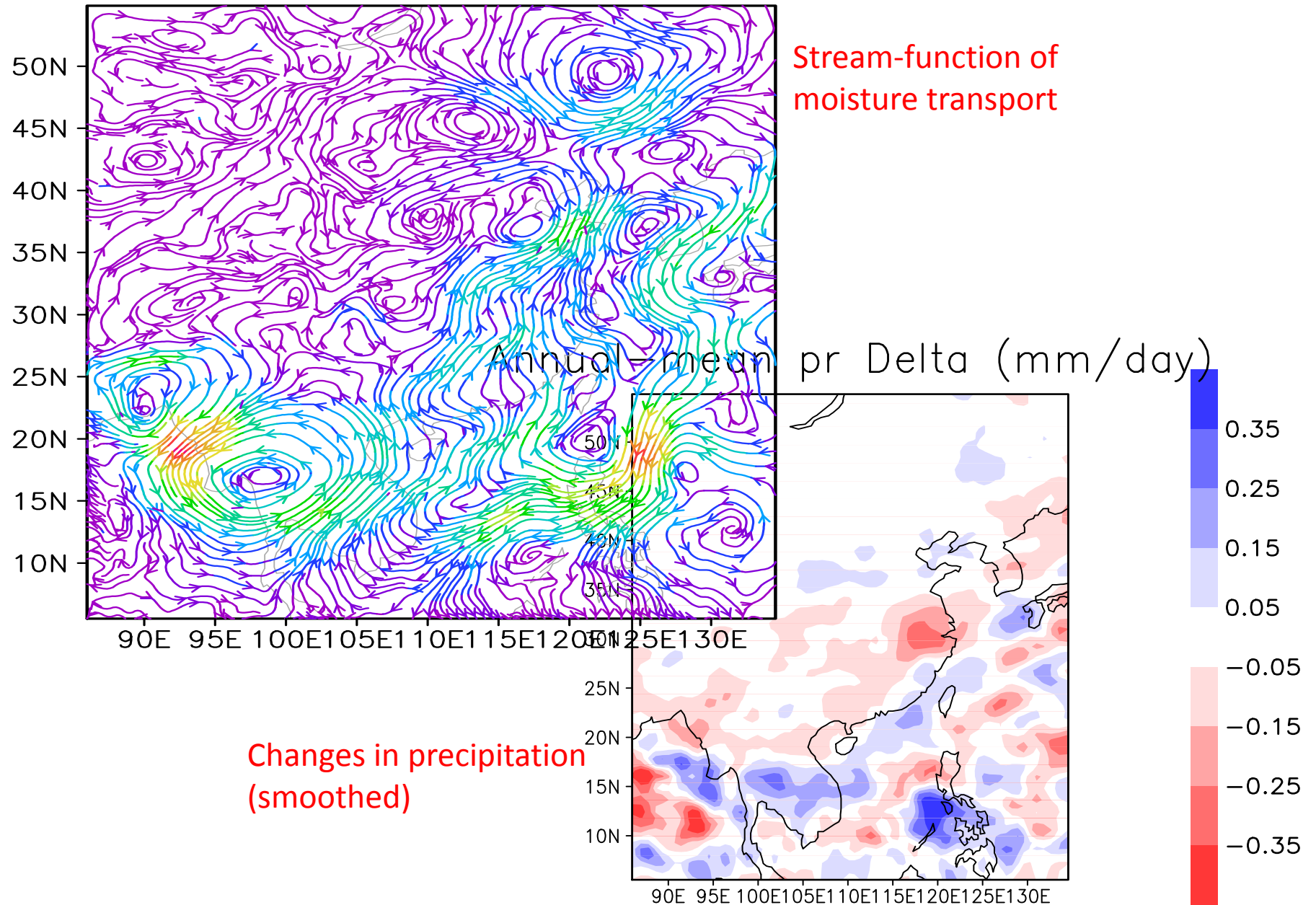
JJA-mean hfls Delta (W/m²)



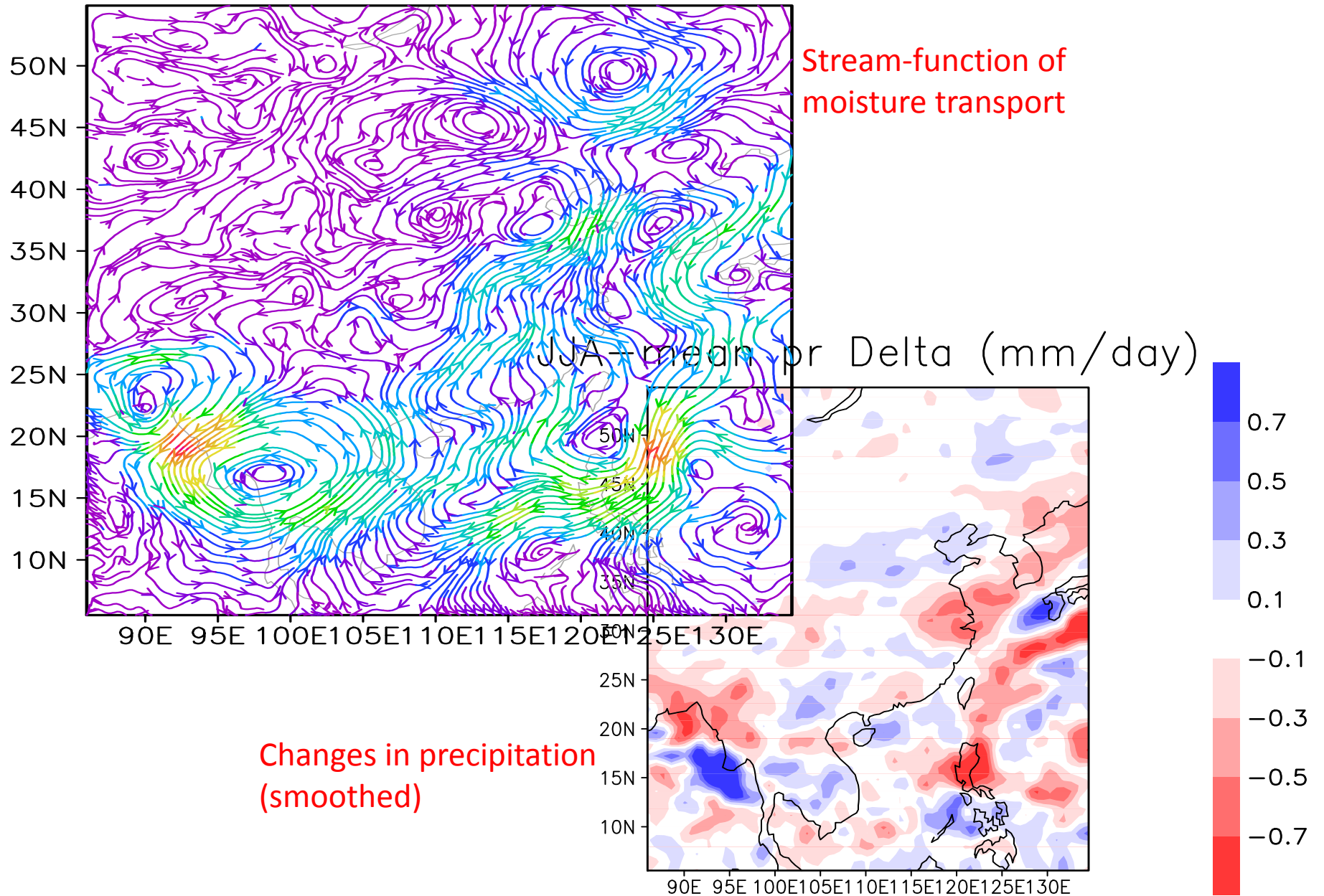
JJA-mean hfss Delta (W/m²)



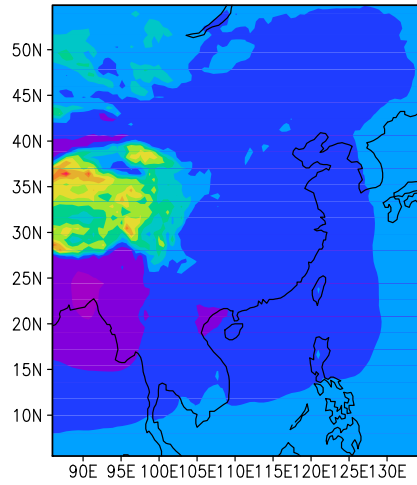
Annual-mean VQ Delta



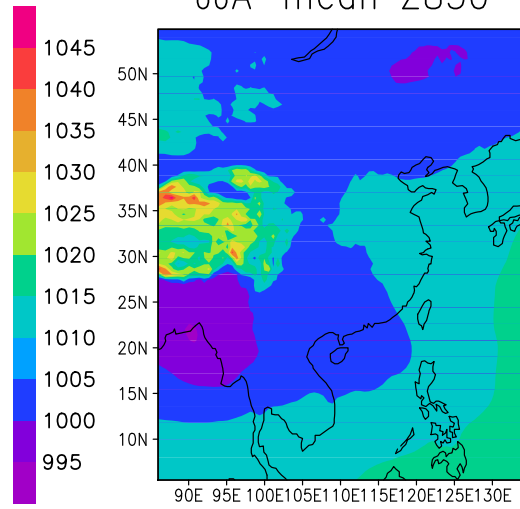
JJA—mean VQ Delta



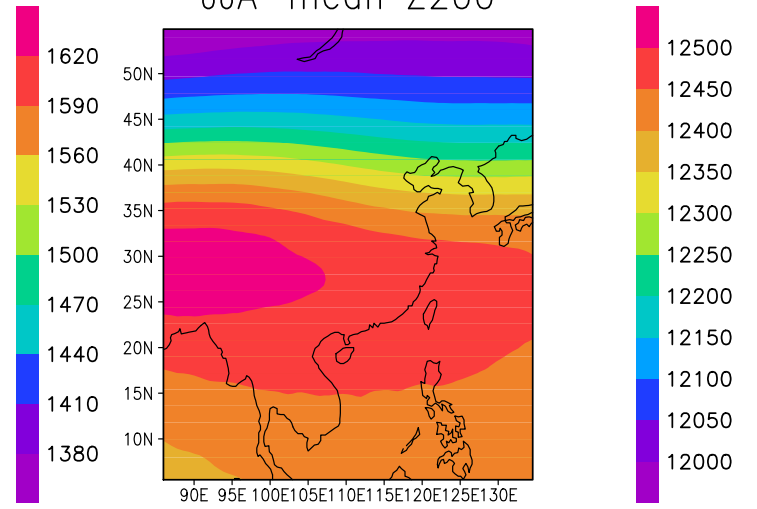
JJA-mean psl



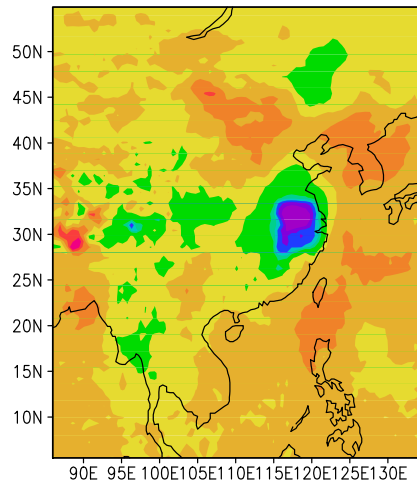
JJA-mean Z850



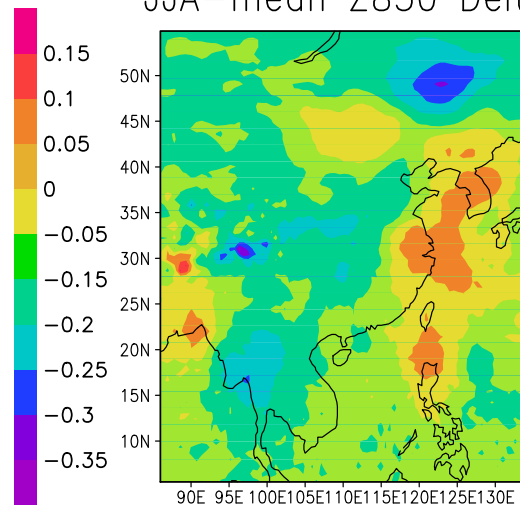
JJA-mean Z200



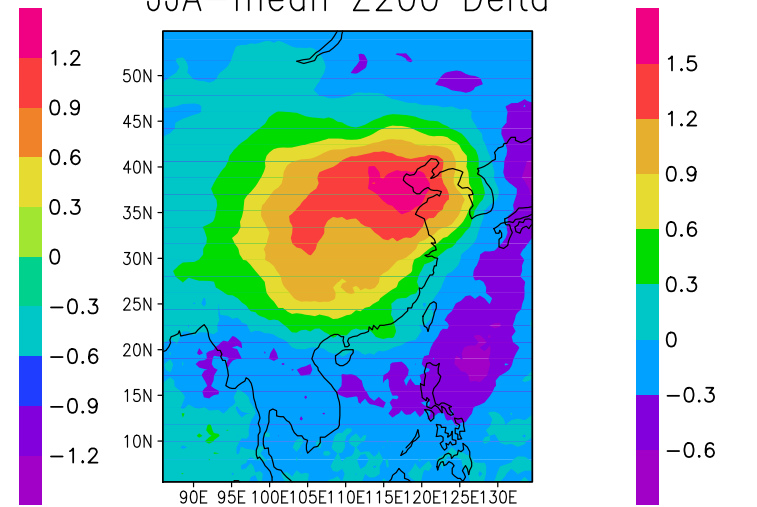
JJA-mean psl Delta



JJA-mean Z850 Delta



JJA-mean Z200 Delta



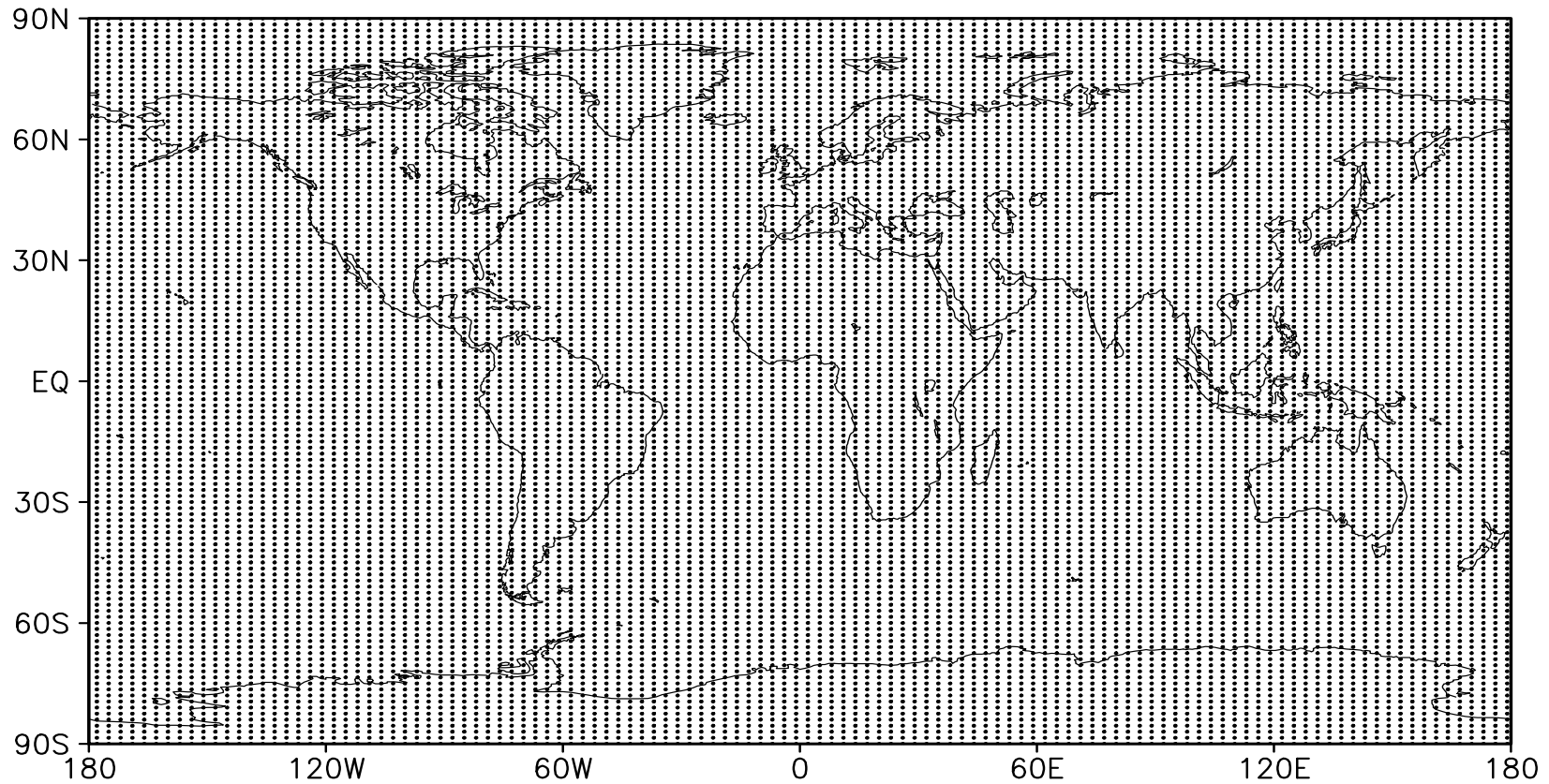
Sea-level pressure

850-hPa geop height

200-hPa geop height

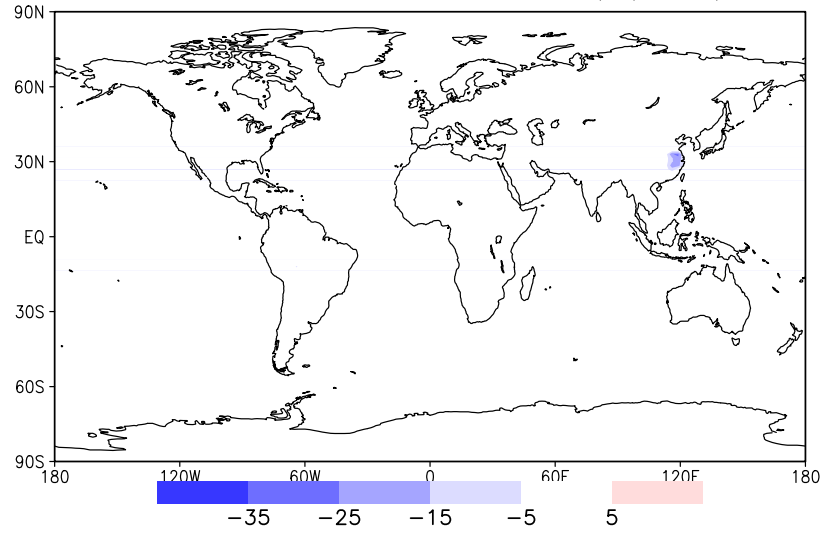
LMDZ-global: 200(lon) x 120(lat), about 200 km

Model Grid



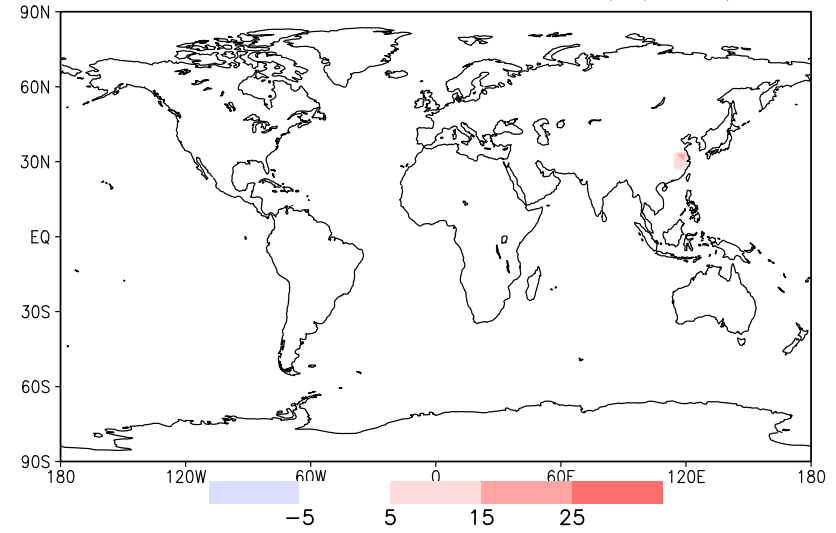
Changes in Latent heat flux

Annual-mean hfls Delta (W/m²)

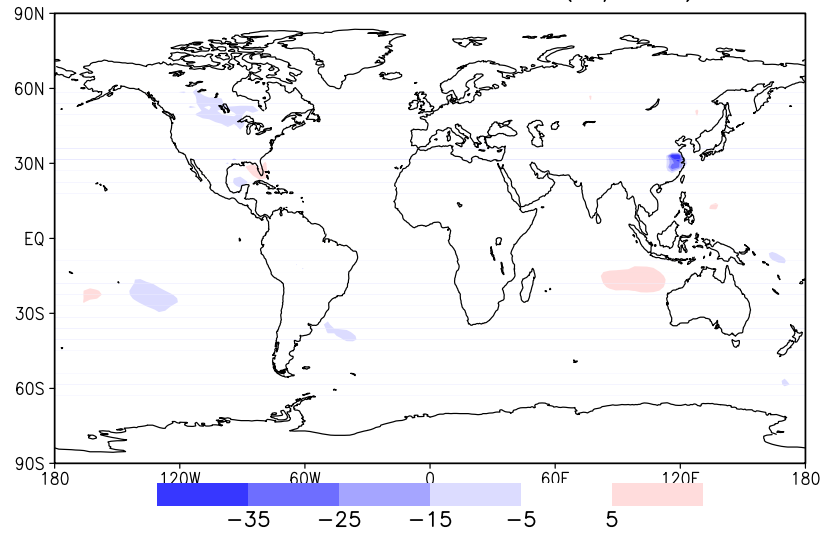


Changes in Sensible heat flux

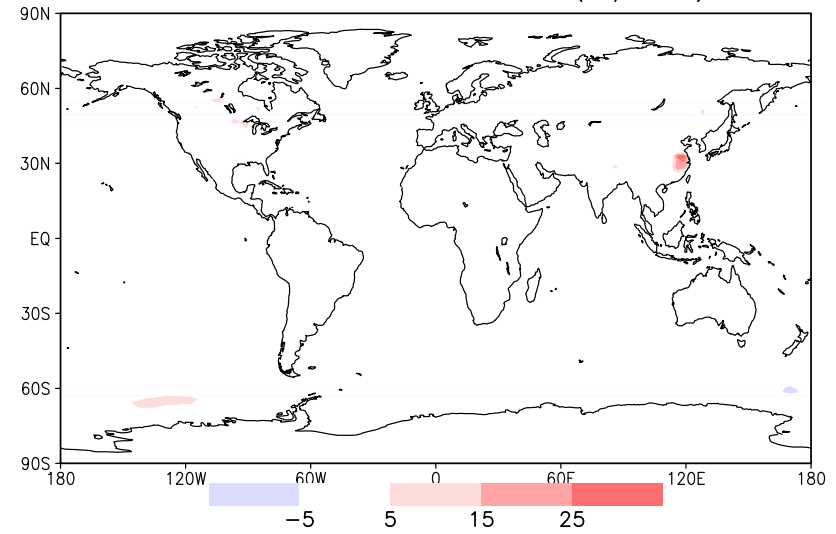
Annual-mean hfss Delta (W/m²)



JJA-mean hfls Delta (W/m²)

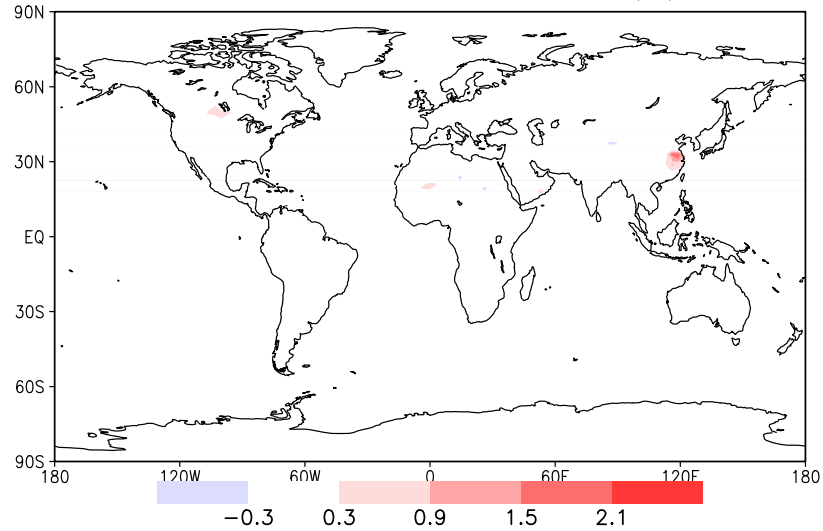


JJA-mean hfss Delta (W/m²)

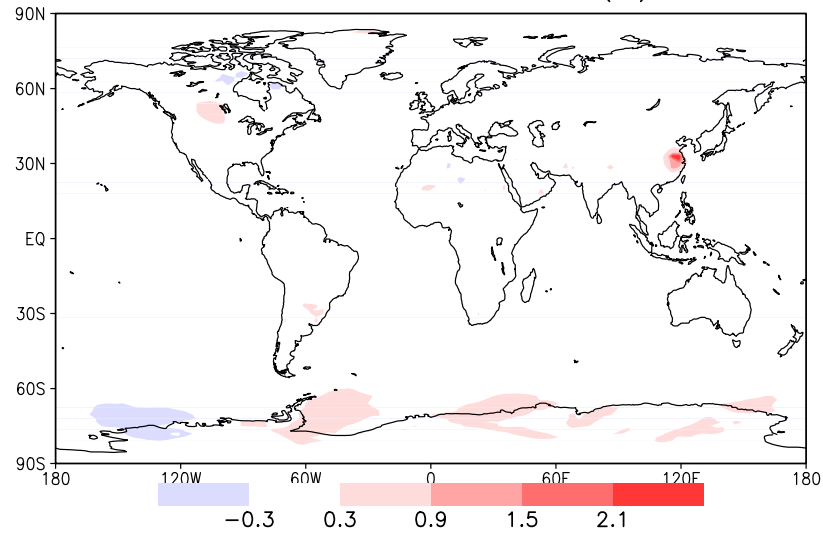


Changes in surf air temp

Annual-mean tas Delta (K)

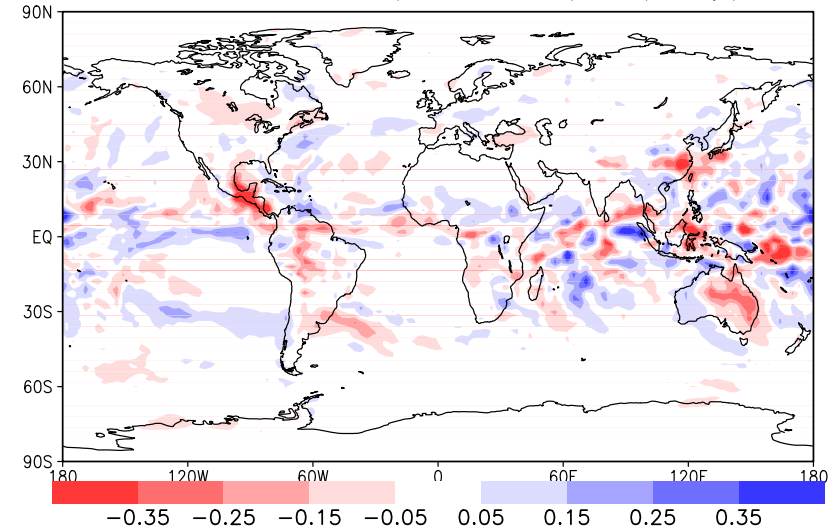


JJA-mean tas Delta (K)

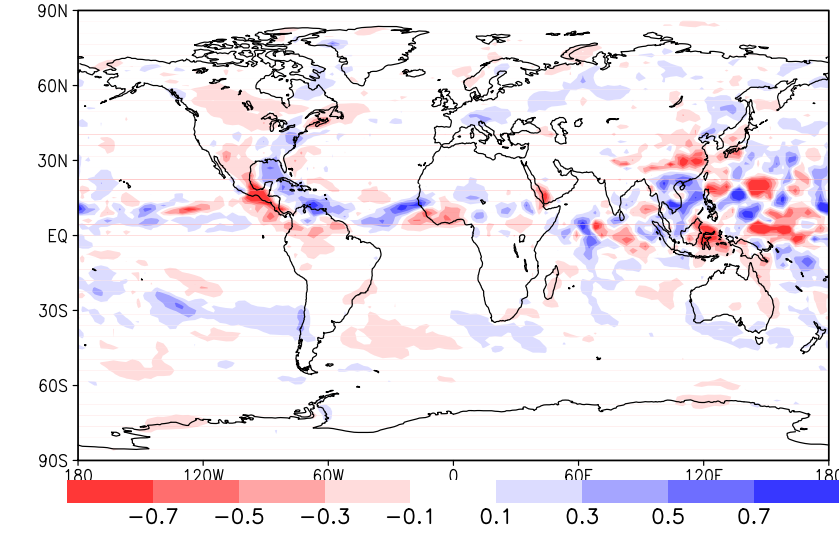


Changes in precipitation

Annual-mean pr Delta (mm/day)

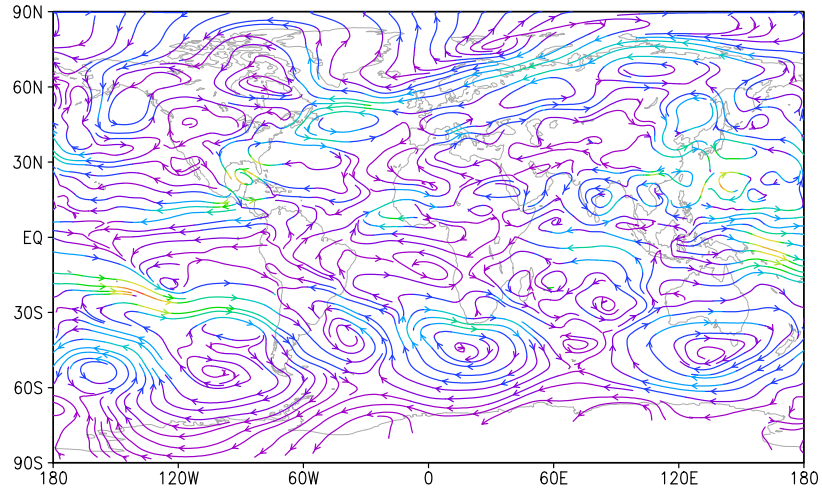


JJA-mean pr Delta (mm/day)



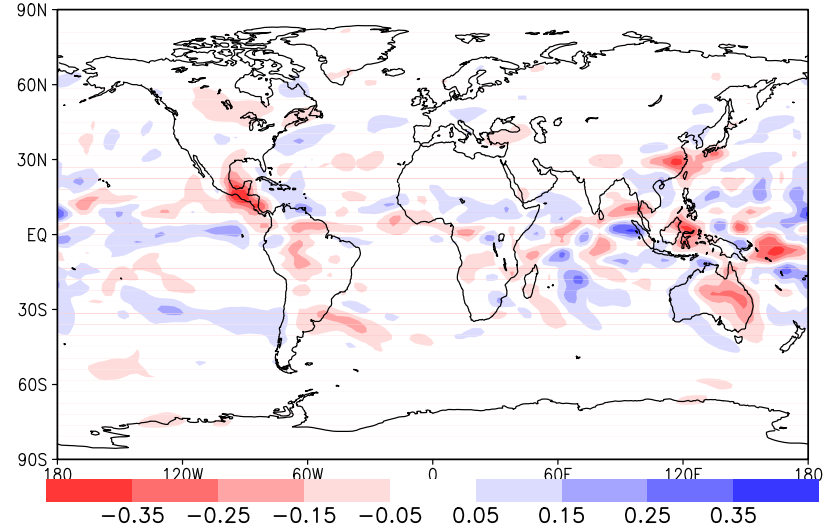
Changes in moisture transport

Annual-mean VQ Delta

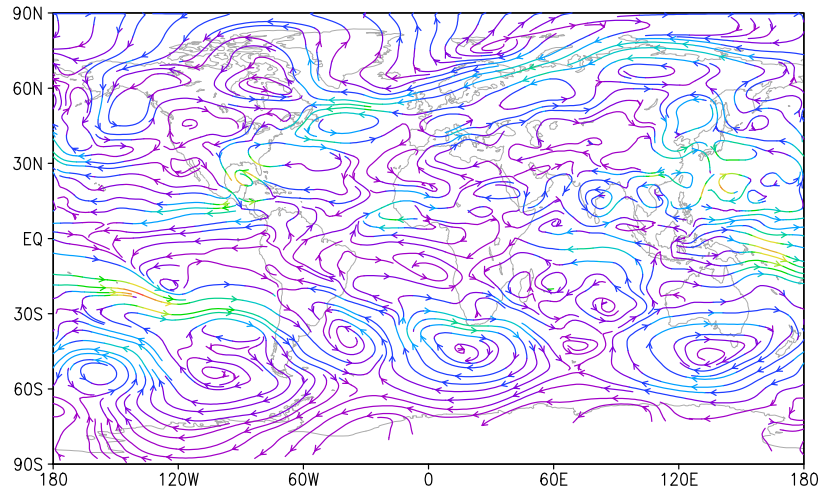


Changes in precipitation (smoothed)

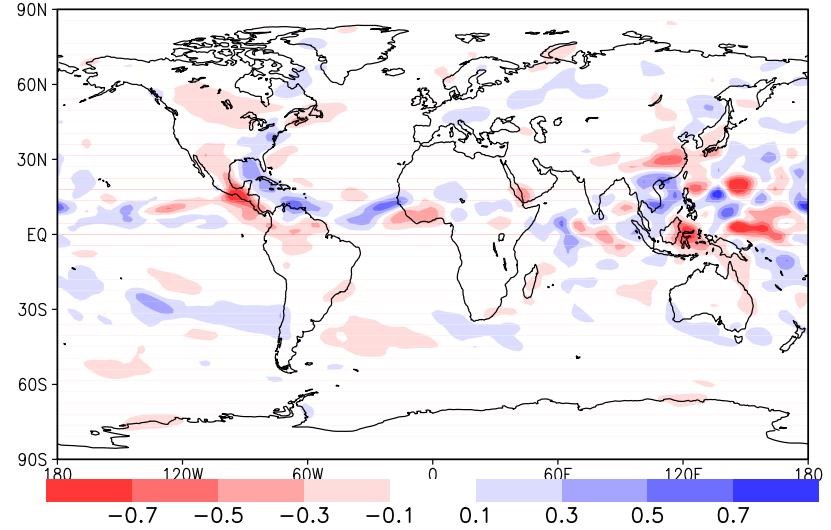
Annual-mean pr Delta (mm/day)



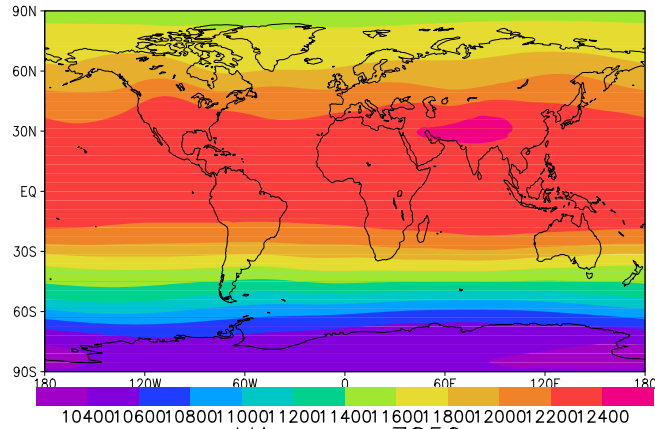
JJA-mean VQ Delta



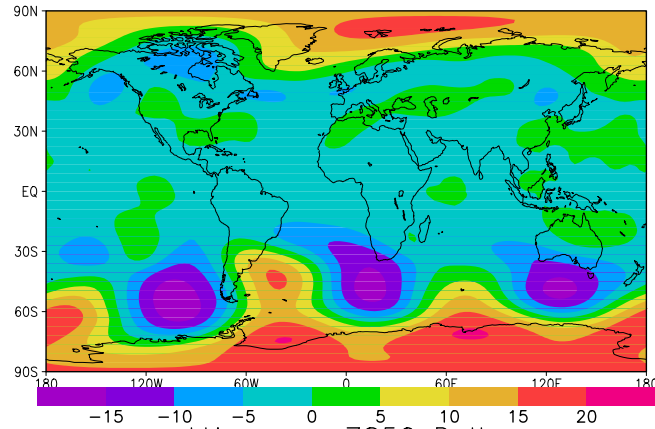
JJA-mean pr Delta (mm/day)



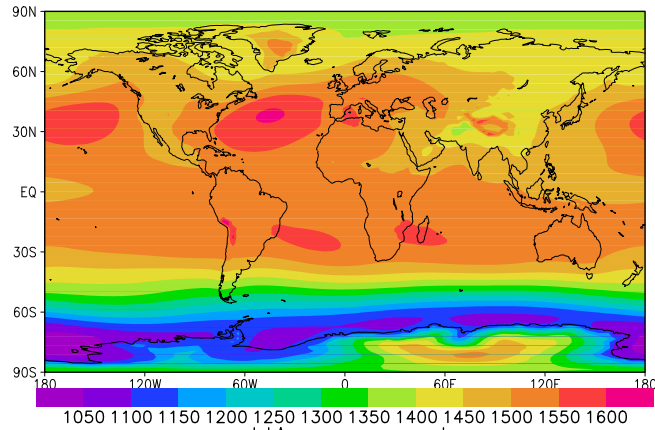
JJA-mean Z200



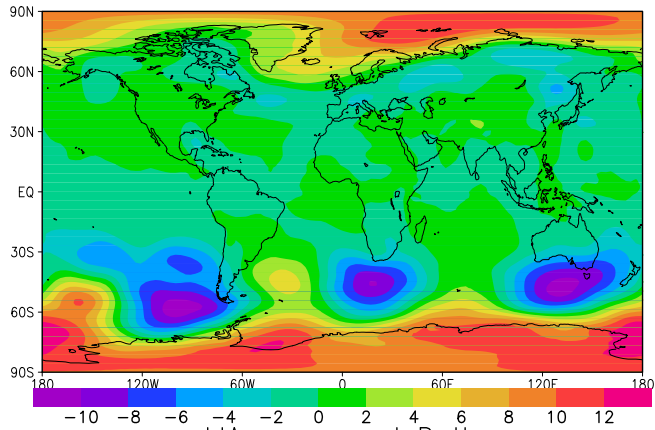
JJA-mean Z200 Delta



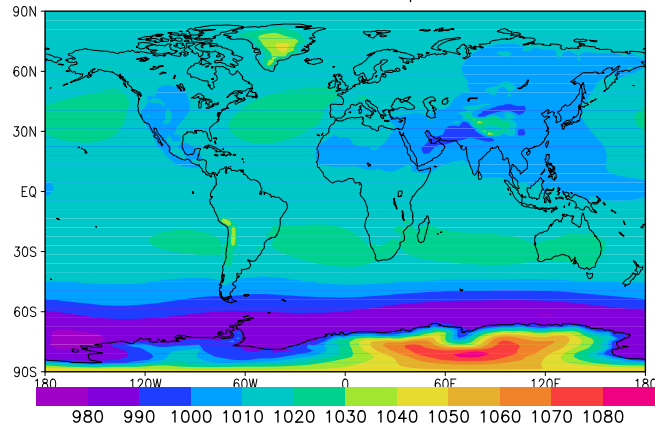
JJA-mean Z850



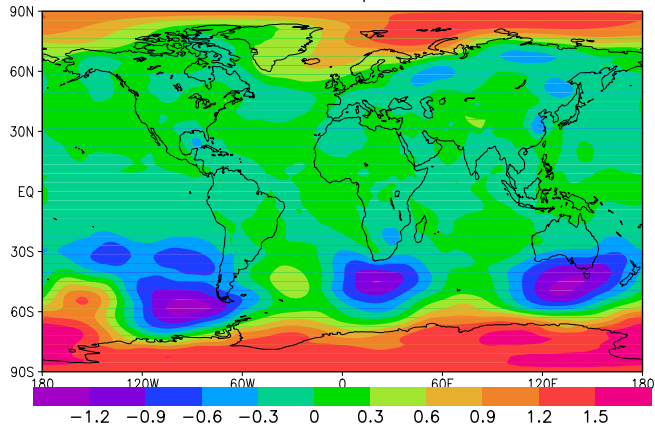
JJA-mean Z850 Delta



JJA-mean psl



JJA-mean psl Delta



Conclusion

Urbanization in the Yangtze river Delta :

- Local warming and drying effects.
- Enhance the summer monsoon.
- Global effects are difficult to assess.