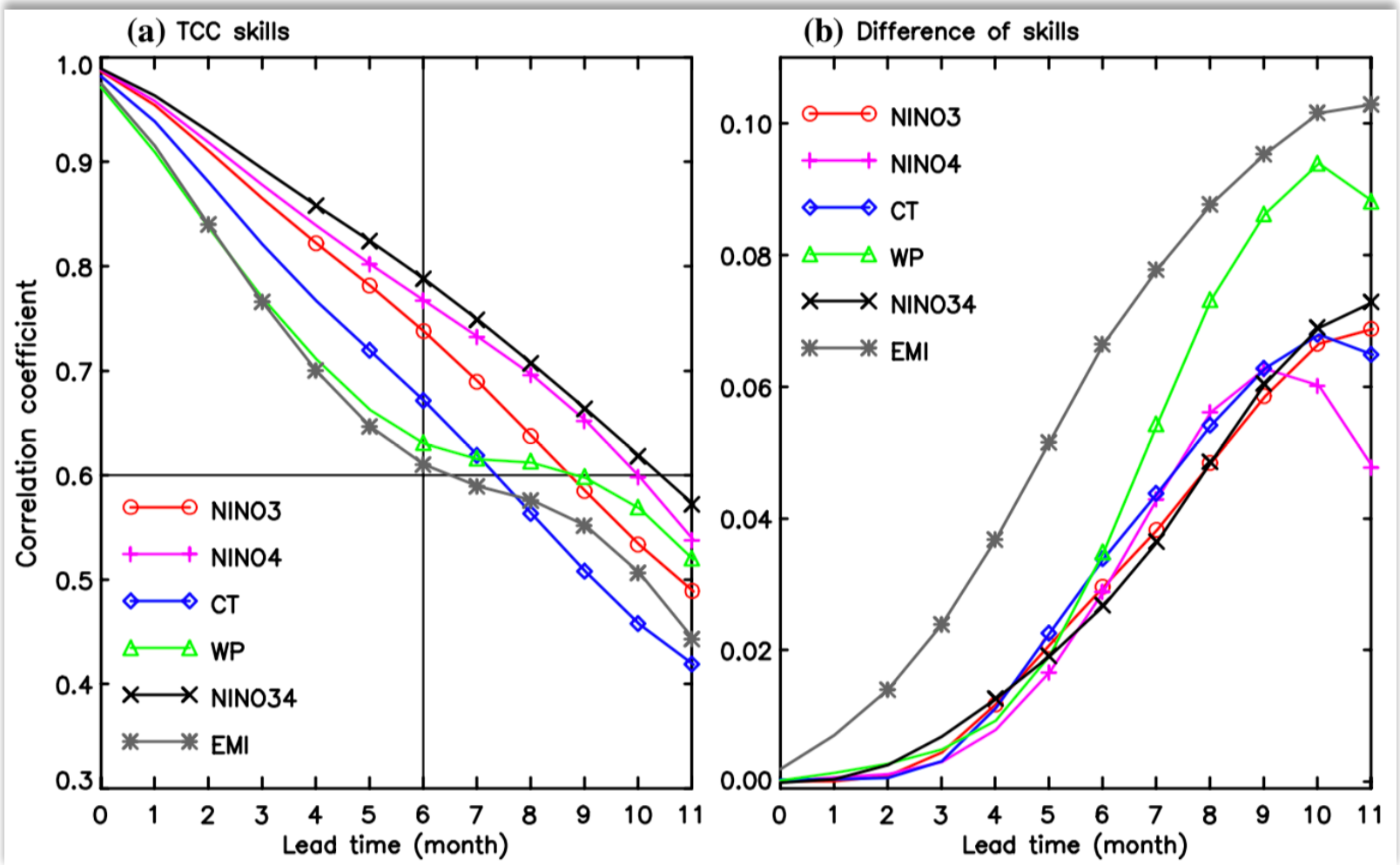
Cross-validated correlation skill scores of the Niño indices predicted by conditionally adding the NTA precursor

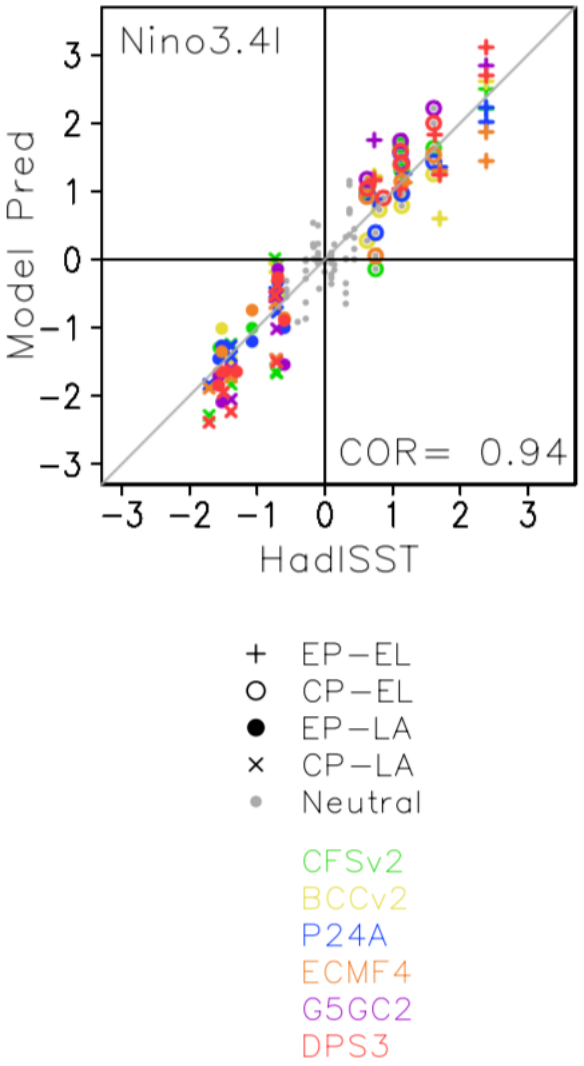
$$\text{Niño}(t) = \alpha\text{Niño}(t) + \beta\text{WWV}(t) + \gamma\text{ZWS}(t) + \delta\text{NTA}(t)$$

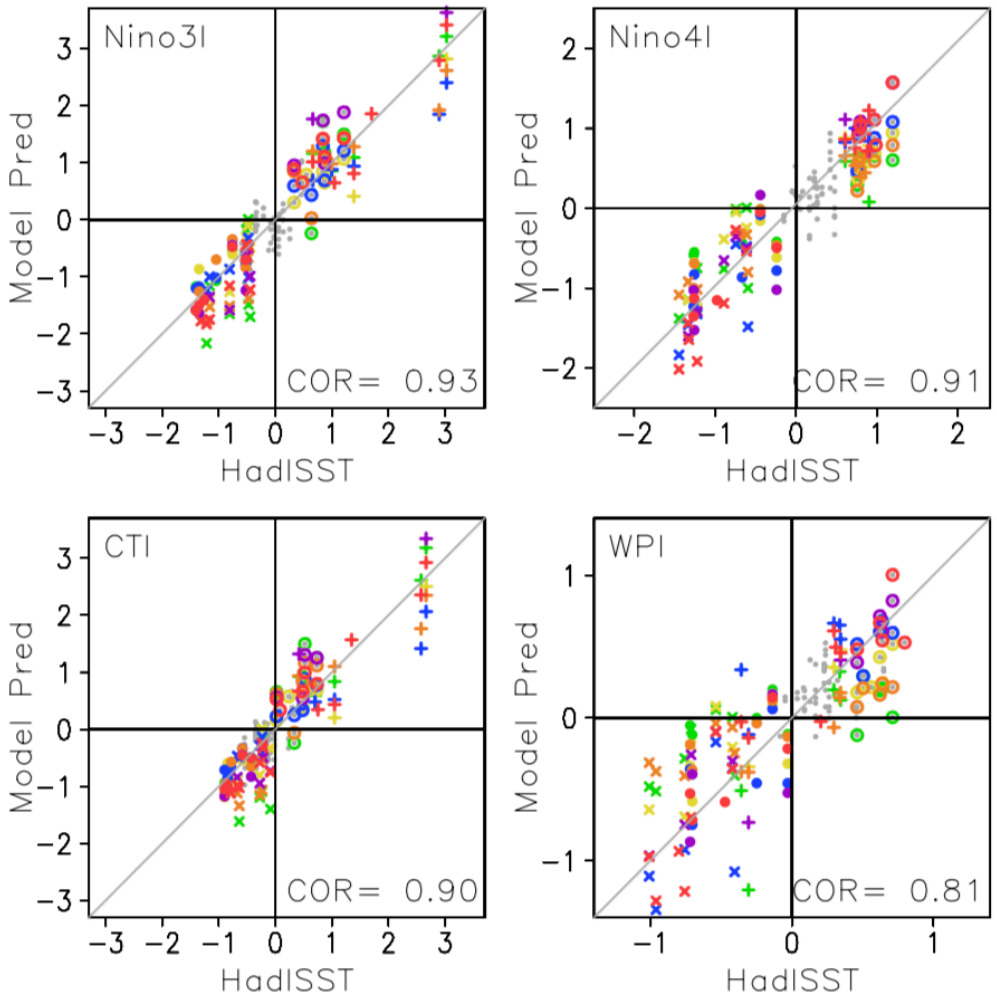


(Ren et al. 2019)

Indices-based skills of ENSO prediction in dynamical models

Nino3.4, Nino3 & Nino4 indices, as well as Nino CT & WP indices





$$\begin{cases} N_{CT} = N_3 - \alpha N_4 \\ N_{WP} = N_4 - \alpha N_3, \end{cases} \qquad \alpha = \begin{cases} 0.4, & N_3 N_4 > 0 \\ 0, & \text{otherwise.} \end{cases}$$

(Ren et al. 2019)

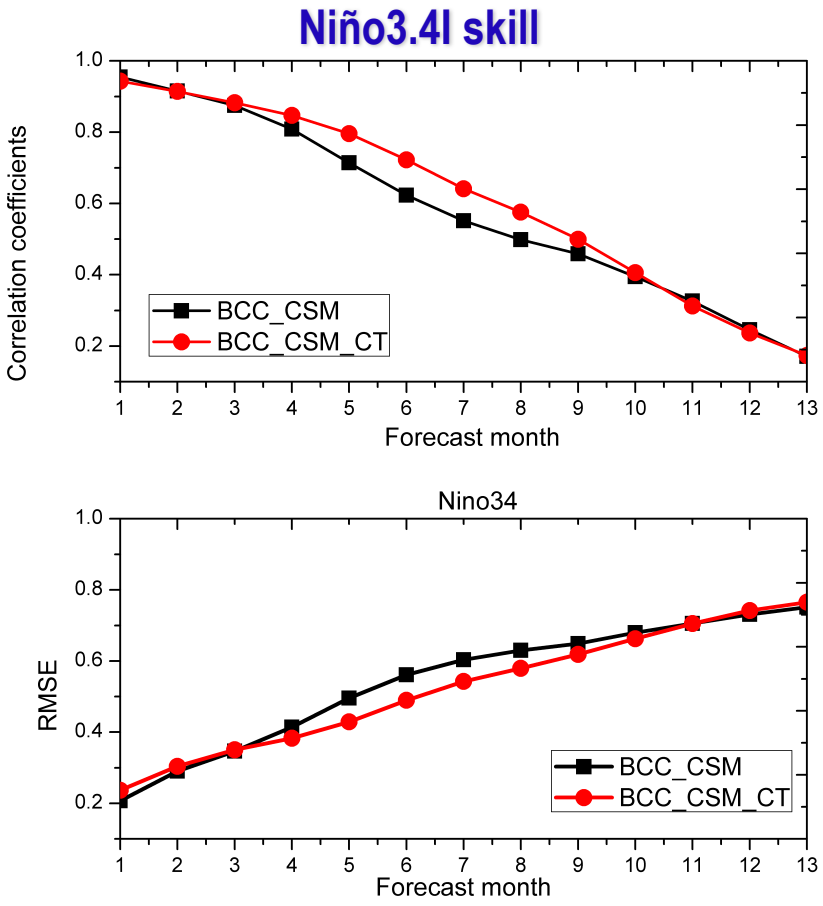
(Ren and Jin 2011)

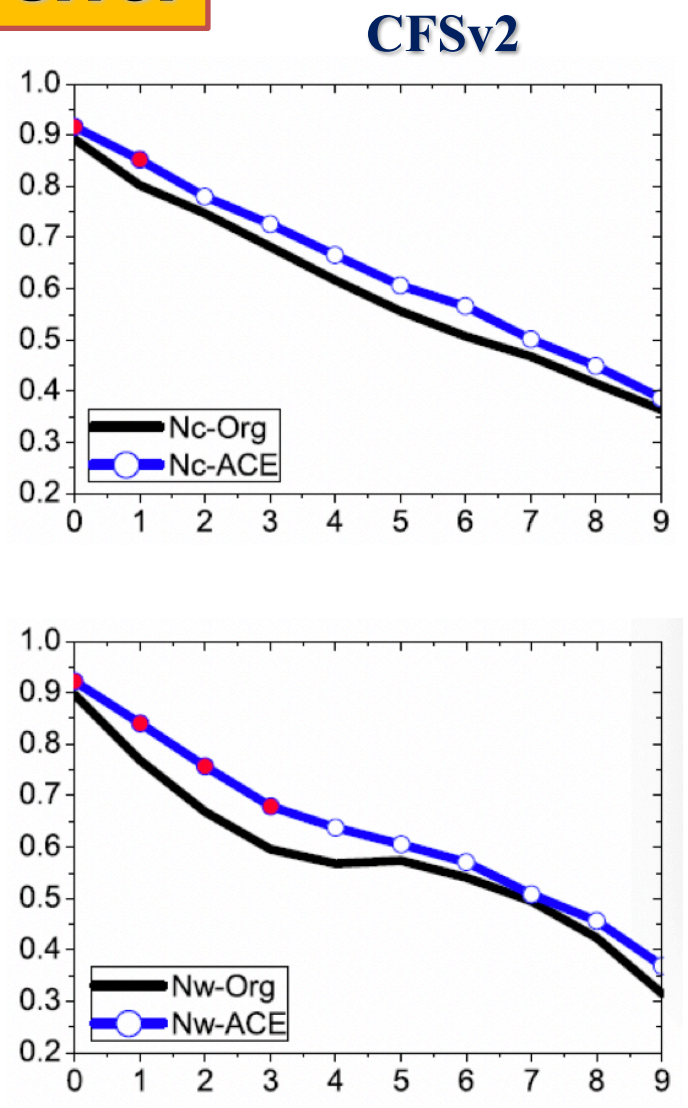
Analog-based Correction of prediction Errors (ACE)

Basic idea: （Ren et al. 2014）

$$\hat{P}_{\mathrm{M}}(\psi_0) = P_{\mathrm{M}}(\psi_0) + \tilde{P}_{\mathrm{M}}(\tilde{\psi}_j) - P_{\mathrm{M}}(\tilde{\psi}_j)$$

Model error



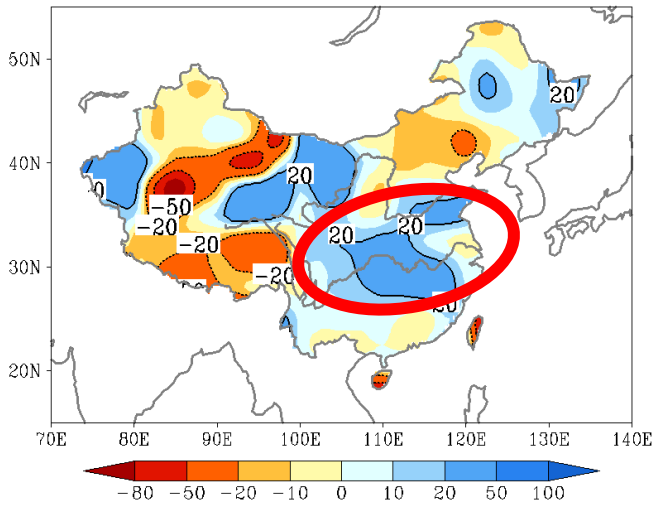


BCC-CSM1.1m

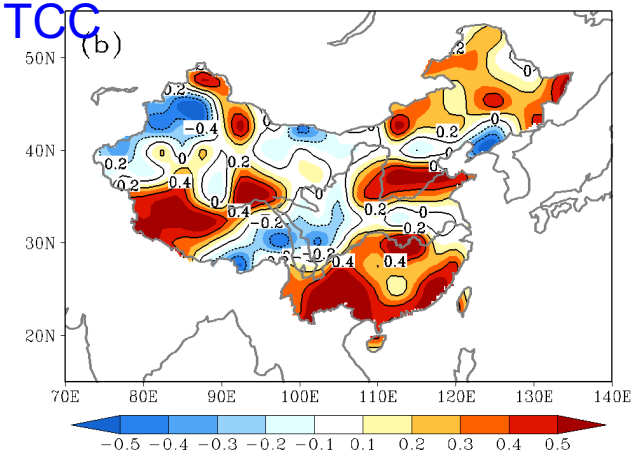
Liu and Ren* 2017 IJOC

Statistical correction to BCC dynamical prediction

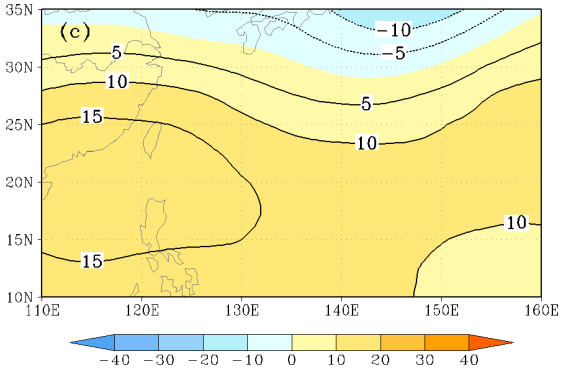
Fcst of precip anomaly percent

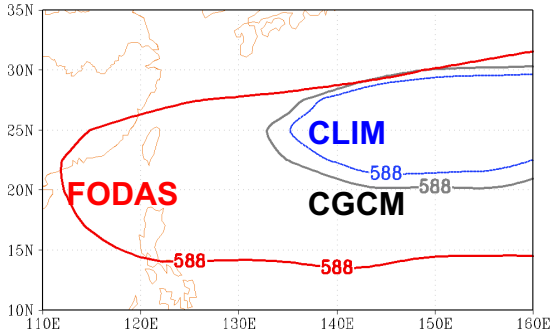


TCC

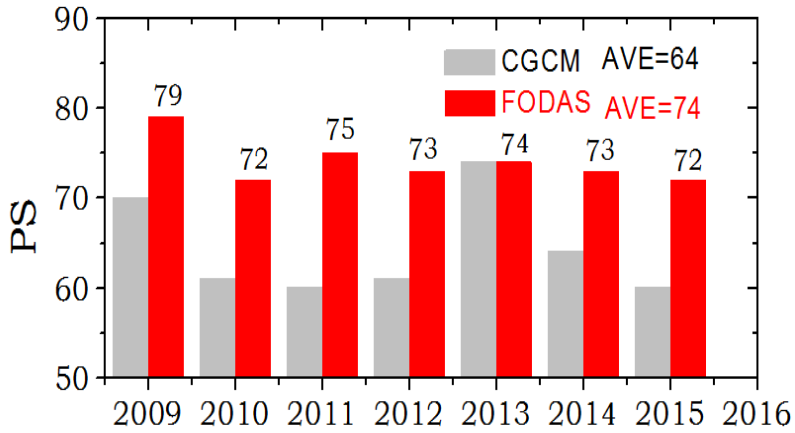


Fcst of 500hPa HGT





Stronger and more southward of WPSH , more precip along the Yangtze river valley.



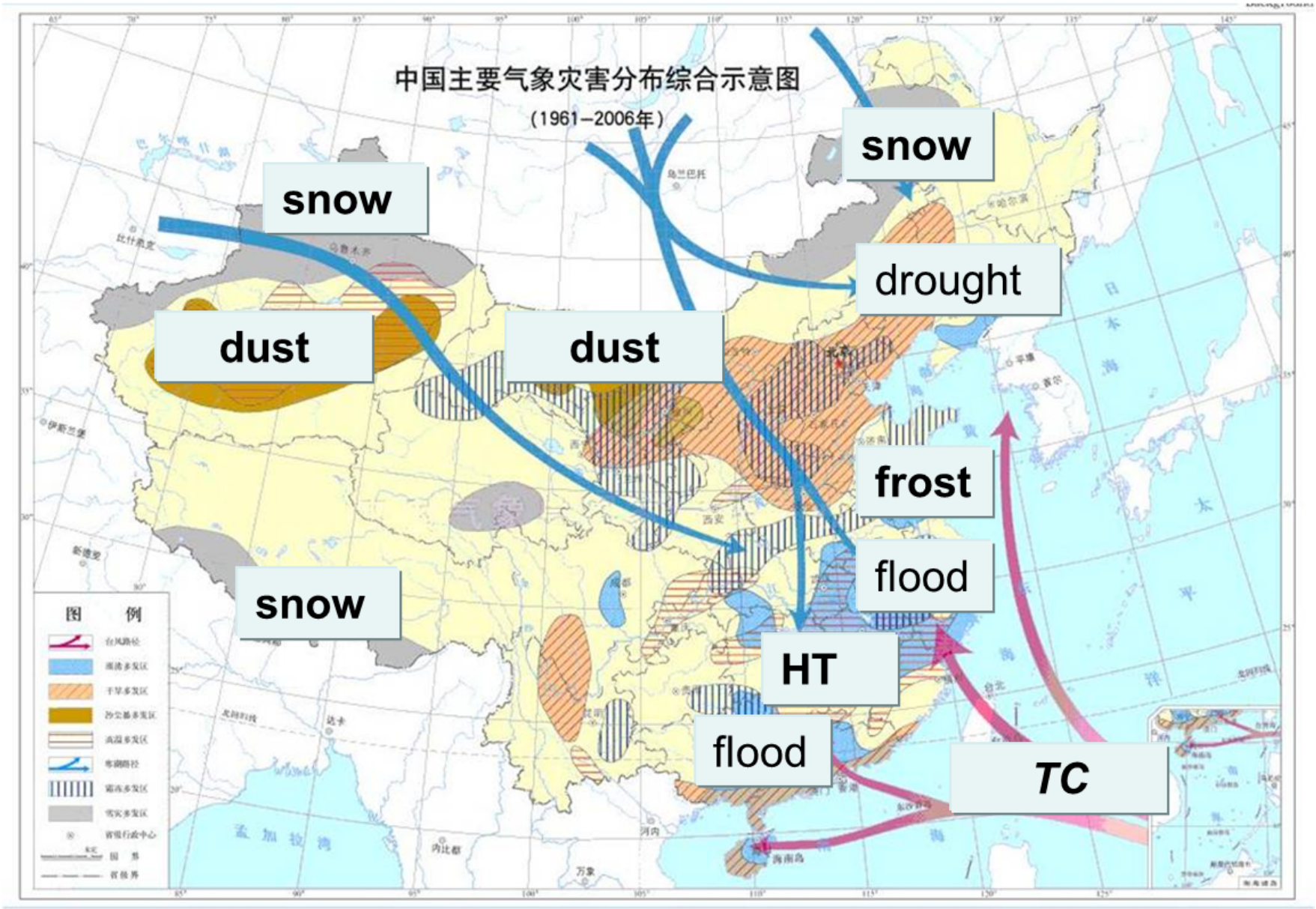
Outline

- Introduction
- Operational model system
- Climate prediction operation
- Climate prediction research
- Summary and outlook

Summary

- Climate prediction is essential to the national demand in China.
- BCC has made a big progress in climate model development.
- CMME products have been applied to real-time seasonal climate prediction since 2018, showing a good skill.
- There has been a relatively complete operational system of China climate prediction, particularly with a development of the SIP.
- Hindcast verifications showed that the correlation skills of ENSO, IOD, NAST, WNSH, and EASM are high but can be Improved as well.
- Some researches on climate impact and prediction as well as new methodology have been carried out in China.
- ∘ ∘ ∘ ∘ ∘ ∘

Distributions of major meteorological disasters in China



2008 snow disaster – still a big challenge


公路结冰交通受阻

旅客滞留车站

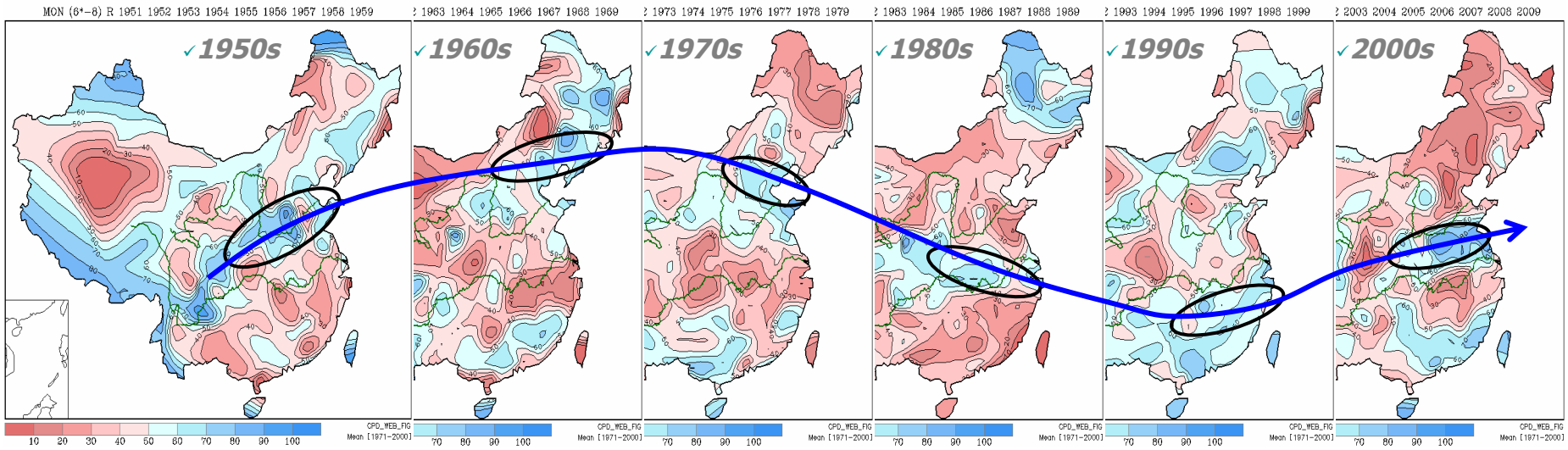

生活受影响


电塔倒伏


电线结冰


树木受毁

Decadal variations of China rainbelt

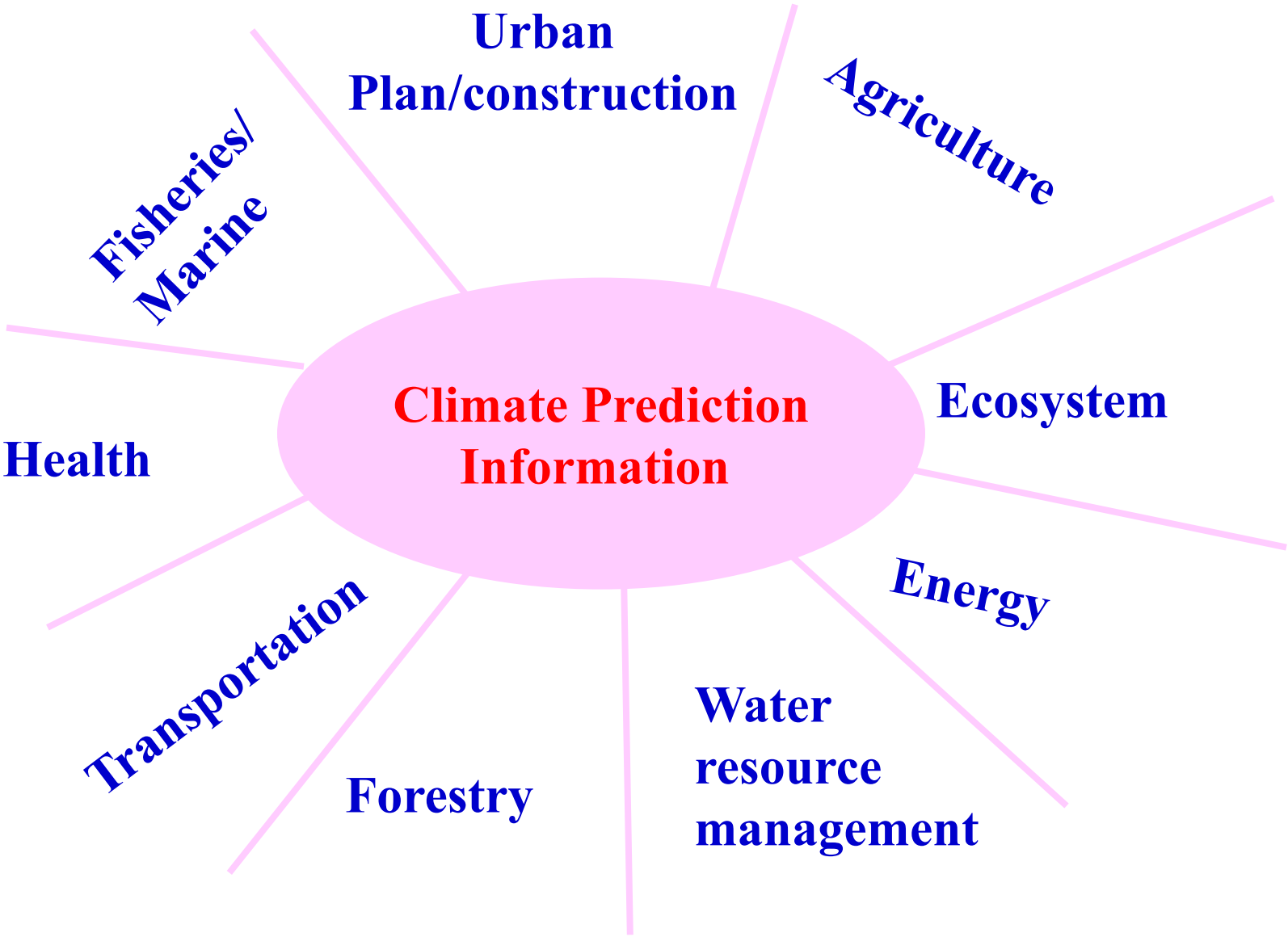


What will be in the next decade?

How to predict it in BCC?

Believe it or not?

Climate prediction services for economic sectors



Thanks !

For your attention

Main progresses

Climate Models:

- BCC CSM1.1m (T106L26) —>CSM1.2 (T106L40)
- BCC CSM2 (T266L56)

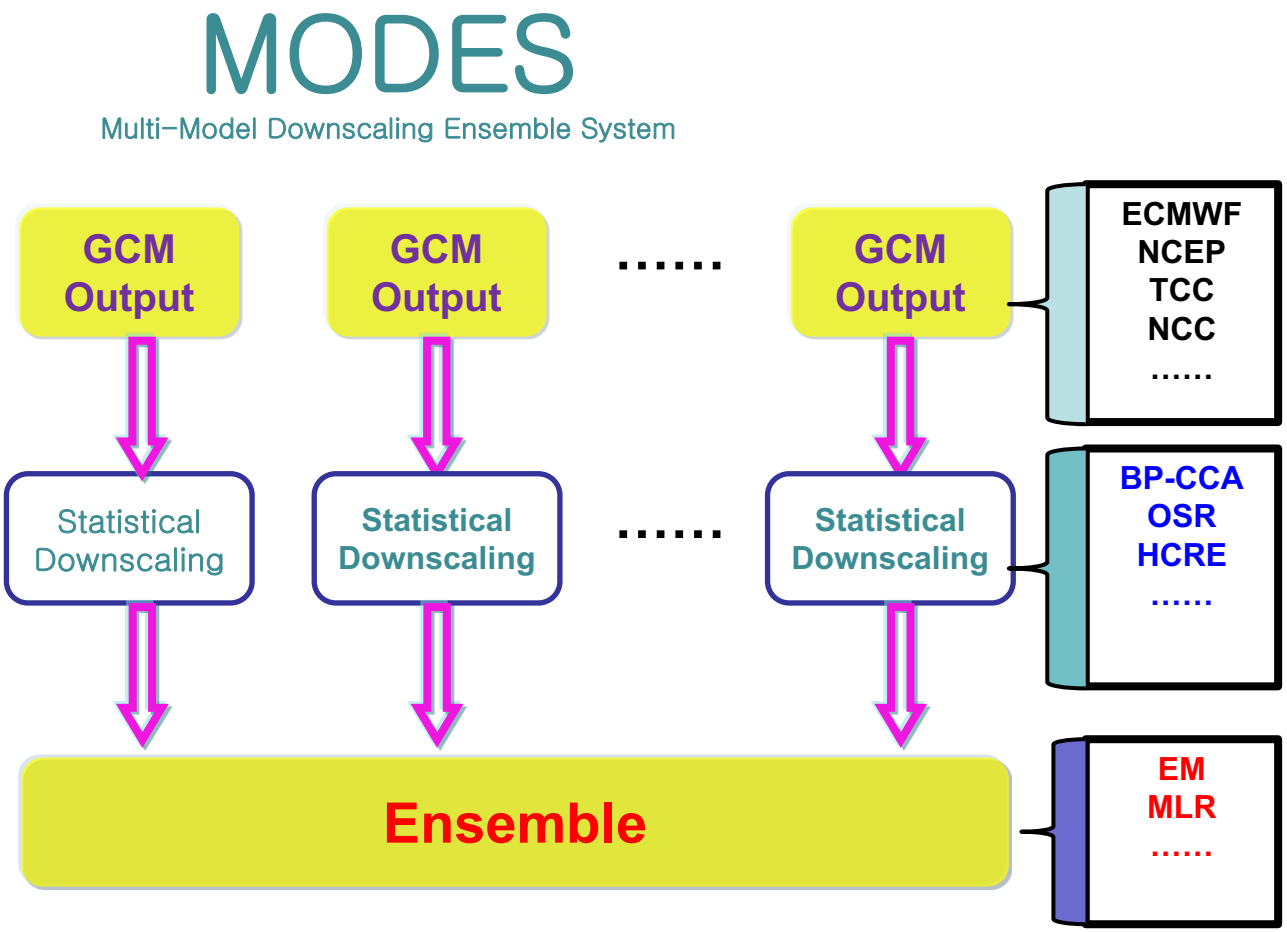
CPPS

- ENSO, AO, Siberian High
- MJO, EAWM

CMME

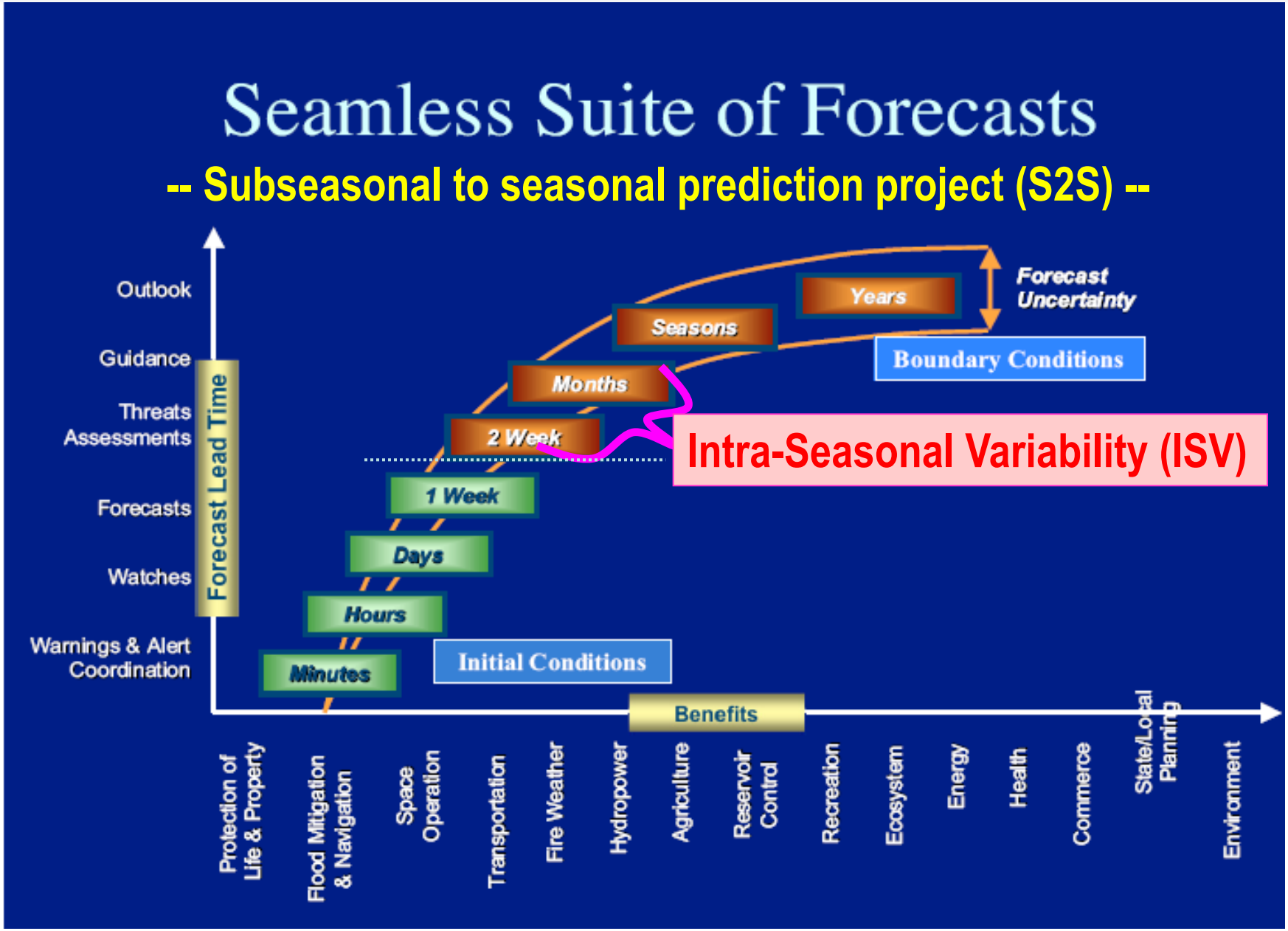
- More Models involve
- MODES

CMME——MODES



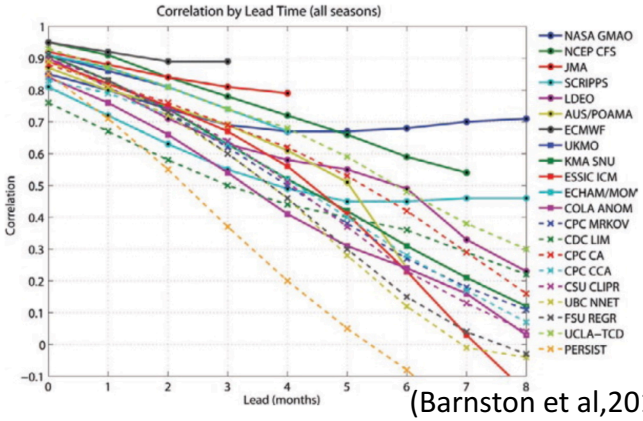
Previous study shows that forecast by downscaling and ensemble perform better than that by ensemble and downscaling.(Kang H. W. et al.,2009)

Seamless forecasts: WWRP-WCRP



Skills: ENSO vs EA seasonal prediction

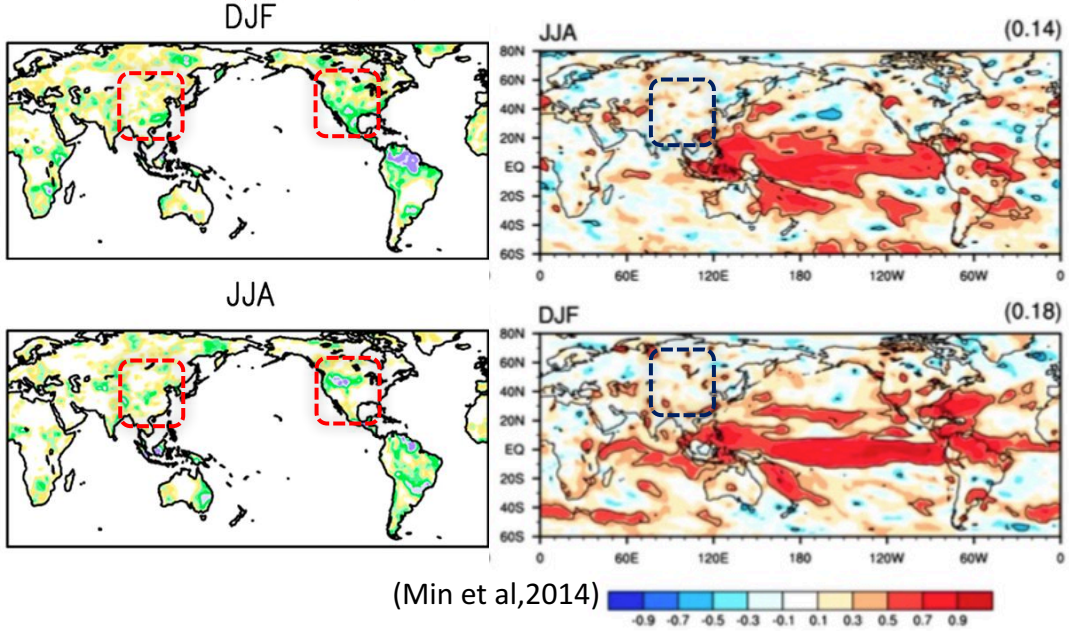
ENSO预测技巧



(Barnston et al,2012)

ENSO技巧高 ≠ 东亚技巧高

NMME提前1个月的降水预测　APCC提前1个月的降水预测



(Min et al,2014)

VECOM1.0系统二级页面

预报与实况对比和空间距平相似系数(ACC) | 趋势异常综合评分(Ps) | 符号一致率评分(Pc) | 分级评分(Pg)

检验方法

2016 | 冬（DJF） | 查询

检验时间

不同LM检验结果