

# JMA's Future Activity Plan

Shingo Yamada  
Tokyo Climate Center  
Japan Meteorological Agency

2006/11/02 7<sup>th</sup> Joint Meeting on EAWM

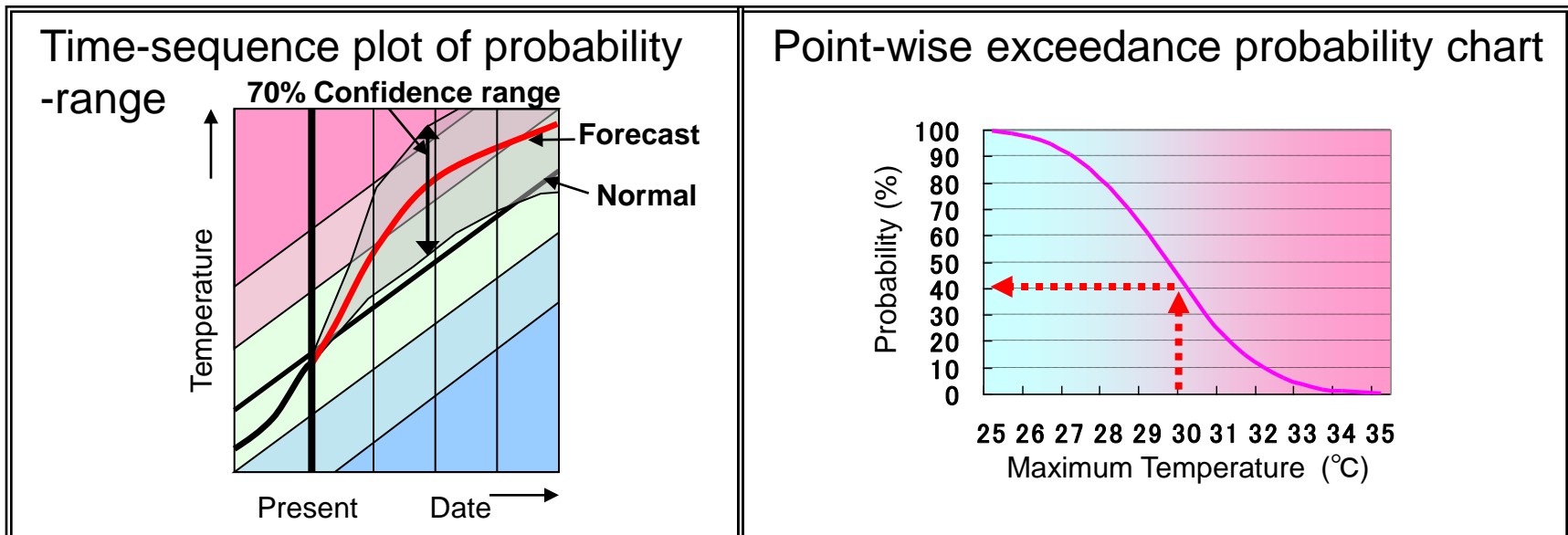
# Contents

1. Plan for the “Early Warning on Unusual Weather Condition”
2. Development of probabilistic one-month EPS product for Southeastern Asian stations
3. Meeting announcement
  1. International Workshop on the Applications of Advanced Climate Information in the Asia-Pacific Region (Feb. 2007)
  2. The 3rd Reanalysis Conference (Jan. 2008)

# 1. Plan for the “Early Warning on Unusual Weather Condition”

- Final Goals
  - To provide **quantitative (probabilistic) outlook information** which is useful **for the risk management** in the fields of agriculture, energy, human health etc., where they’re vulnerable to climate variability.
- Immediate Goals
  - To provide a precautionary information on the **unusually hot or cold weather** predicted **in the second week**.
  - It is provided **to the specific users** who can understand the meaning of probabilistic information and want to use it.
- Scientific Backgrounds
  - The **calibrated forecasting guidance** based on the **JMA’s extended-range Ensemble Prediction System** and the long-term hind-cast experiment is shown to have some definite skill on the prediction of extreme temperature anomalies.
  - **Understanding the meteorological mechanisms** that bring unusual weather conditions (e.g. Rossby wave propagation / Inter-annual or Intra-seasonal Oscillation like ENSO, MJO)
  - **Understanding the specific needs of the users** (meteorological thresholds of damaging weather conditions)

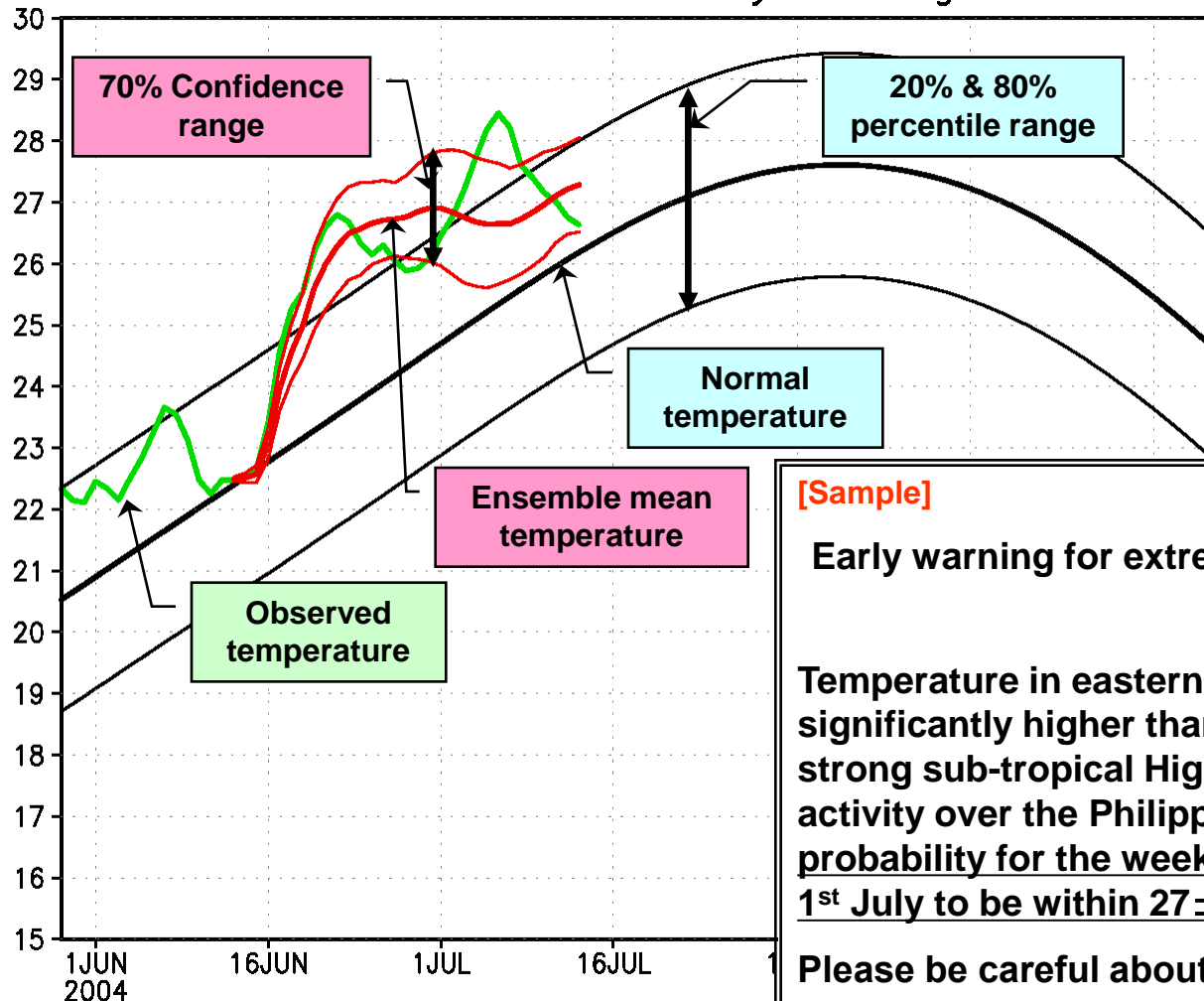
- **Planned Operational Products** (to be started in March 2007)
  - “Early Warning Information”
    - When relatively high probability is forecasted in the second week, a cautionary statement including the meteorological causes, probability and necessary action against the unusual weather condition is issued.
  - “Weekly Outlooks for the second week” (for educational purpose)
    - When no significant probability is forecasted, a non-cautionary outlook for the second week is provided to the users at regular intervals.
  - Website on the “detailed probabilistic prediction products”
    - Point-wise exceedance probabilities and time-sequence plot of predicted probability-range are regularly provided through the Internet, in order for the users to check the probabilities at their relevant thresholds.
- **Examples of the detailed probabilistic prediction products**



# Case study

## – Extremely hot weather in June 2004 –

E.J. 2004.06.17.12Z 7-day running mean



[Sample]

**Early warning for extremely hot weather in Kanto region**

Issued on 18<sup>th</sup> June 2004

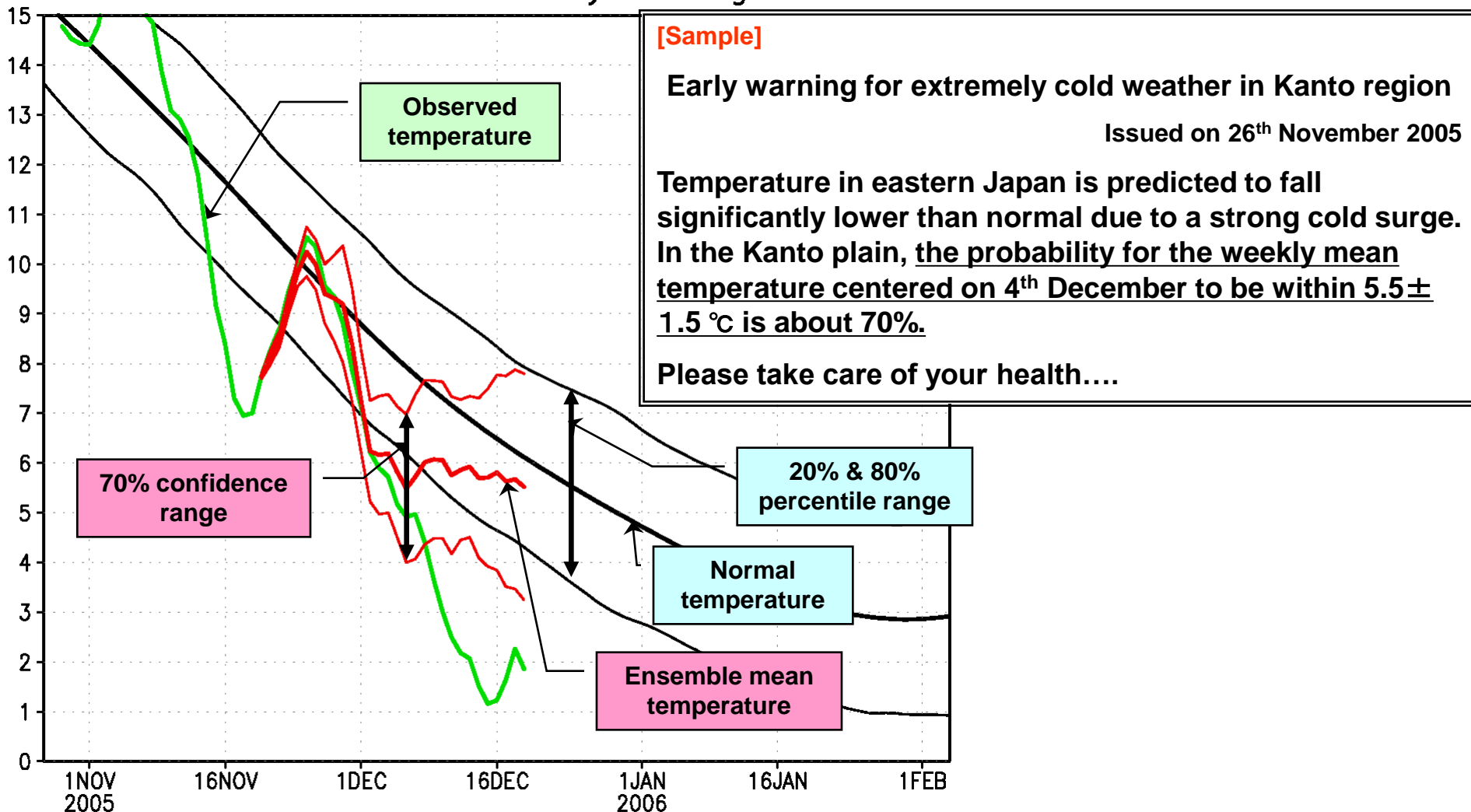
Temperature in eastern Japan is predicted to stay significantly higher than normal under the influence of strong sub-tropical High due to the enhanced convective activity over the Philippine Sea. In the Kanto plain, the probability for the weekly mean temperature centered on 1<sup>st</sup> July to be within  $27 \pm 1^\circ\text{C}$  is about 70%.

**Please be careful about your crop management and ....**

# Case study (2)

## – Extremely cold weather in December 2005 –

E.J. 2005.11.24.12Z 7-day running mean



# Verification of the operational EPS predictions for the second week

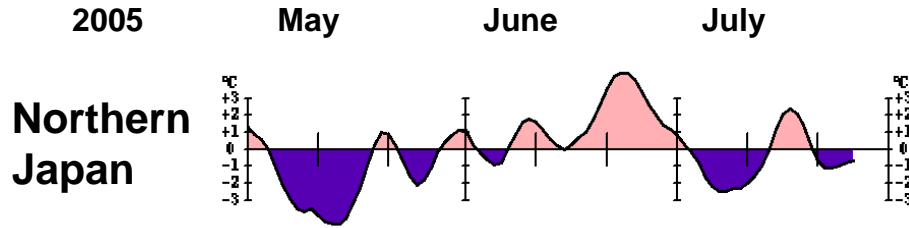
## Observed Regional mean temperature

2005/06

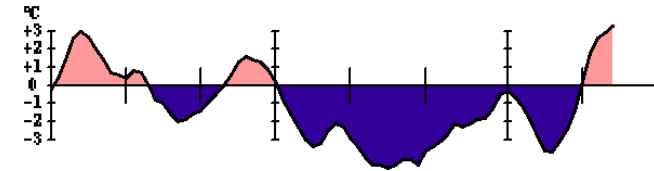
November

December

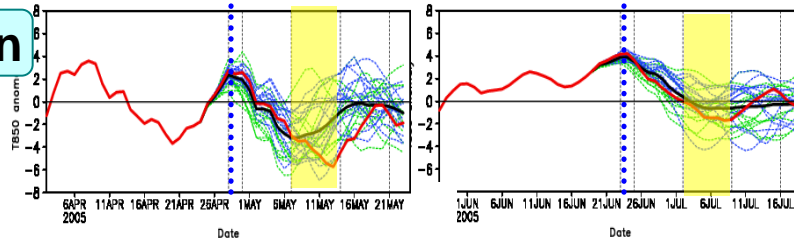
January



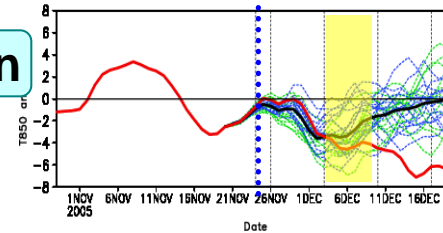
Western Japan



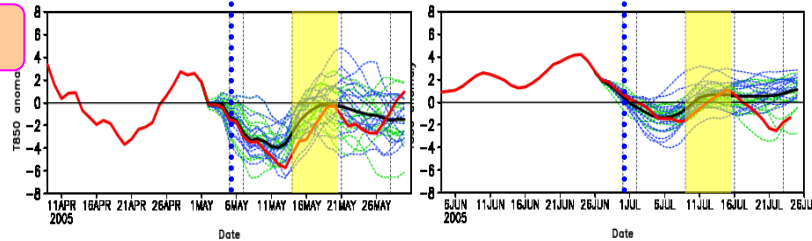
Begin



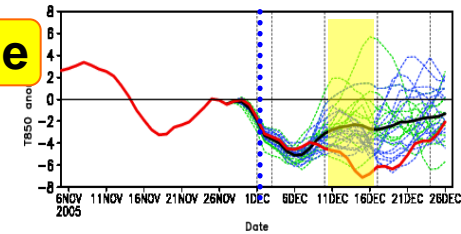
Begin



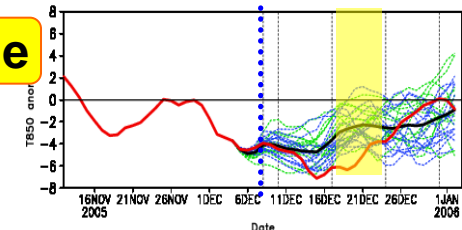
End



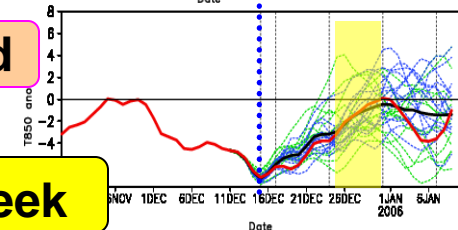
Continue



Continue



End



**T850 anomaly over Japan**  
 Each member's prediction (green/blue)  
 Ensemble mean prediction (black)  
 Analyzed temperature (red)

Ensemble prediction system for one-month is being operated once a week

Initial Date

Second Week

# Development of probabilistic one-month EPS product for Southeastern Asian stations

## Purpose:

- To develop a statistically downscaled probabilistic guidance based on the one-month EPS prediction at the Southeast Asian stations

## Status:

- TCC has been developing this product since 2004
- By the end of 2006, a kind of prototype product will be developed and verified.

(Collaborative research with Fujitsu FIP Co.)

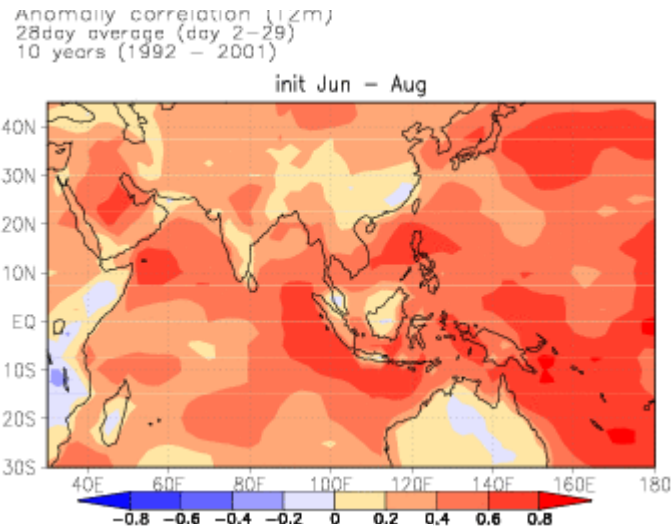


# Methodology

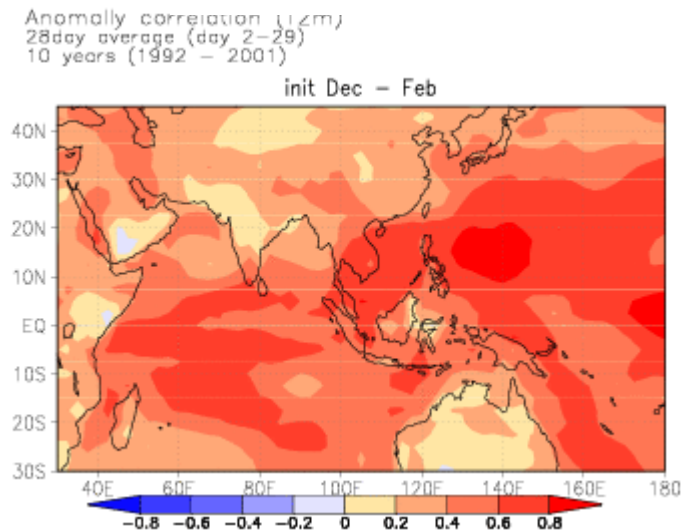
- Data:
  - Daily temperature and precipitation data at around 200 stations in Southeastern Asia
  - JMA's One-month EPS hindcast data (1992-2001 : three-times per month : 10members)
- Target seasons (four seasons):
  - winter dry (Jan-Mar), pre-monsoon (Apr-May), summer monsoon (Jun-Sep), post-monsoon (Oct-Dec).
- Target elements:
  - 7-day, 14-day and 28-day average of temperature
  - 14-day and 28-day precipitation (1/4 powered)
- Statistical Downscaling using linear regression (MOS):
  - Selectable Predictors: model precipitation, topographical upward motion (U850 x slope), MJO-Index (2 components) and NINO.3 SSTA.
- Estimation of Probability Density Function
  - Gaussian Average or Gauss Kernel-2 method

# Preliminary Results (1)

- **28-day mean temperature** (forecast day **2-29**)
- **correlation coefficients between hindcasts and observations**

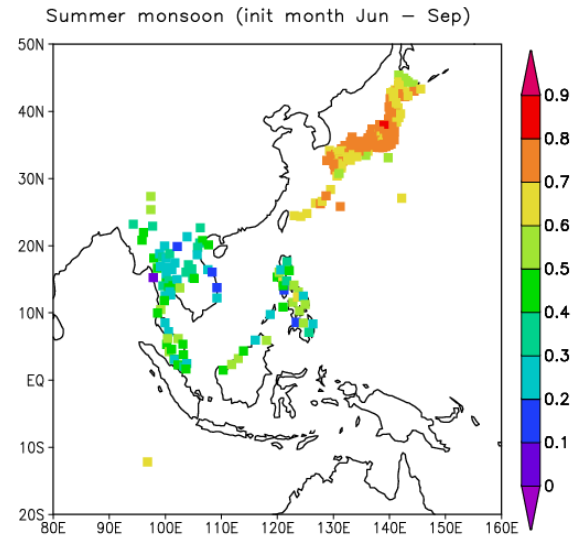


**with JRA**

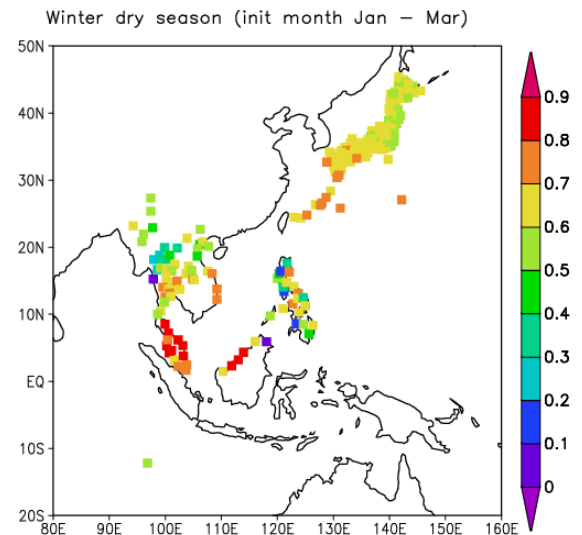


**Summer monsoon  
(June-September)**

**Winter dry season  
(January-March)**



**with in situ observation**



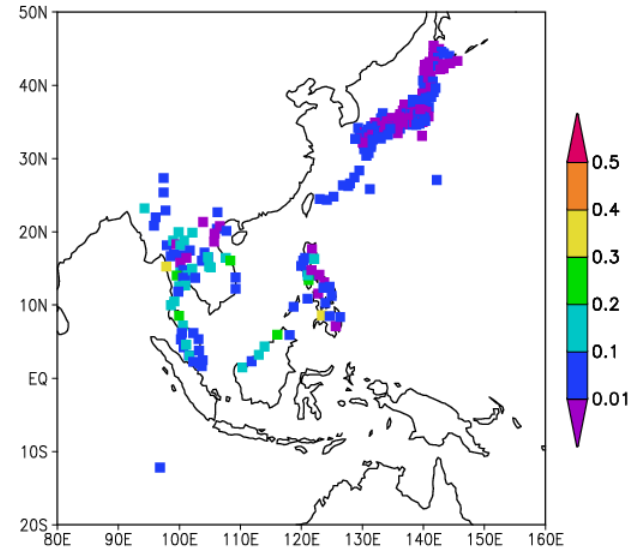
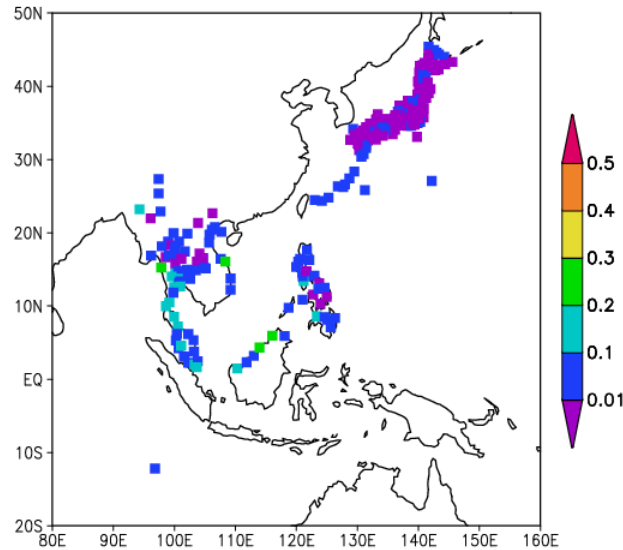
# Preliminary Results (2)

- difference of correlation coefficients between multiple and single regression using cross validation method

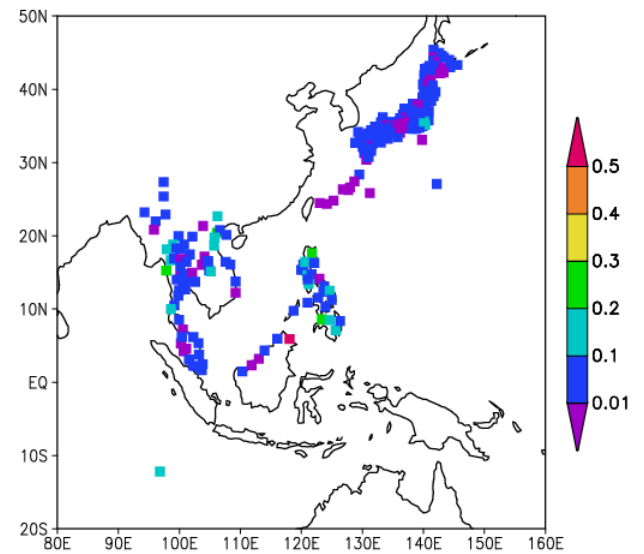
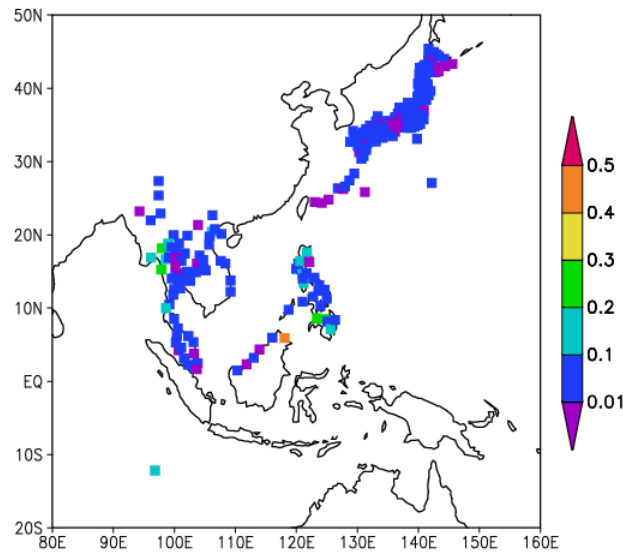
**14-day mean temperature**

**28-day mean temperature**

**Summer monsoon  
(June-September)**



**Winter dry season  
(January-March)**



# Effect of multiple regression (predictors)

- Larger improvement in precipitation than in temperature
- Topographical upward-motion
  - 14-day precipitation in the summer and post monsoon seasons.
  - 28-day precipitation in the winter dry, summer monsoon and post monsoon seasons
  - Many stations, especially in Thailand
- MJO-Index
  - 14-day precipitation in the post monsoon season
  - Thailand, the Philippines and Japan
- NINO.3 SSTA
  - 28-day precipitation in the winter dry season.
  - Thailand, the Philippines and Malaysia

## Meeting Announcement:

# *“International Workshop on the Applications of Advanced Climate Information in the Asia-Pacific Region”*

**Date** 20-22 February 2007

**Place** JMA headquarters in Tokyo, Japan

- Invited participants from NMHSs in China, Korea, Southeast Asian countries, WMO, IRI, Australia
- This workshop will be held by **JMA** under the auspices of the **Ocean Policy Research Foundation.**

***“International Workshop on the Applications of Advanced Climate Information in the Asia-Pacific Region”, 20-22 February 2007 in Tokyo***

## **Tentative Agenda**

**20 February** Open seminar on “Applications of climate information in various socio-economic sectors”

**21-22 February**

**Session 1:** Reports on the status and future plans of climate information and its application for the domestic users

**Session 2:** Recent developments which would serve for the advancement of climate information and its application in the Asia-Pacific region

**Session 3:** International cooperation for advancing the climate information and its application in the Asia-Pacific region



## Announcement

# The 3rd Reanalysis Conference

Co-hosting Organizations: JMA, CRIEPI, WCRP

To be held in Tokyo in January 2008

### International Programming Committee

Dr. Phillip Arkin (MD Univ.)

Dr. Michael Fiorino (NHC)

Dr. Eugenia Kalnay (MD Univ.)

Dr. Masao Kanamitsu (Scripps lab.)

Dr. Toshio Koike (Univ. of Tokyo)

Dr. Michael Manton (Monash Univ.)

Dr. Siegfried Shubert (GMAO/NASA)

Dr. Andrew Lorenc (UKMO)

Dr. Adrian Simmons (ECMWF)

Dr. Detlef Stammer (Univ. Hamburg)

Dr. Masato Sugi (MRI/JMA)

Dr. Kevin Trenberth (NCAR)

Dr. Tadashi Tsuyuki (JMA)

Dr. Tetsuzo Yasunari (Nagoya Univ.)

Dr. Glenn White (NCEP)

# The 3rd Reanalysis Conference

## Provisional Sessions

(Day 1)

### **Keynote address**

1. Introduction of reanalysis (by the reanalysis centres)  
(NCEP, ECMWF, JMA, NASA/GMAO and Ocean)

### **Features of reanalysis products**

2. Variation of observational data and reanalysis
3. Long term tendencies found in reanalysis

(Day 2)

4. Monsoons, and the hydrological cycle
5. Tropical cyclone and extratropical storms
6. Land surface and hydrology

(Day 3)

7. Stratosphere
8. Polar regions

(Day 3)

### **Applications of reanalysis products**

9. Diagnosis of extreme climate events and climate monitoring
10. Seasonal forecast and prediction of climate change
11. Ocean applications (surface fluxes and driving ocean models)

(Day 4)

### **Data assimilation technique for atmospheric and ocean reanalysis**

12. Quality control of observational data in the past, including bias correction
13. Assimilation of satellite data
14. Advanced data assimilation techniques

(Day 5)

### **Future reanalysis**

15. Advanced reanalysis plan  
(National plans, coordination, datasets, archives, coupled reanalysis, etc.)
16. Panel discussion : 'Future reanalysis and international cooperation'



# The 3rd Reanalysis Conference

## Tentative schedule

Dec. 2006 -- : call for paper

1st Jun. to 15th Jul. 2007

: registration period

16th Jul. to 20th Sep. 2007

: refereeing period

30th Sep. 2007 : program fixed

*Thank you  
for your attention.*