

# **JMA's Seasonal Forecast for 2008 Summer**

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# **JMA's Seasonal Forecast for 2008 Summer**

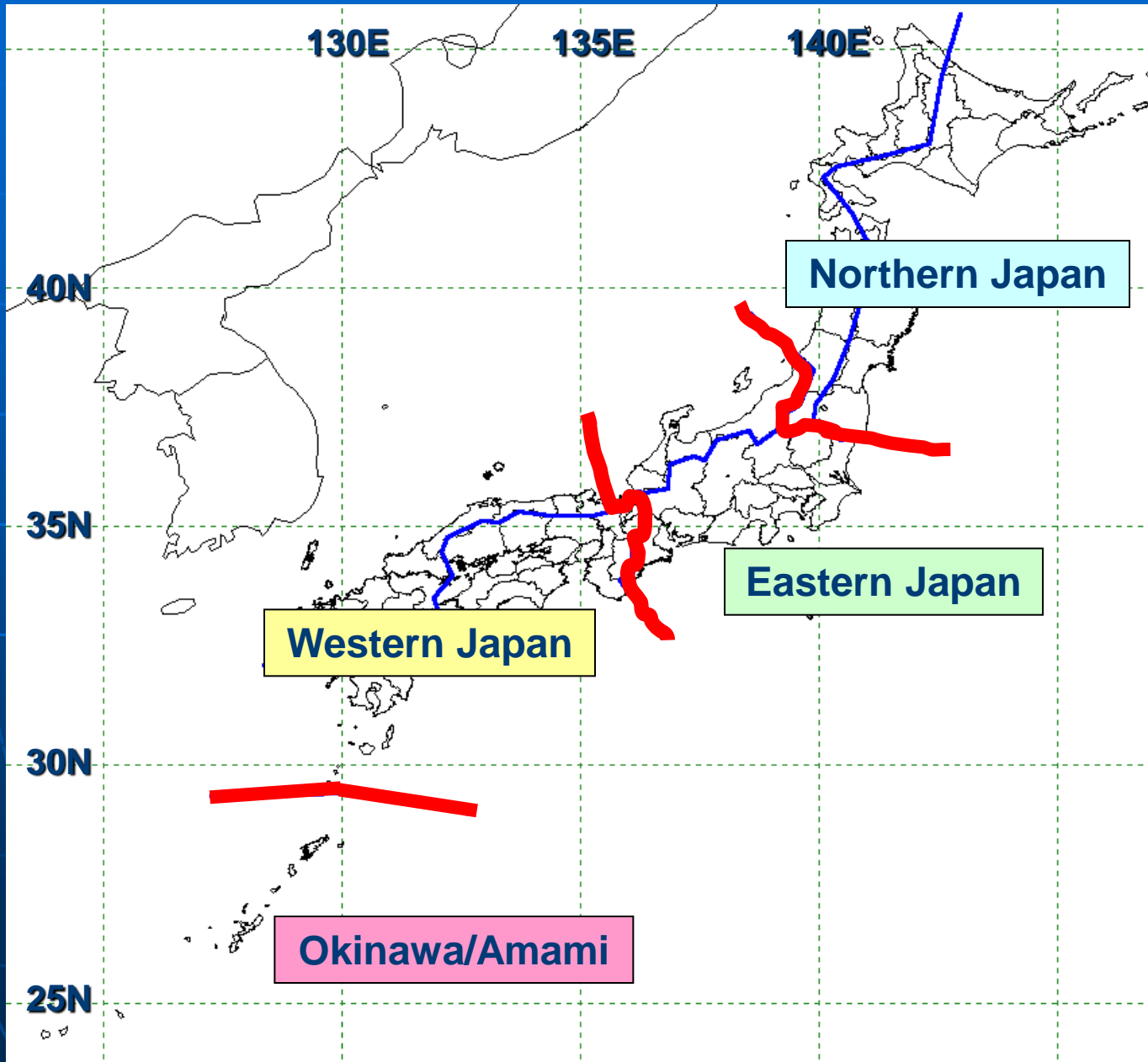
**Part I    Recent long-term trend**

**Part II    Oceanic conditions and outlook**

**Part III    Numerical prediction**

**Conclusion**

# Geographical subdivisions of Japan



# Probability of seasonal mean temperature for summer ( June – August ) 2008

Climatology

Below Normal,

33

Near Normal,

33

Above Normal,

33

Northern Japan

30

30

40

Western Japan

20

30

50

20

40

40

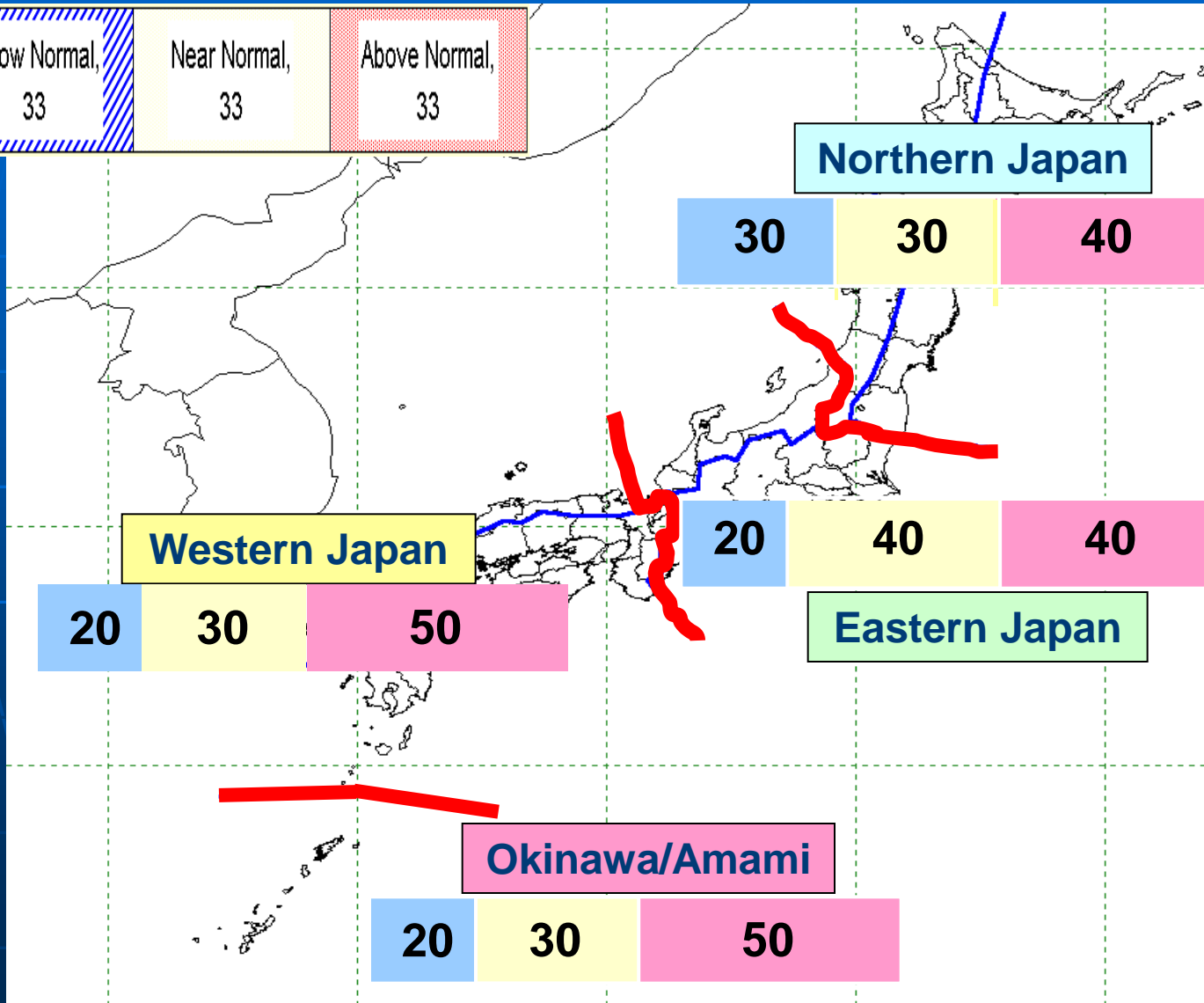
Eastern Japan

Okinawa/Amami

20

30

50



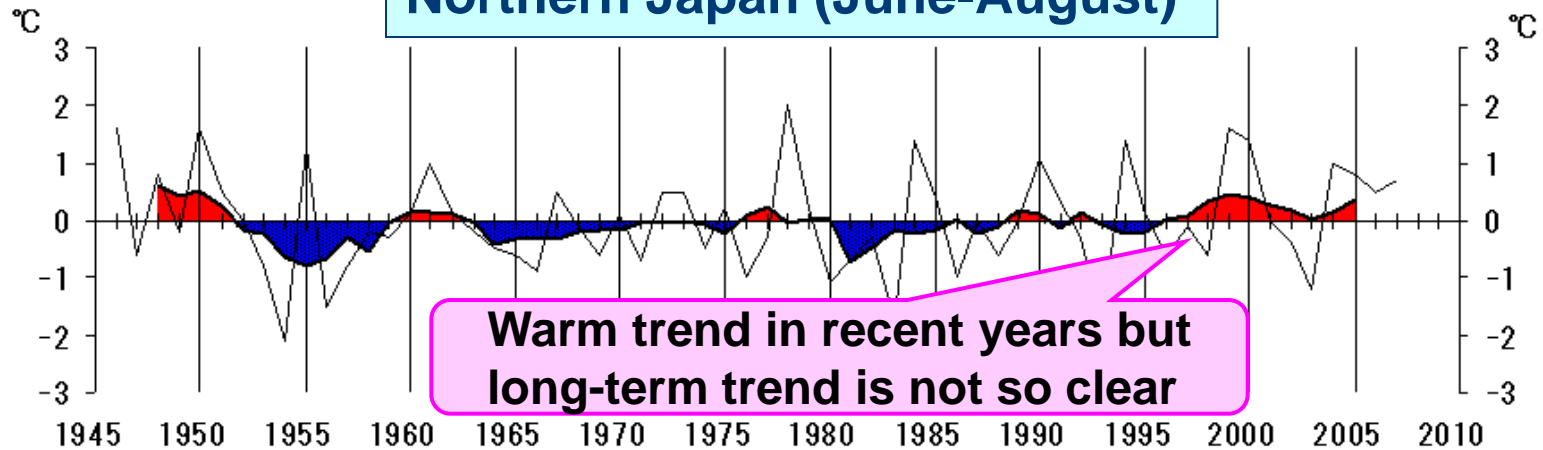
# Part I

## Recent Long-term Trend

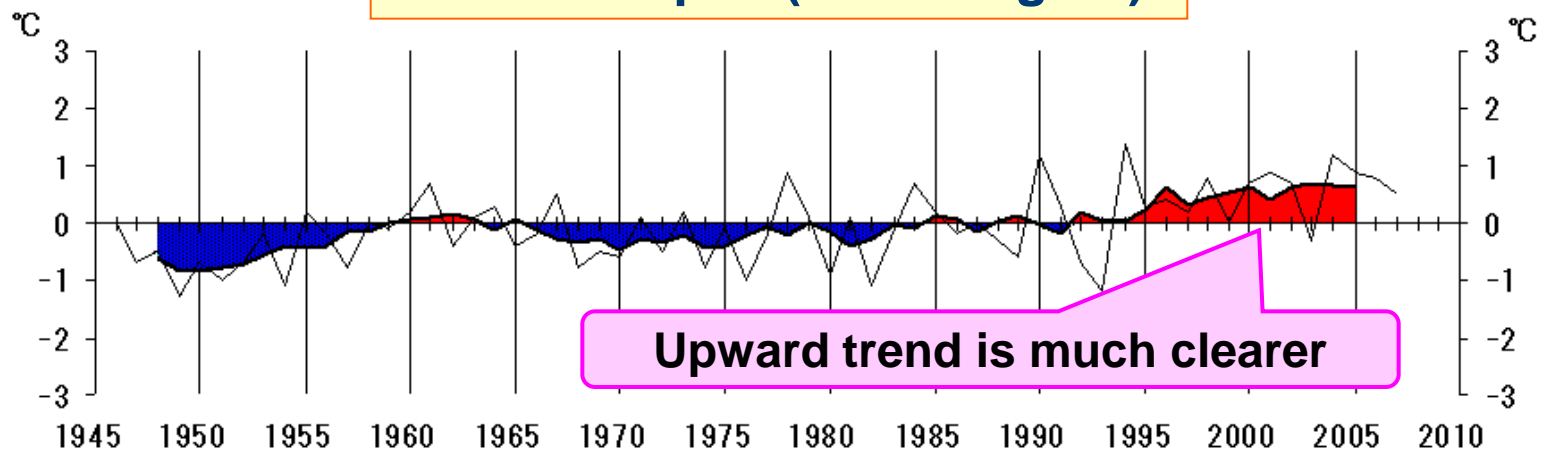
# Long-term Trend (1)

## Area-averaged Temperature Anomalies

Northern Japan (June-August)

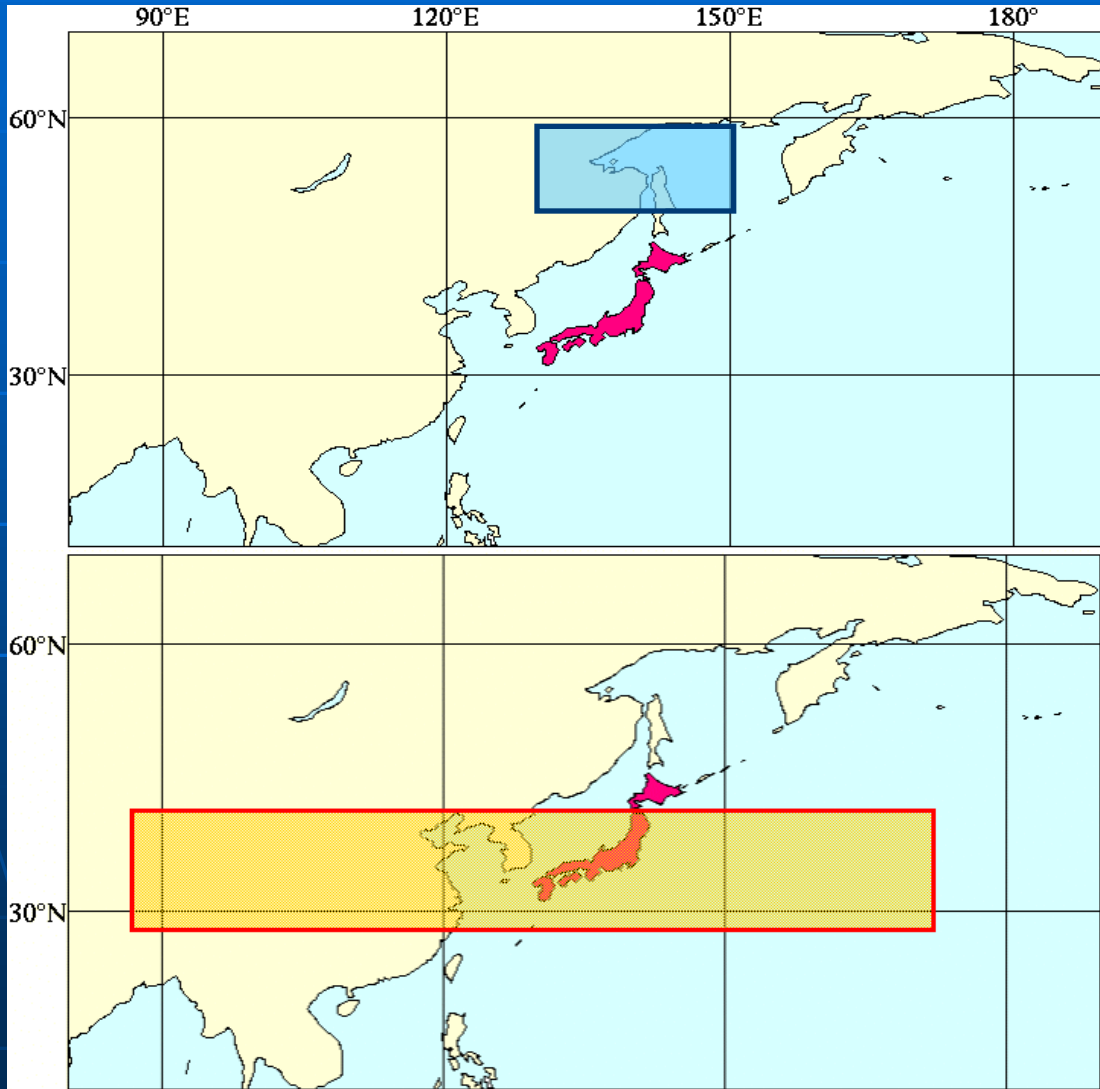


Western Japan (June-August)



# Long-term trend (2)

## General Circulation Indices



Positive anomaly is dominant in recent years

Sea level pressure Index tends to be positive from mid 1990s, reflecting hot summers in eastern and southern Japan.

Sea level pressure Index tends to be positive in recent years

Sea level pressure Index tends to be positive from mid 1980s, reflecting occasional hot summers in northern Japan.

# Warm Season Outlook

## Summary and interpretation

### Recent Long-term trend

- Long-term upward trends are clear in the summer mean temperatures (June-July-August) over Japan except northern Japan. In northern Japan, the summer mean temperature has large year-to-year fluctuations though it tends to be above normal in recent years.
- The Okhotsk high index tends to be positive from late 1980s, reflecting occasional cool summers in northern Japan.



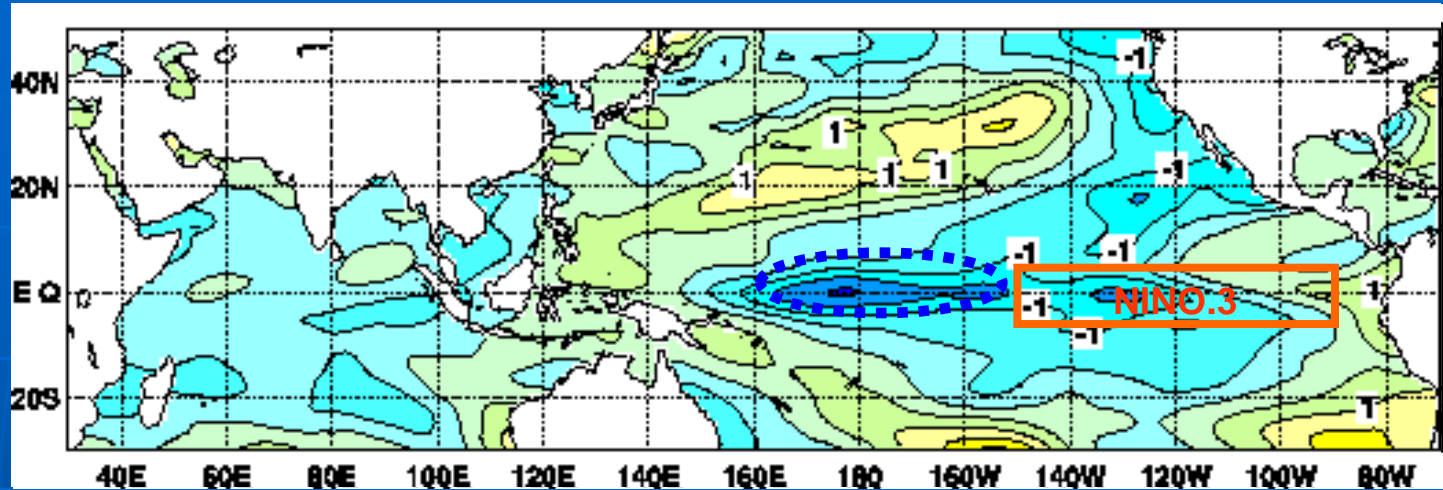
## **Part II**

# **Oceanographic Conditions and Outlook**

# Equatorial SST anomalies and SOI

February  
2008

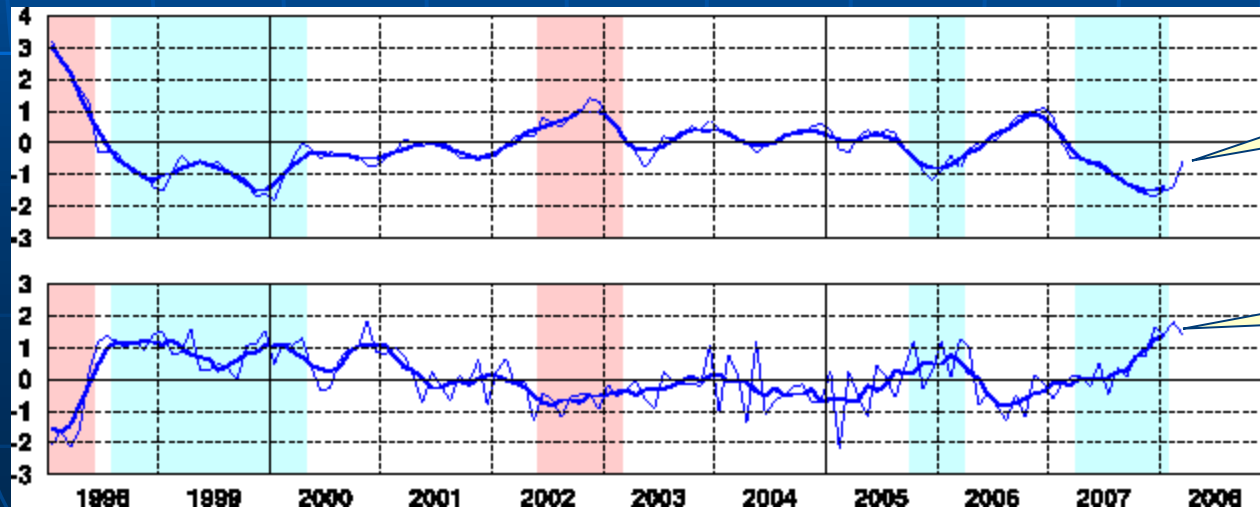
March  
2008



La Niña event has continued since last spring, while negative SST anomalies in the eastern equatorial Pacific is rapidly weakening.

**NINO.3**  
SST  
deviation  
(150W-90W,  
5S-5N)

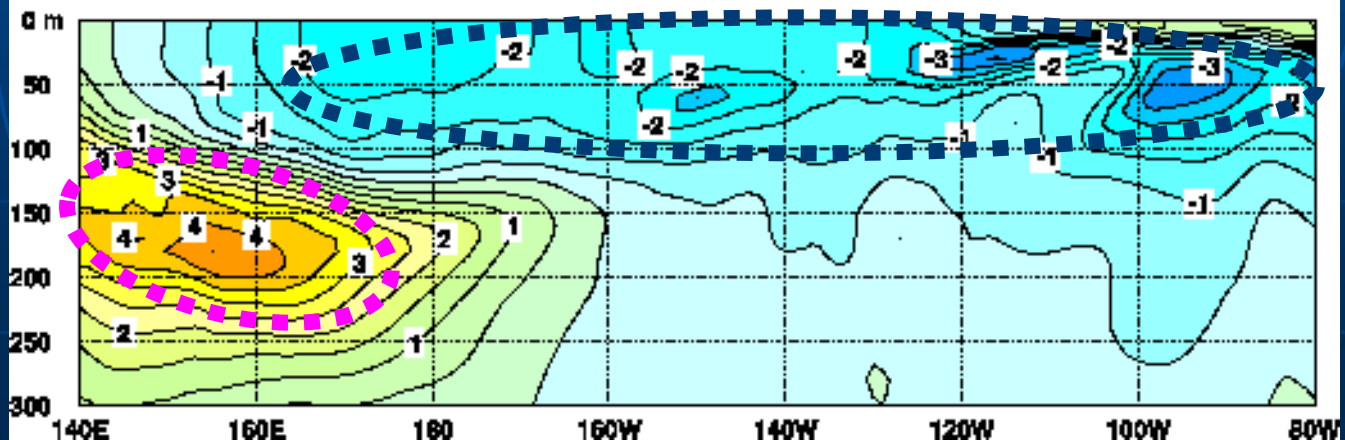
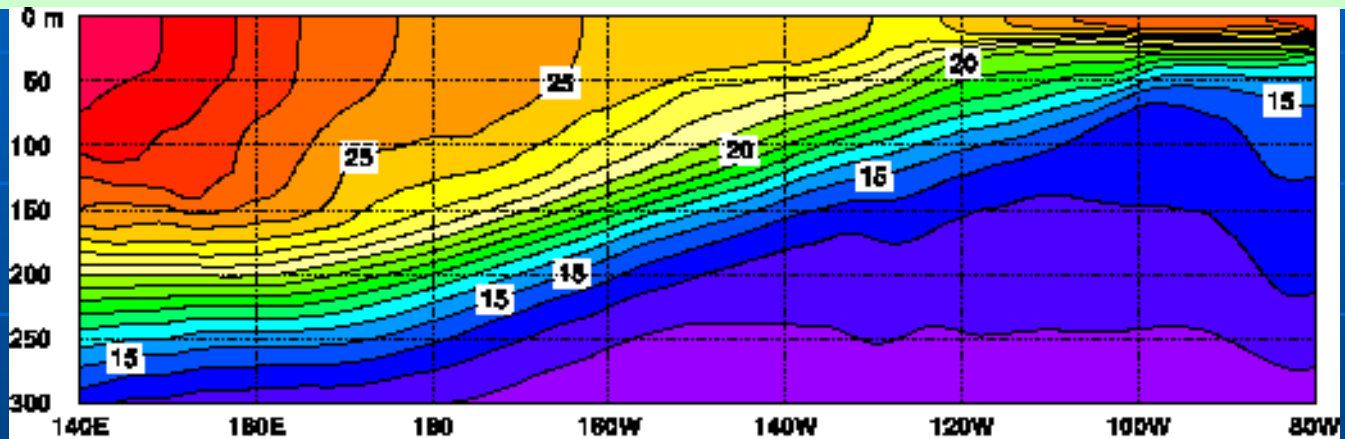
**SOI**  
SOI: Southern  
Oscillation Index



# Subsurface temperatures and anomalies along the equator in the Pacific

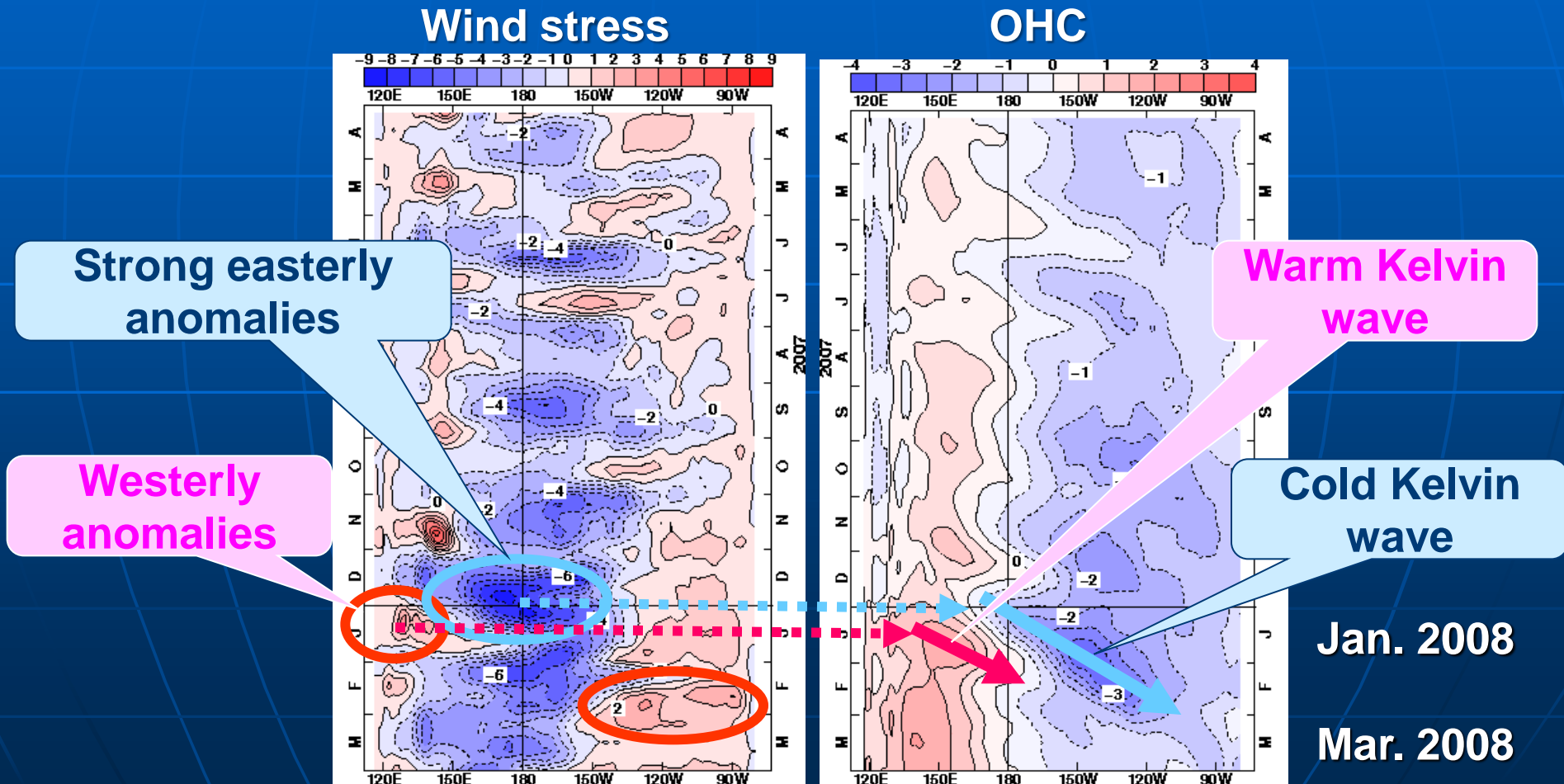
- Negative subsurface temperature anomalies through the central and eastern equatorial Pacific
- Positive anomalies in the western part.

March  
2008



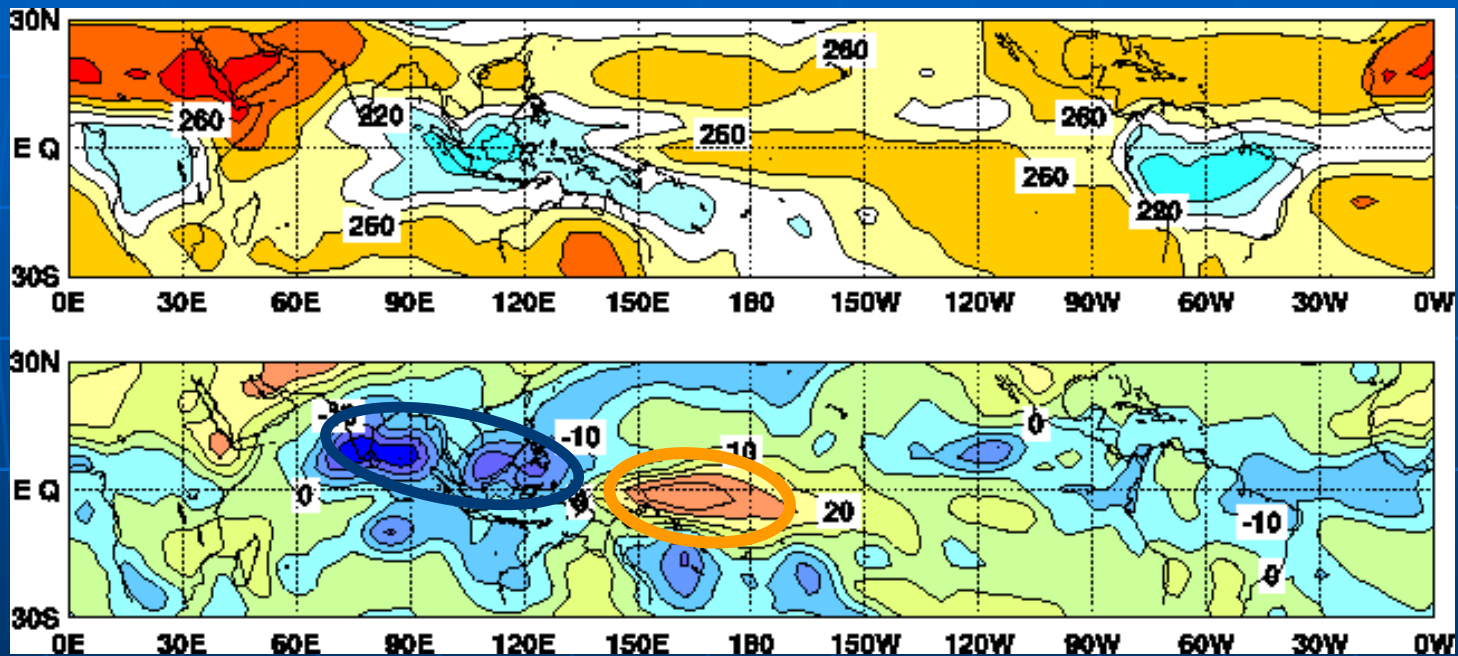
# Time-longitude cross-sections of wind stress and OHC anomalies along the equator in the Pacific

During the latter half of February and early March, westerly wind anomalies were prominent in the eastern equatorial Pacific. In response, negative OHC anomalies have weakened.



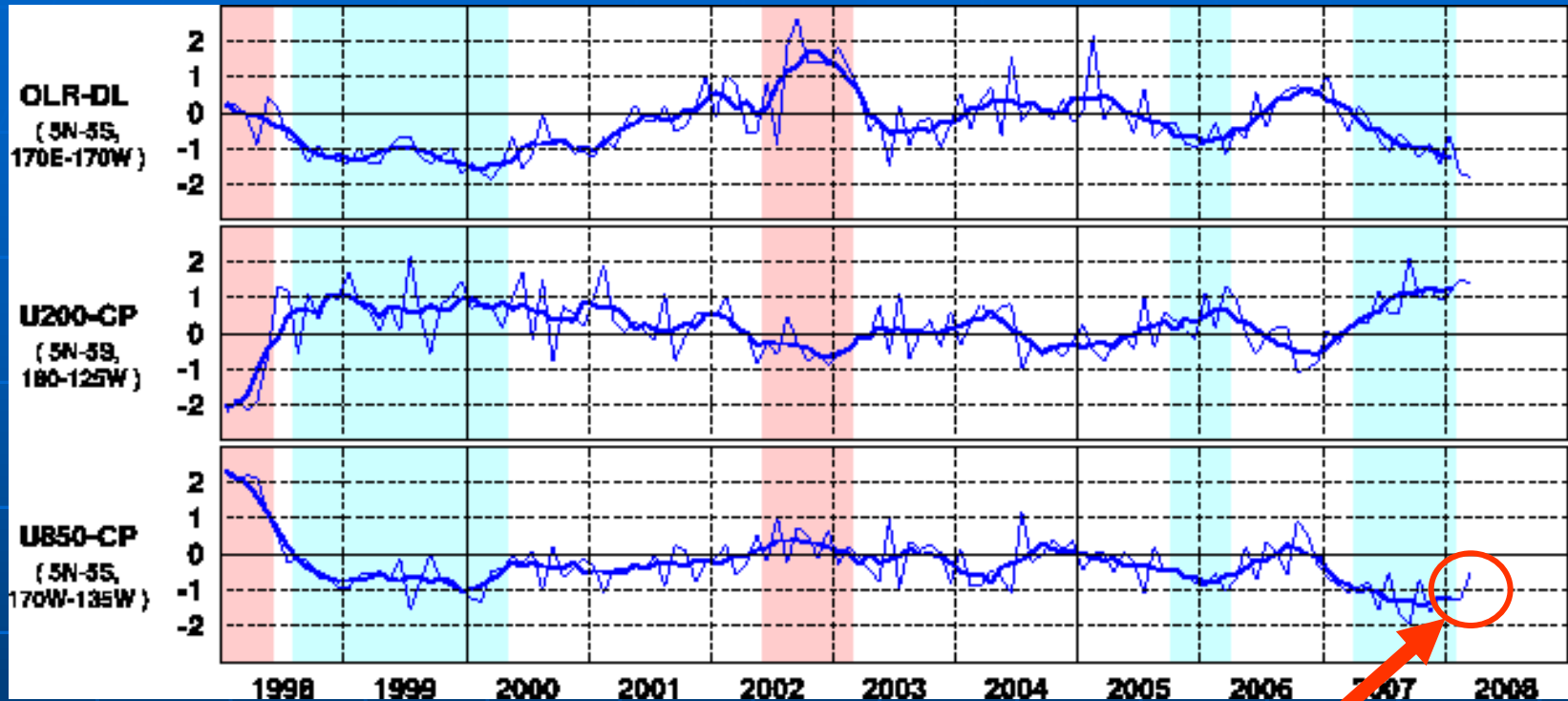
# Convective activities

Monthly mean outgoing longwave radiation (OLR) and anomalies in March 2008. Base period for normal is 1979-2004. Original data were provided by NOAA.



In March, convective activities were above normal near Indonesia, and below normal in the western equatorial Pacific.

# OLR and Zonal Wind Indices



In March, easterly wind anomaly at the lower troposphere in the central equatorial Pacific (bottom panel) weakened compared with the values during last winter.

# Diagnosis of oceanic conditions

In March 2008:

- ◆ Negative SST anomalies substantially weakened in the eastern equatorial Pacific.
  - ◆ Negative subsurface temperature anomalies also weakened in the central and eastern equatorial Pacific, while positive anomalies remained prominent in the western part.
  - ◆ Easterly wind anomaly at the lower troposphere in the central equatorial Pacific weakened.
- ◆ “2007/08 La Niña event” hit its peak last winter, but weakened rapidly.

# NINO.3 SST forecast by JMA El Niño forecast model

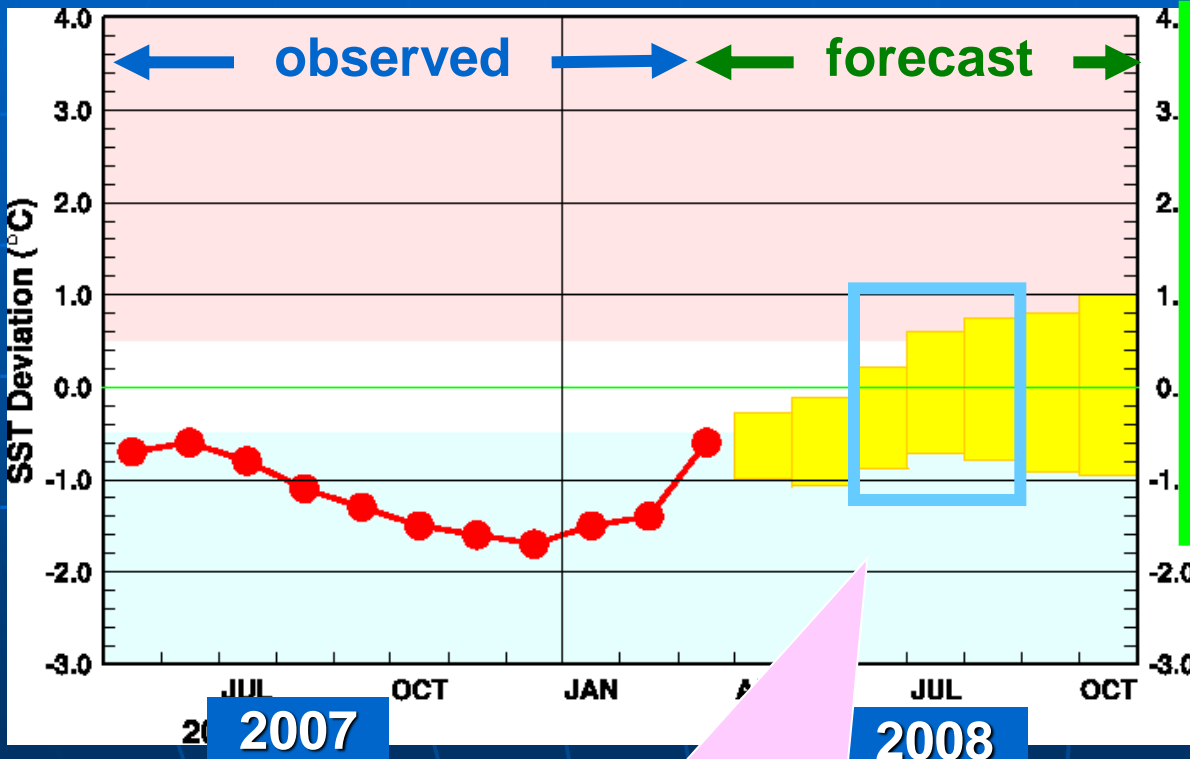
## model spec

### CGCM

Atmosphere : T<sub>L</sub>95L40  
Ocean : 1.0x0.3-1.0deg  
L50

### Ensemble

method : LAF  
(5days interval)  
size : 12 members



Coming closer to normal  
towards the summer

Each yellow box  
denotes the range  
where the SST  
deviation will be  
included with the  
probability of 70%.



# Warm Season Outlook

## Summary and interpretation

### Oceanic conditions

- ◆ “2007/08 La Niña event” hit its peak last winter, but weakening rapidly.
- ◆ It is likely to be weak La Niña or ENSO neutral conditions in the coming summer.

# Part III

## Numerical Prediction

# Numerical Prediction

## Specification of Seasonal forecast model

**AGCM**

**Atmosphere : TL95L40**

**SST : refer to the chart below**

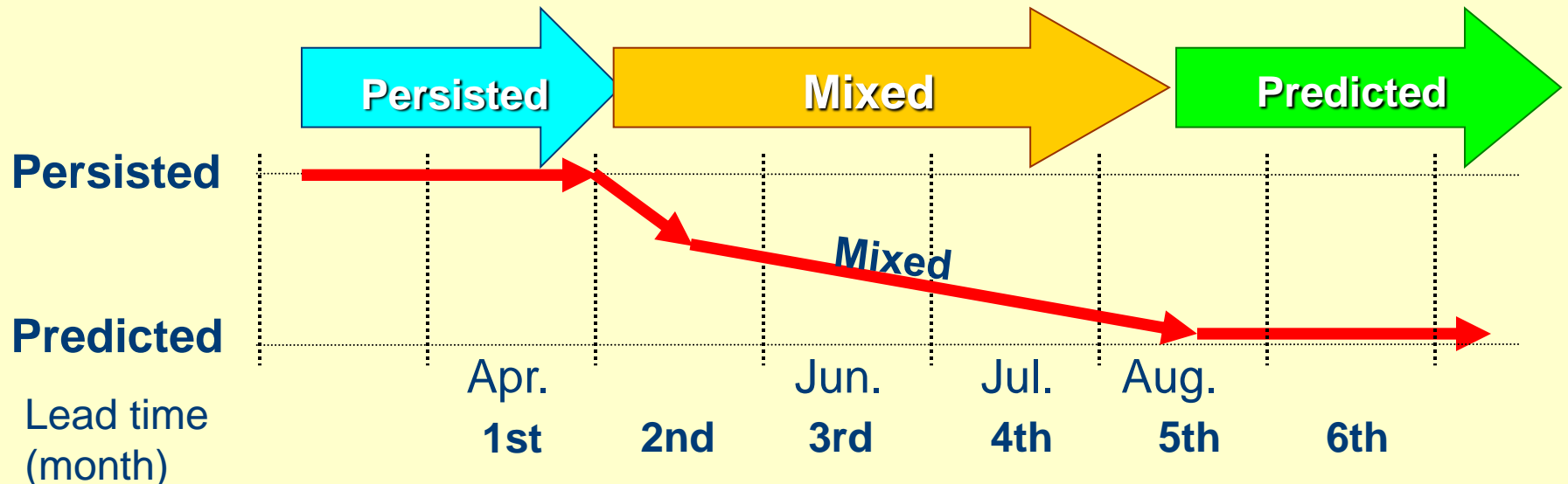
**Ensemble method :**

**Singular Vector**

**Ensemble size :**

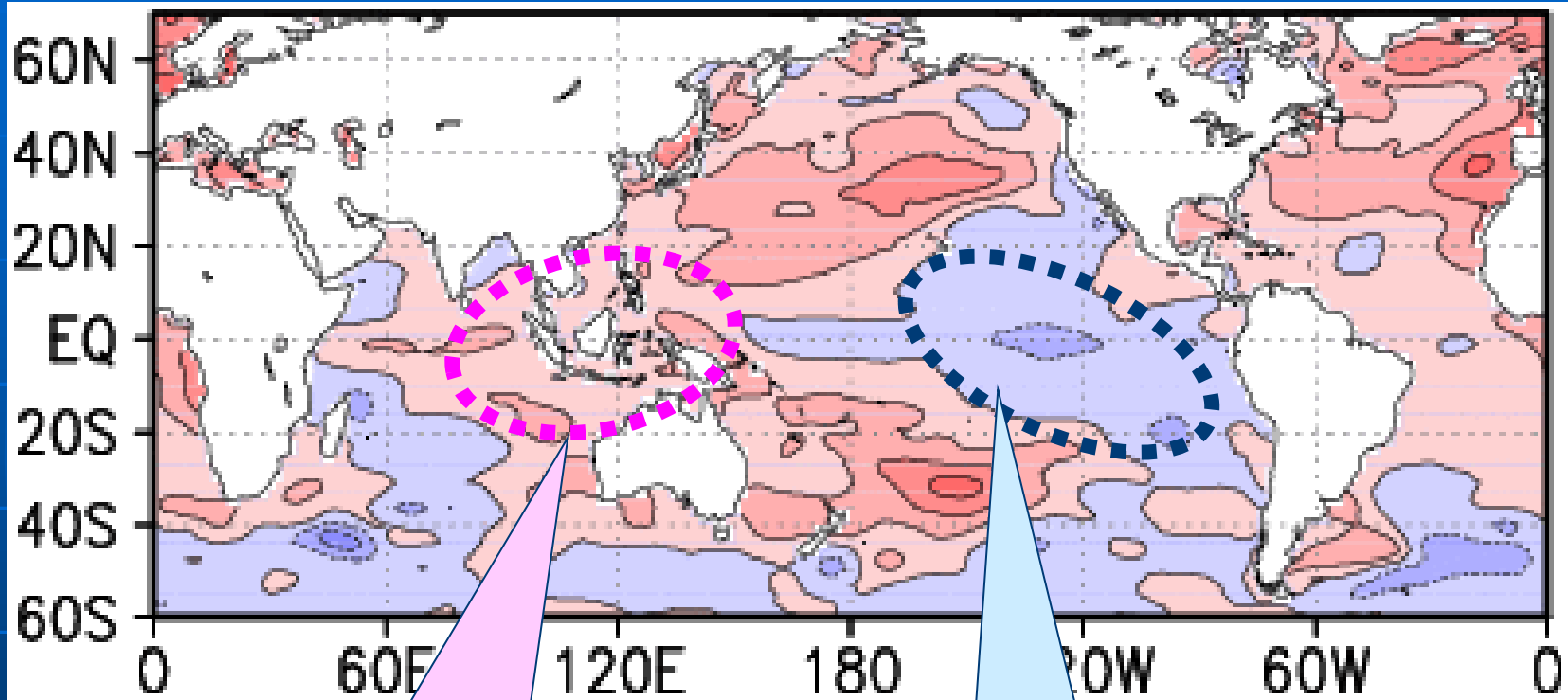
**51 members**

## How to merge persisting SSTs and predicted SSTs



# Numerical Prediction (1)

## Sea Surface Temperature Anomalies



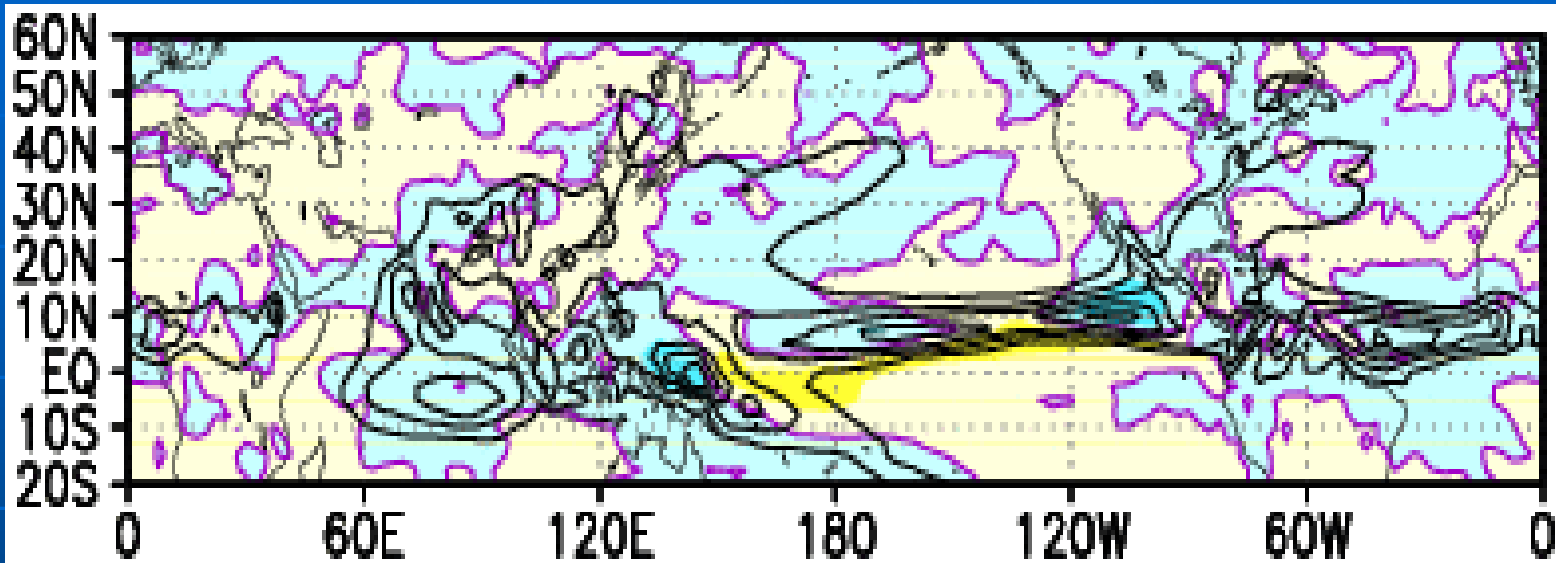
**Positive anomalies around the Maritime Continent**

**Negative anomalies from the central to eastern equatorial Pacific**

**Slight influence of La Niña remains ??**

# Numerical Prediction (2)

## Precipitation and Anomalies



### ◆ No significant precipitation anomalies found

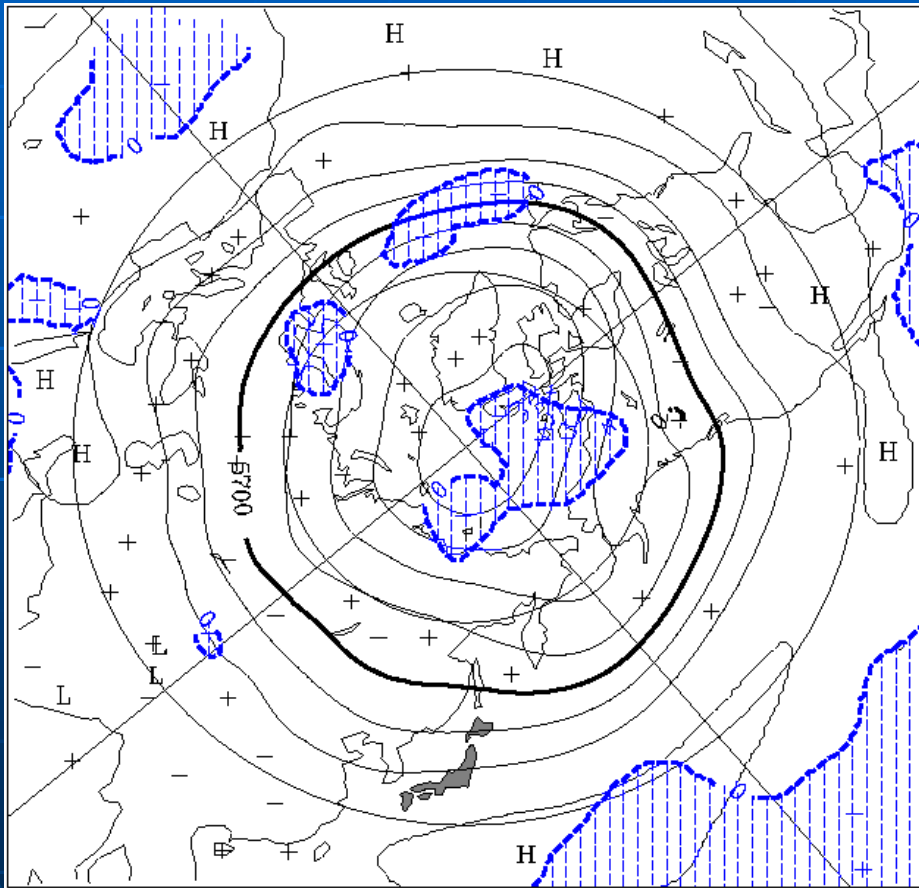
Slightly positive anomalies: West Pacific, South Indian Ocean, and Atlantic

Slightly negative anomalies: Central to eastern equatorial Pacific

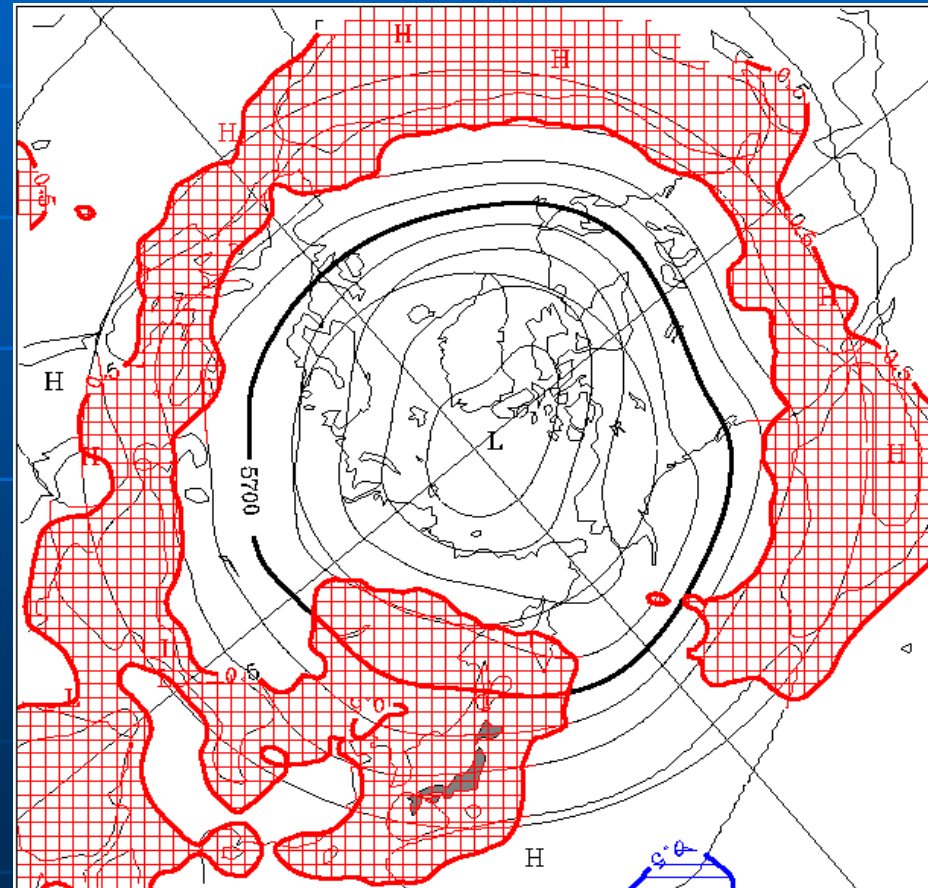
# Numerical Prediction (3)

Slightly positive area is dominant in most parts of Northern Hemisphere

Higher probability of positive anomaly in and around Japan, and mid-latitude areas worldwide

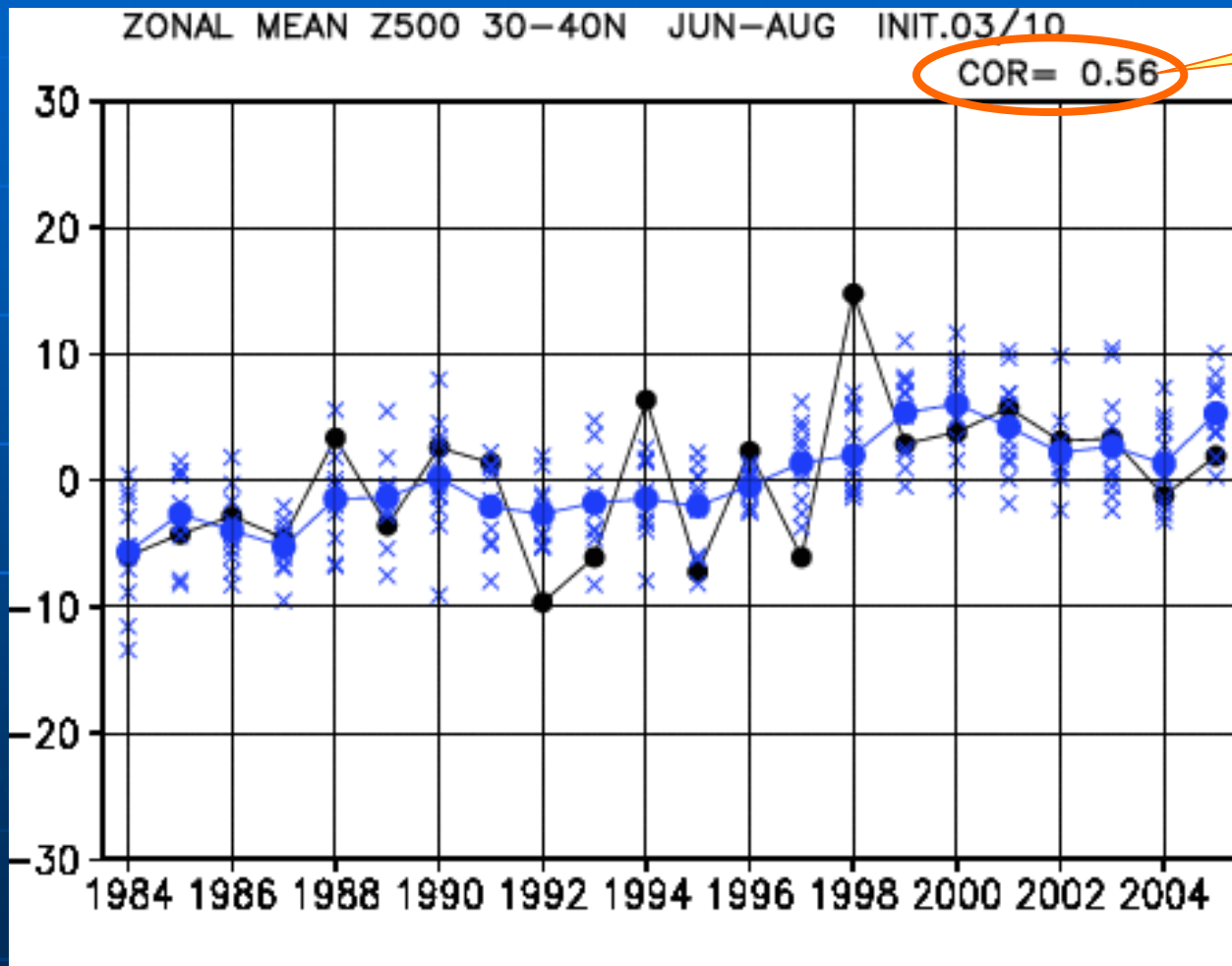


500 hPa Height and Anomalies



Probabilities of Anomalies in Z500

# Verification of zonal mean of Z500 in mid-latitude

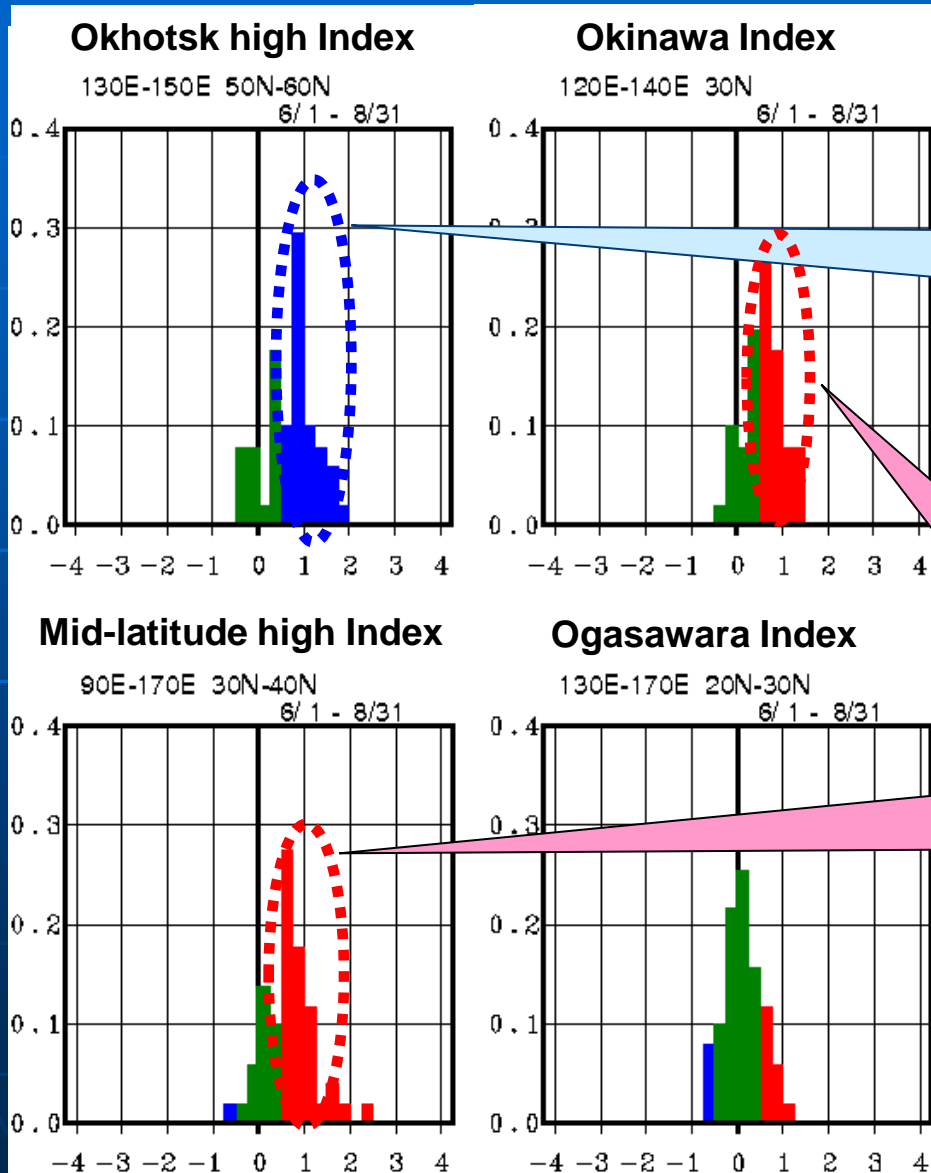


good skill

- Observed
- Ensemble mean
- x Ensemble member

# Numerical Prediction (4)

## General Circulation Indices



Positive anomalies, indicating the Okhotsk high bringing cool weather to northern Japan

Positive anomalies, indicating extension of the subtropical high over from eastern to western Japan and Okinawa



# Warm Season Outlook

## Summary and interpretation

### Numerical Prediction

- As a whole, precipitation anomalies are slightly positive over the tropics except central and eastern equatorial Pacific but no significant signal is found. Subtropical jet stream shifts northward, and 500 hPa height anomalies are slightly positive almost whole Northern Hemisphere, and 850 hPa temperature anomalies are also positive almost whole Northern Hemisphere.
- Positive anomalies of Okhotsk high Index is predicted, which suggests the possibility of appearance of Okhotsk high bringing cool weather around northern Japan.

# Warm Season Outlook

## Summary and interpretation

### Conclusion

- The long-term trend suggests that the temperatures in the NH mid-latitudes tend to be above normal, except northern Japan.
- It is likely to be weak La Niña or ENSO neutral conditions in the coming summer.
- Considering the slightly positive 500 hPa anomalies cover the Asia-Pacific region, the base of summer mean temperature is predicted to be also slightly higher than normal but the potential of cool summer due to the Okhotsk high is not negligible for northern Japan.
- For the start and the end of Baiu (rainy) season and the tropical cyclone activity over the western North Pacific, there is no signal to be mentioned.

# Warm Season Outlook

## Summary and interpretation

### Summary of the Outlook

The JMA's warm season outlook calls for above-normal temperature with 50% probabilities for western Japan and Okinawa/Amami, and both near-normal and above-normal temperatures with 40% probabilities in eastern Japan. The warm season and Baiu season precipitation outlook calls for no particular conditions for all regions.

# Probability of seasonal mean temperature for summer ( June – August ) 2008

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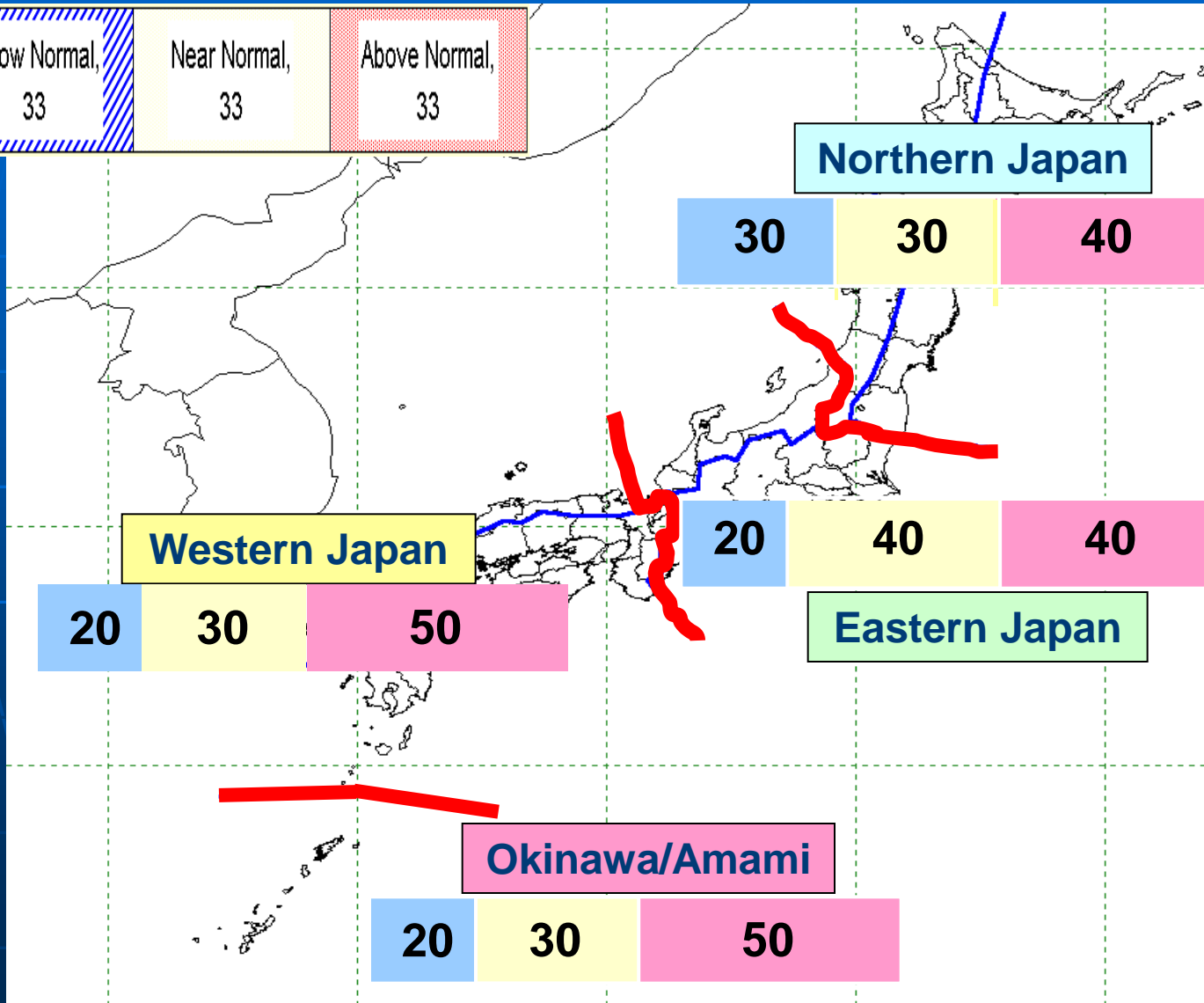
Eastern Japan

Okinawa/Amami

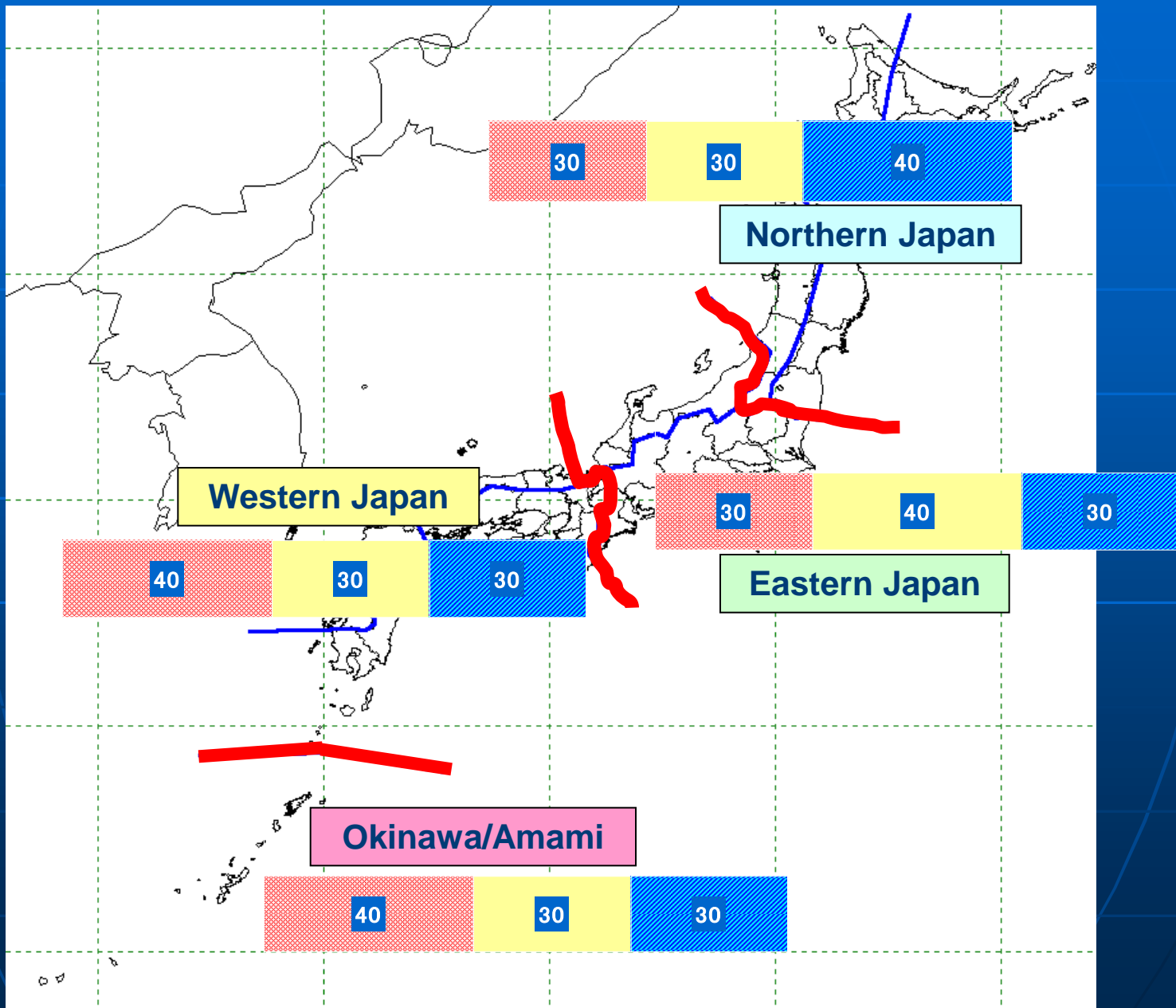
20

30

50



# Warm Season Outlook - Precipitation



**Thank you for your attention.**

# Renewal of the El Niño prediction system

- ◆ The ocean data assimilation system and the El Niño prediction model (ocean-atmosphere coupled model) were replaced by new ones in February.
- ◆ Descriptions of the new system can be found in TCC home page:

<http://ds.data.jma.go.jp/tcc/tcc/products/elnino/index.html>

# Renewal of the El Niño prediction system

◆ Model resolutions were higher than old ones

	OLD	NEW
Ocean model	Horizontal: 2.5° (zonal) x0.5-2.0° (meridional) Vertical : 20 levels	Horizontal: 1.0° (zonal) x0.3-1.0° (meridional) Vertical: 50 levels
Atmosphere model	T42L40	T <sub>L</sub> 95L40



# Renewal of the El Niño prediction system

- ◆ Prediction skills of NINO.3 SST anomaly were improved with the new model compared with old one.

