



State Key Laboratory of Numerical Modelling for Atmospheric Sciences  
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# East Asian Monsoon: Changes and Social Impacts

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WCRP-JNU Training School on Monsoon Variability in Changing Climate

15-21 Jan 2017, Juju National University

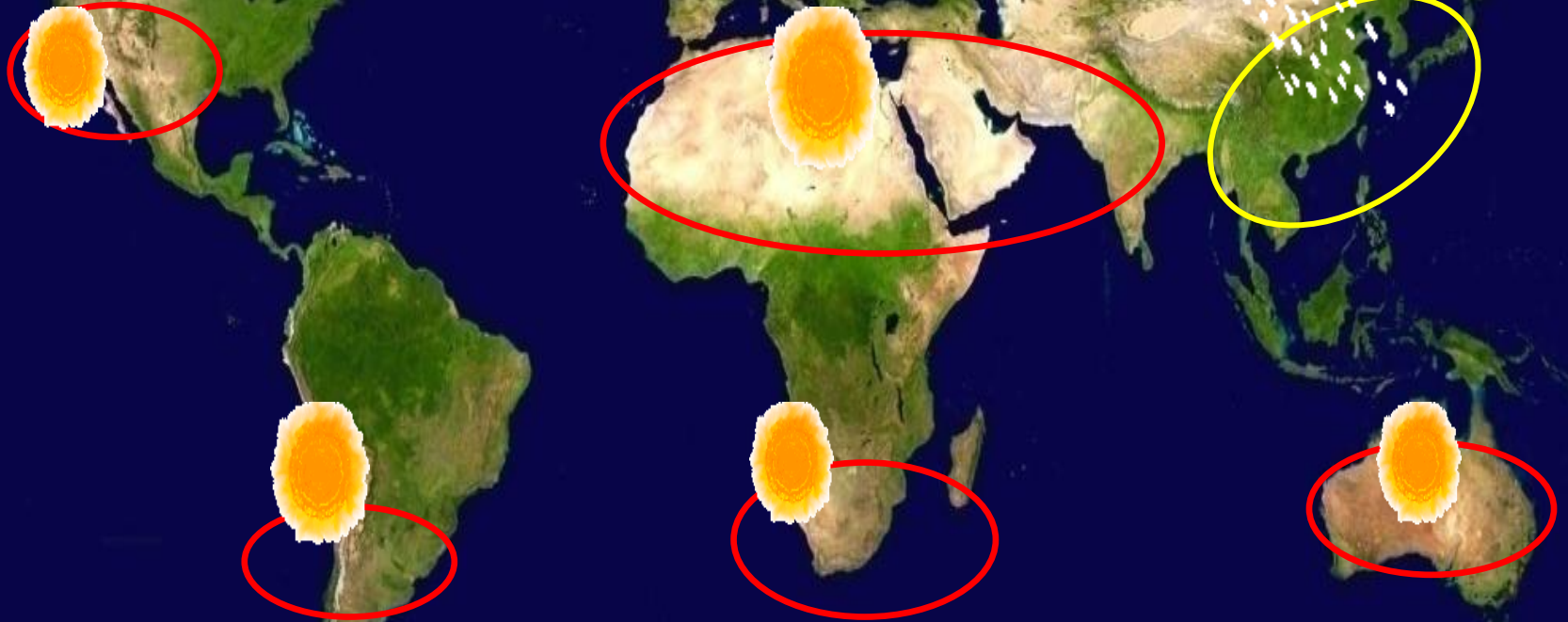
# NOAA Earth Light



The majority of EA people lives in the eastern part of the continent:  
a monsoon region with more than 1 billion population



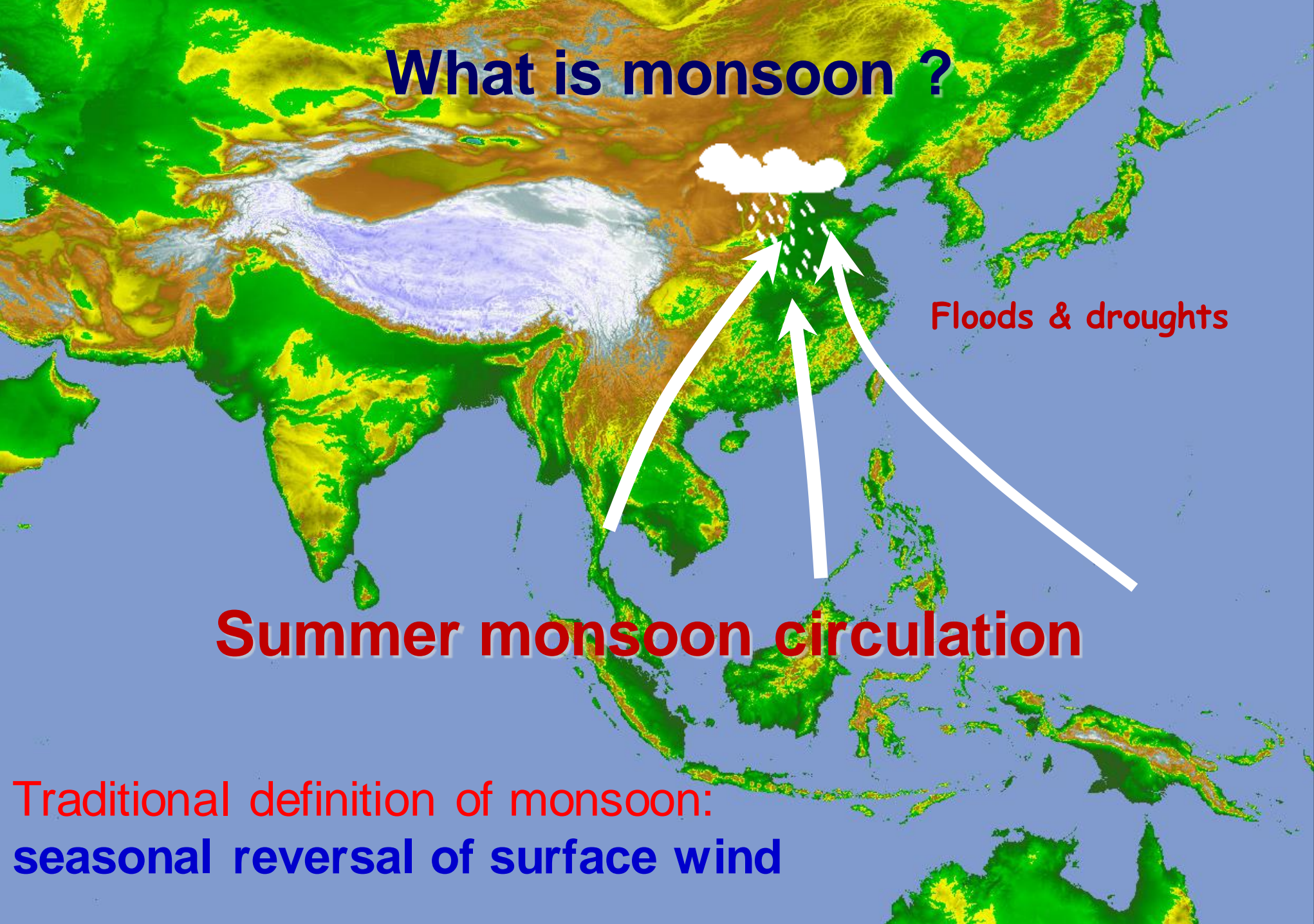
Monsoon in Asia: Supply of water resources for more than one billion people



Subtropical regions of the world are arid/semi-arid regions except for EA



# What is monsoon ?



Floods & droughts

**Summer monsoon circulation**

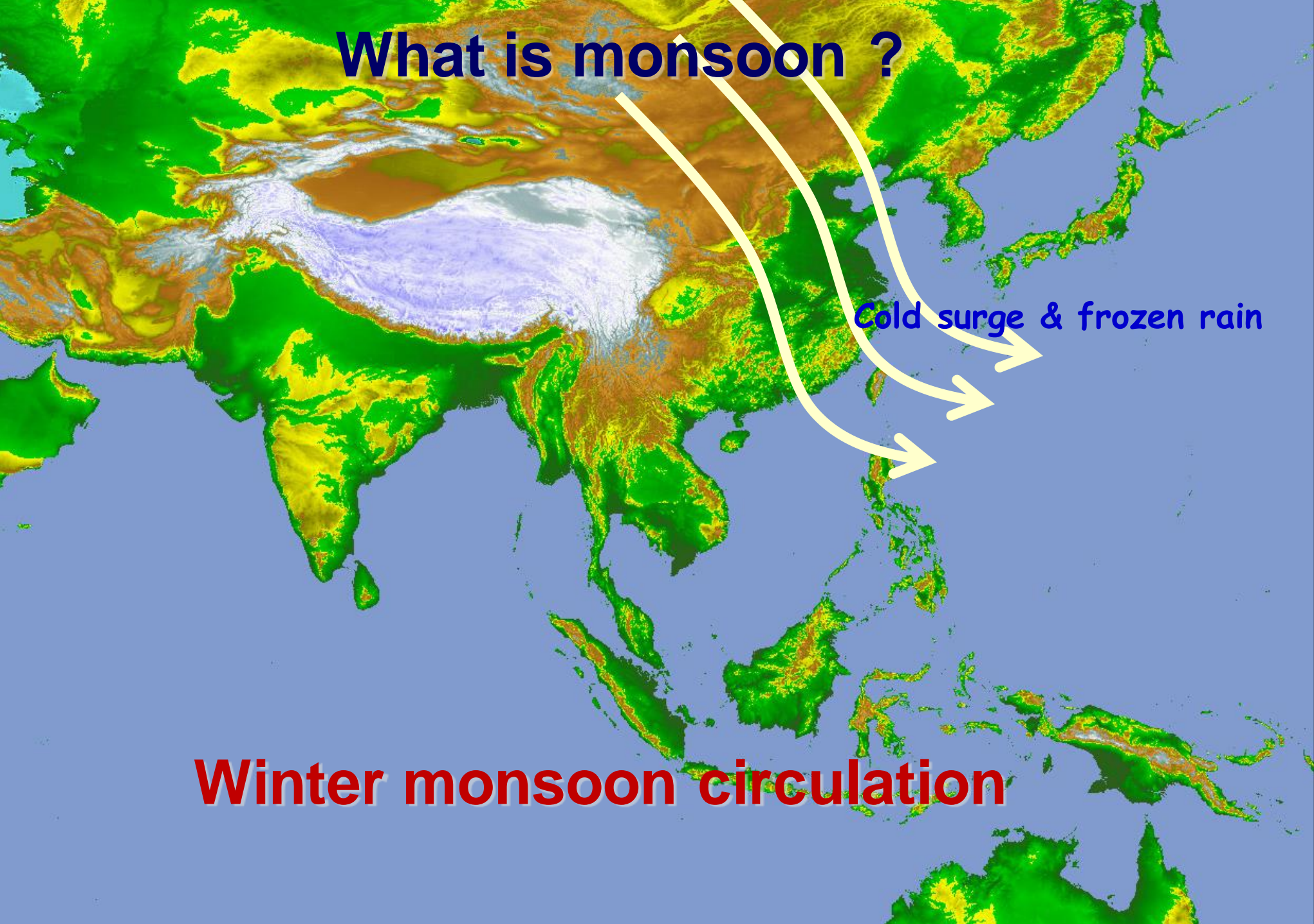
Traditional definition of monsoon:  
seasonal reversal of surface wind

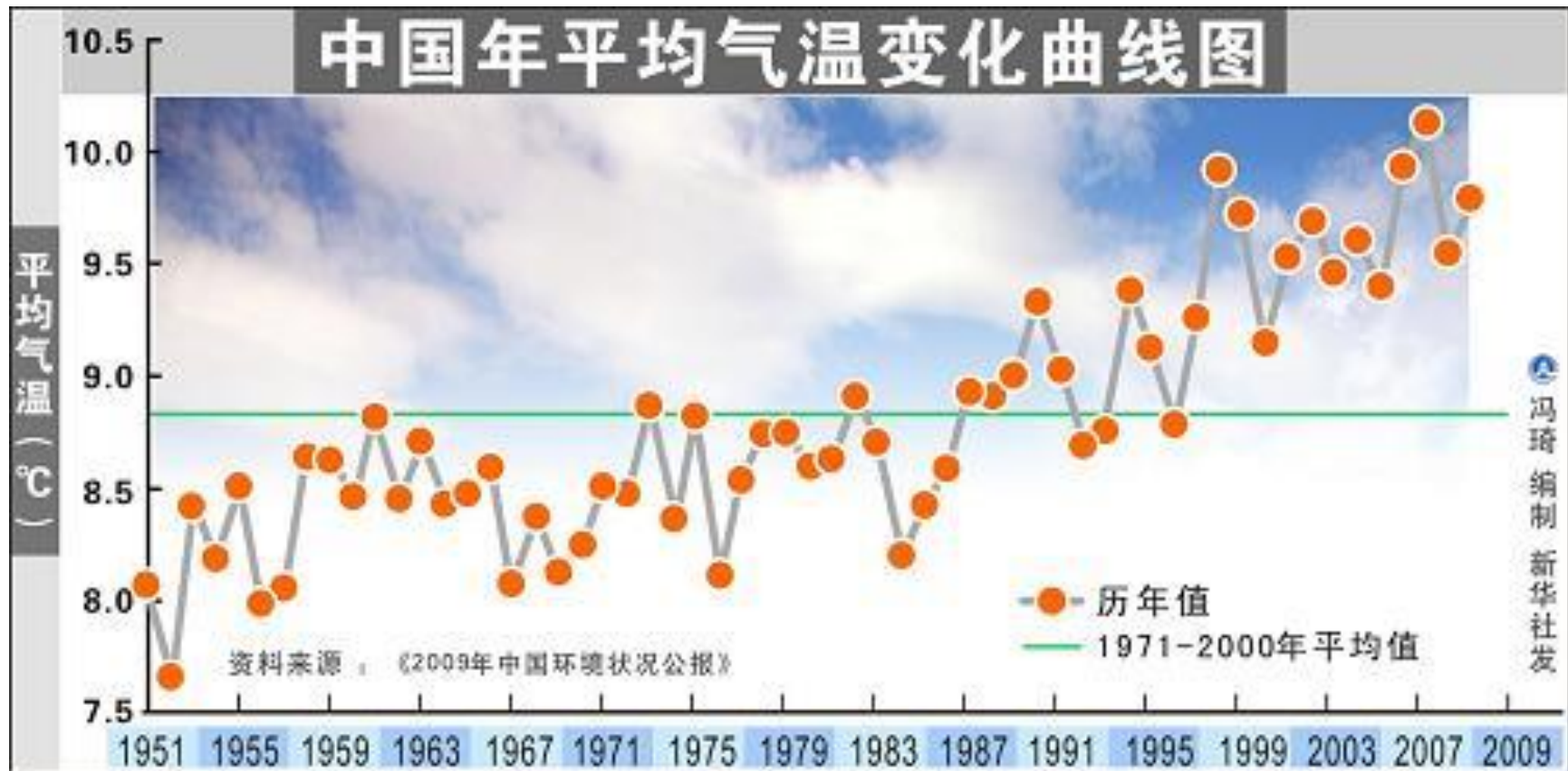


**What is monsoon ?**

**Cold surge & frozen rain**

**Winter monsoon circulation**



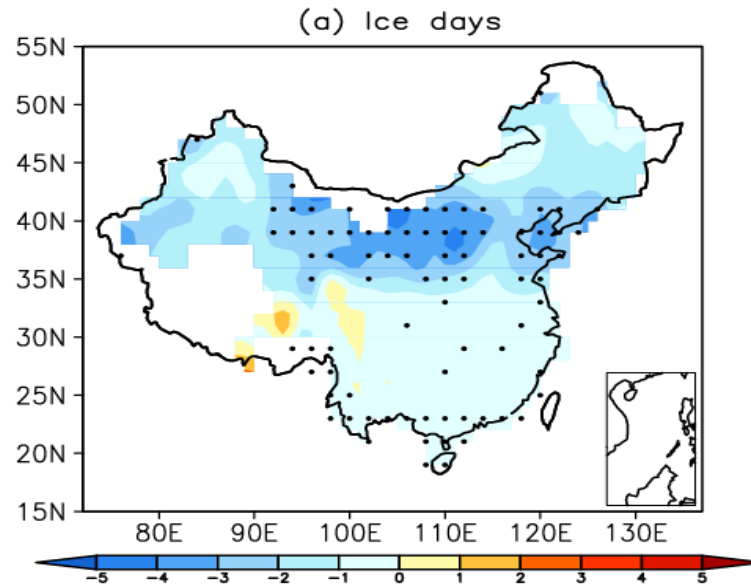
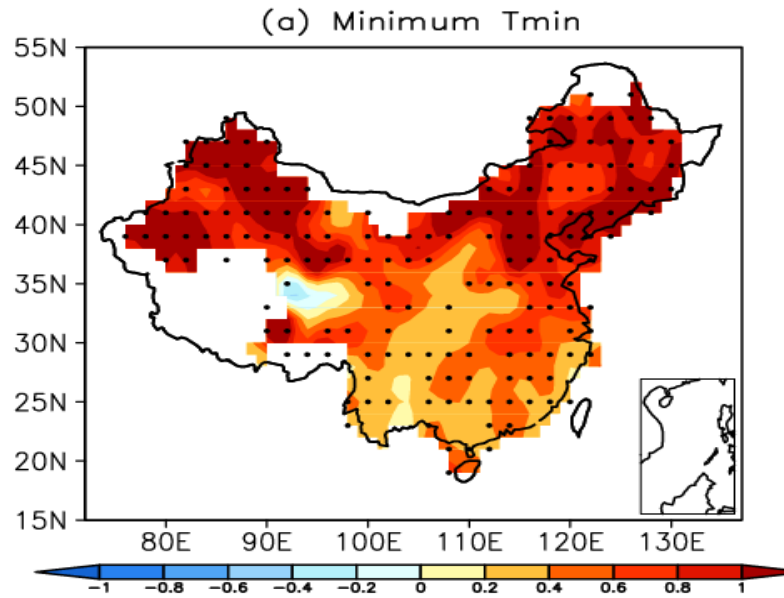


The SAT averaged over Chinese domain shows a warming trend

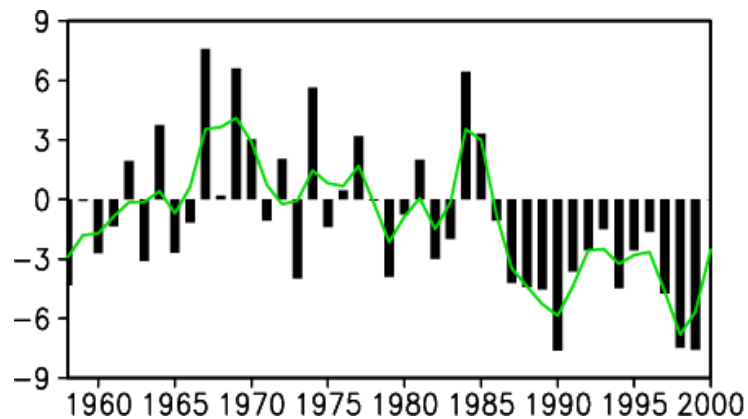
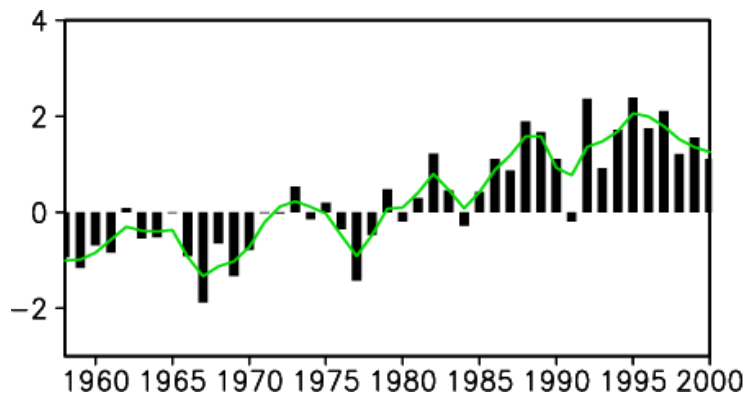


# Trends of annual minimum T<sub>min</sub> and Ice days (1958-2000).

Spatial pattern



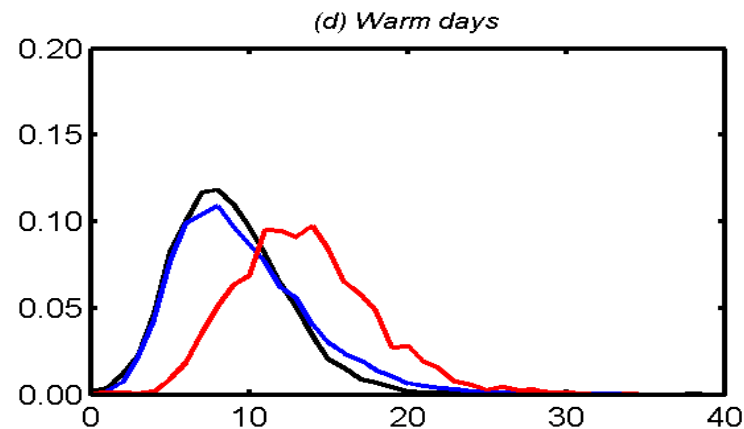
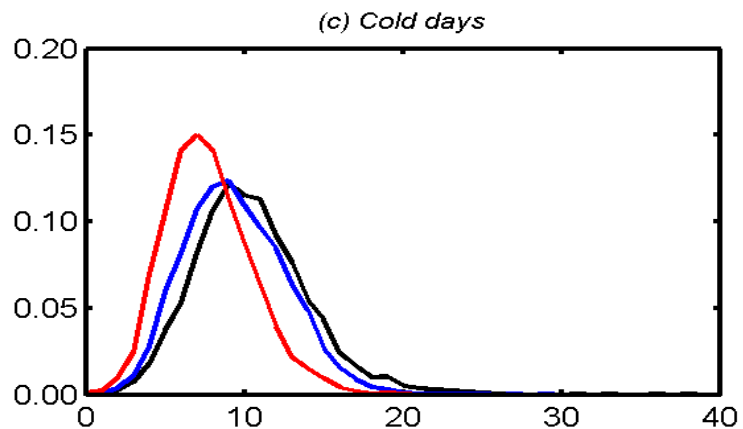
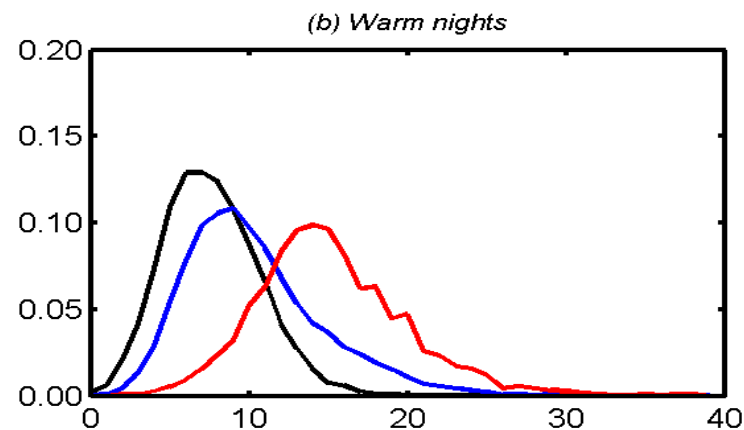
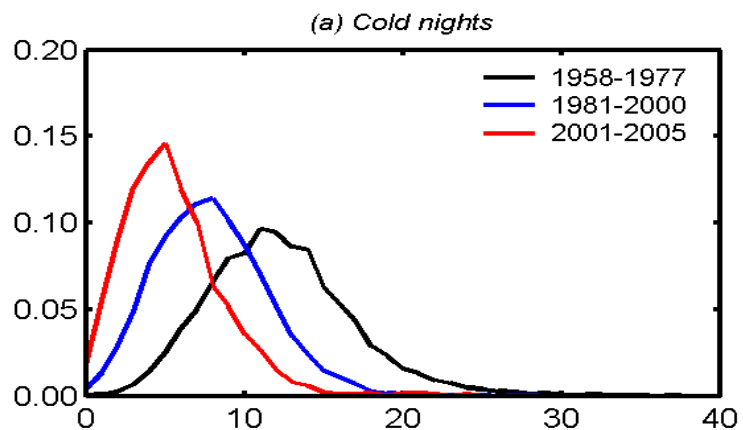
Regional average



The minimum temp has increased, while ice day has decreased

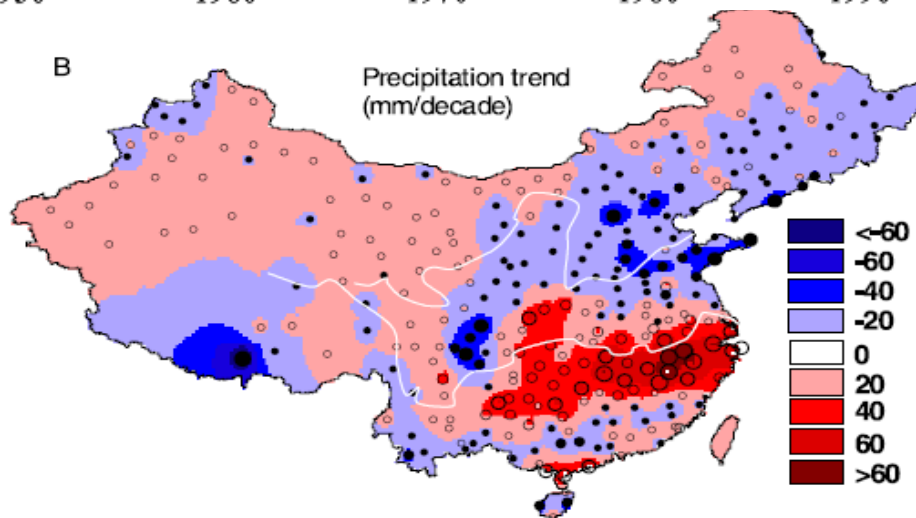
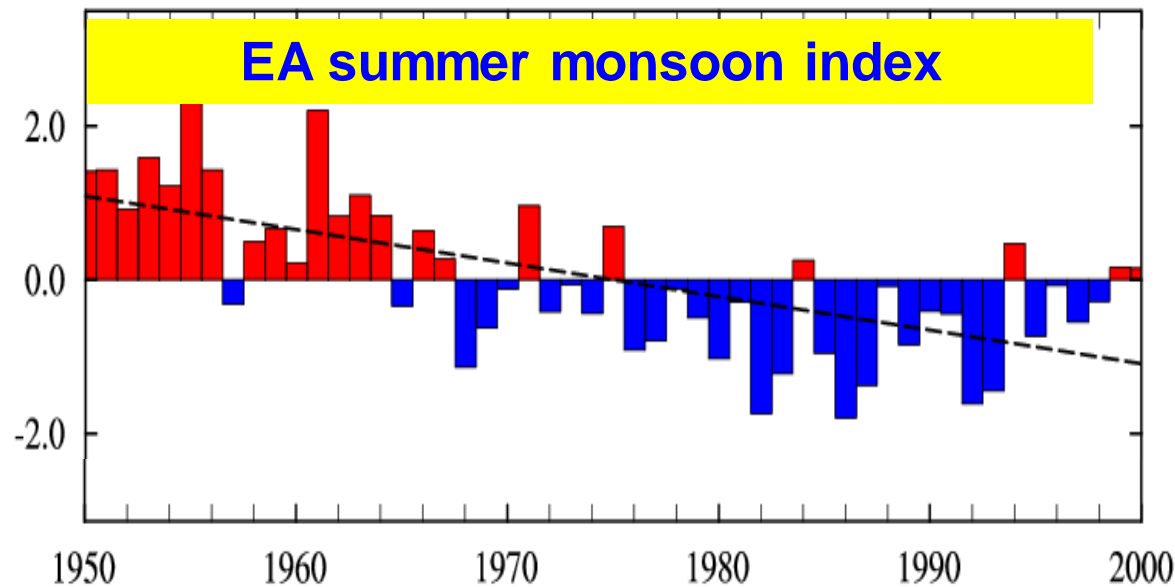


# PDF changes of Cold Nights (TN10p), Warm Nights (TN90p), Cold days (TX10p) and warm days (TX90p)



Cold Night& Cold Days decreased, Warm Nights& Warm Days increased





Precipitation

Xu et al. 2006 JGR



**From Jan 10 to Jan 31, 2008:**

**10 provinces affected, 60 people died.**

**Economic loss more than 53.79 billion RMB**

**(6 RMB=1 USD)**





## Destruction of power transmission tower-cable system







profound influence  
on life



Influence on crops

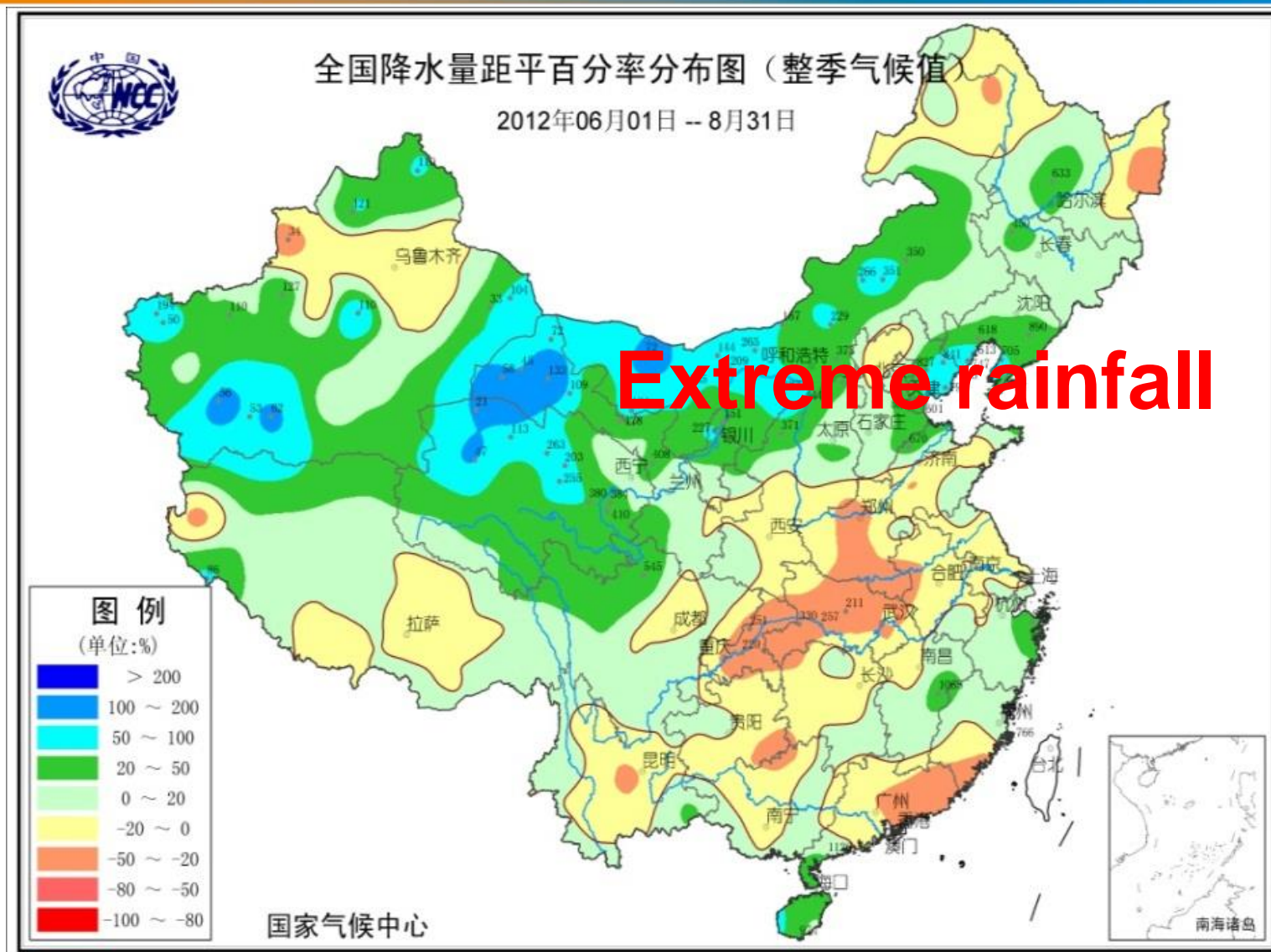




From Jan 10 to Jan 31, 2008:  
**2859 passenger trains delayed,**  
 397 passenger trains cancelled,  
 436 passenger trains weaved the ways  
 8000 freight trains delayed

From Jan 10-31:  
**5800,000 (5M) passengers**  
 stayed in the railway  
 stations & on the trains









Total Annual rainfall

1999: 266.9

2001: 338.9

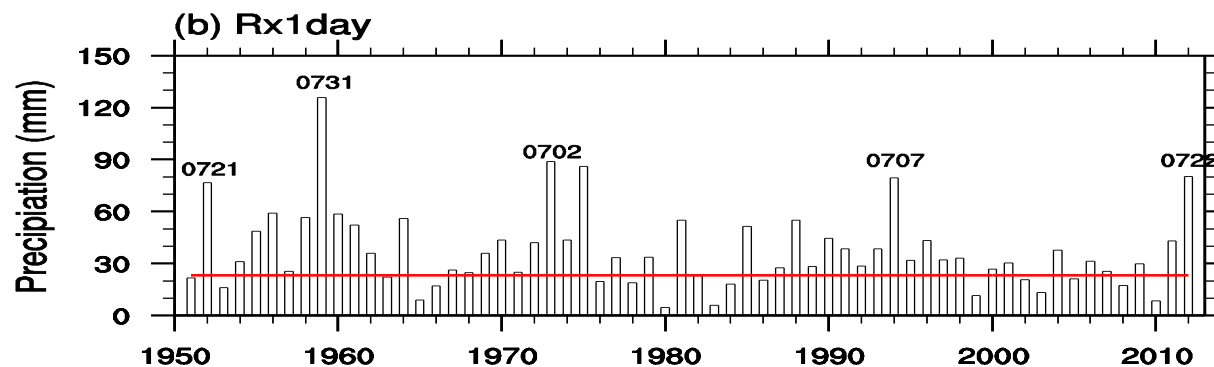
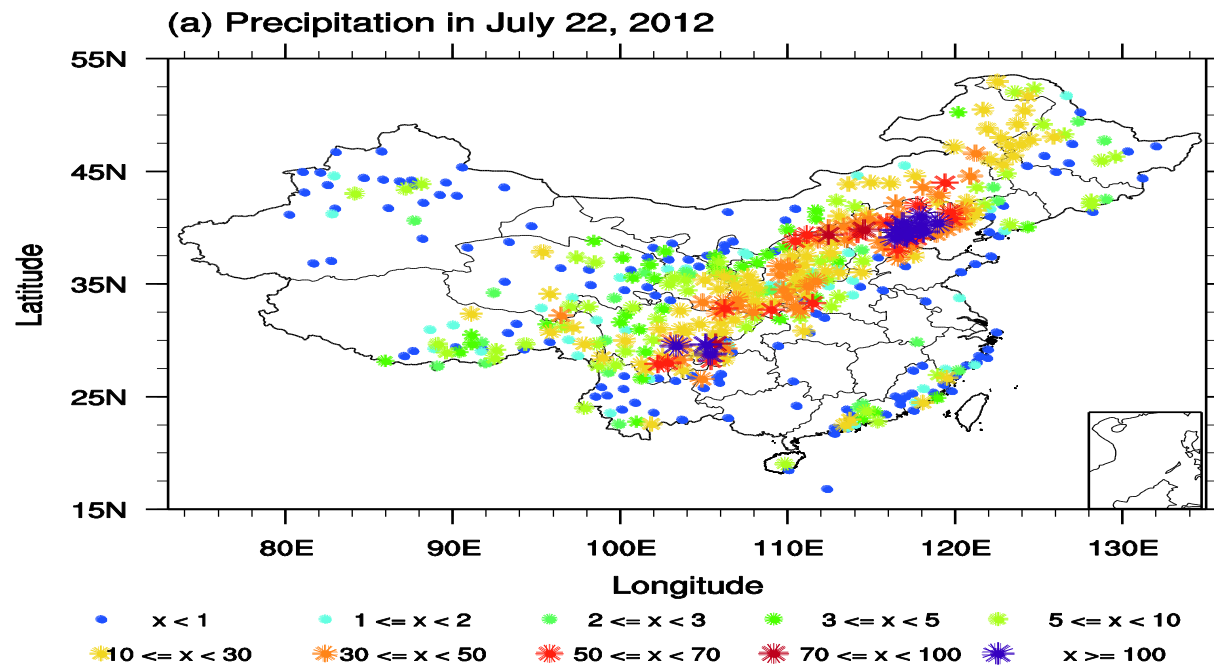
2007: 483.9

2010: 533.8

2011: 721.1

2012:

One-day 460 mm







Northern part of the downtown



Subway

Bus







Western part of the downtown

## 新京报



www.bjnews.com.cn



### “7·21”特大自然灾害 77人遇难

本版1-24版

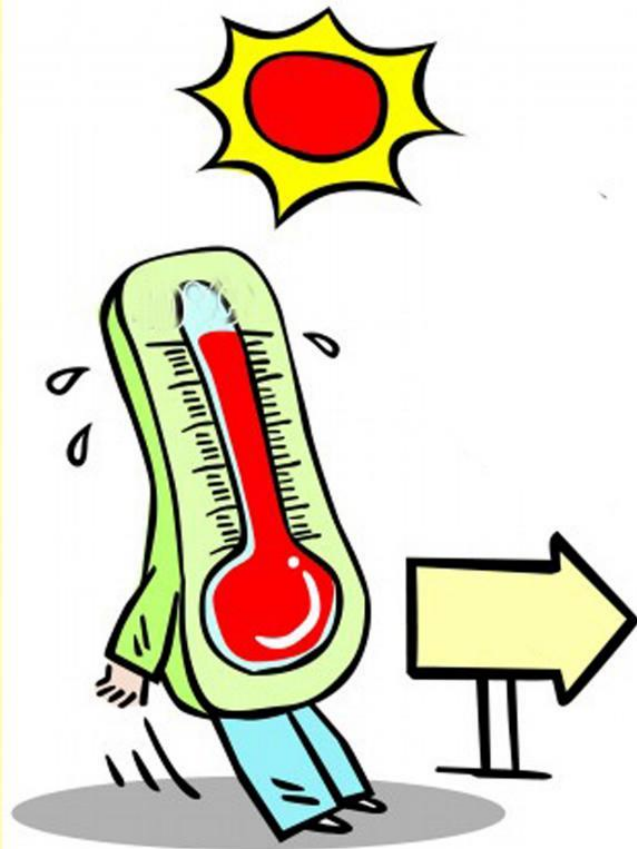


Disaster area: 16000 km<sup>2</sup>;

Damage-suffering population: 1900,000; Dead: 77

Direct economic losses: more than 10 billion RMB







Shanghai





Hunan in *S. China*

Heilongjiang in *N. China*





**Great efforts should be devoted to the studies  
of monsoon activities in high populated regions  
of E. Asia.**





LASG  
THANKS

[www.lasg.ac.cn/staff/ztj](http://www.lasg.ac.cn/staff/ztj)