Hirotaka KAMAHORI (JMA)

2006.9.14 APEC Climate Center Symposium

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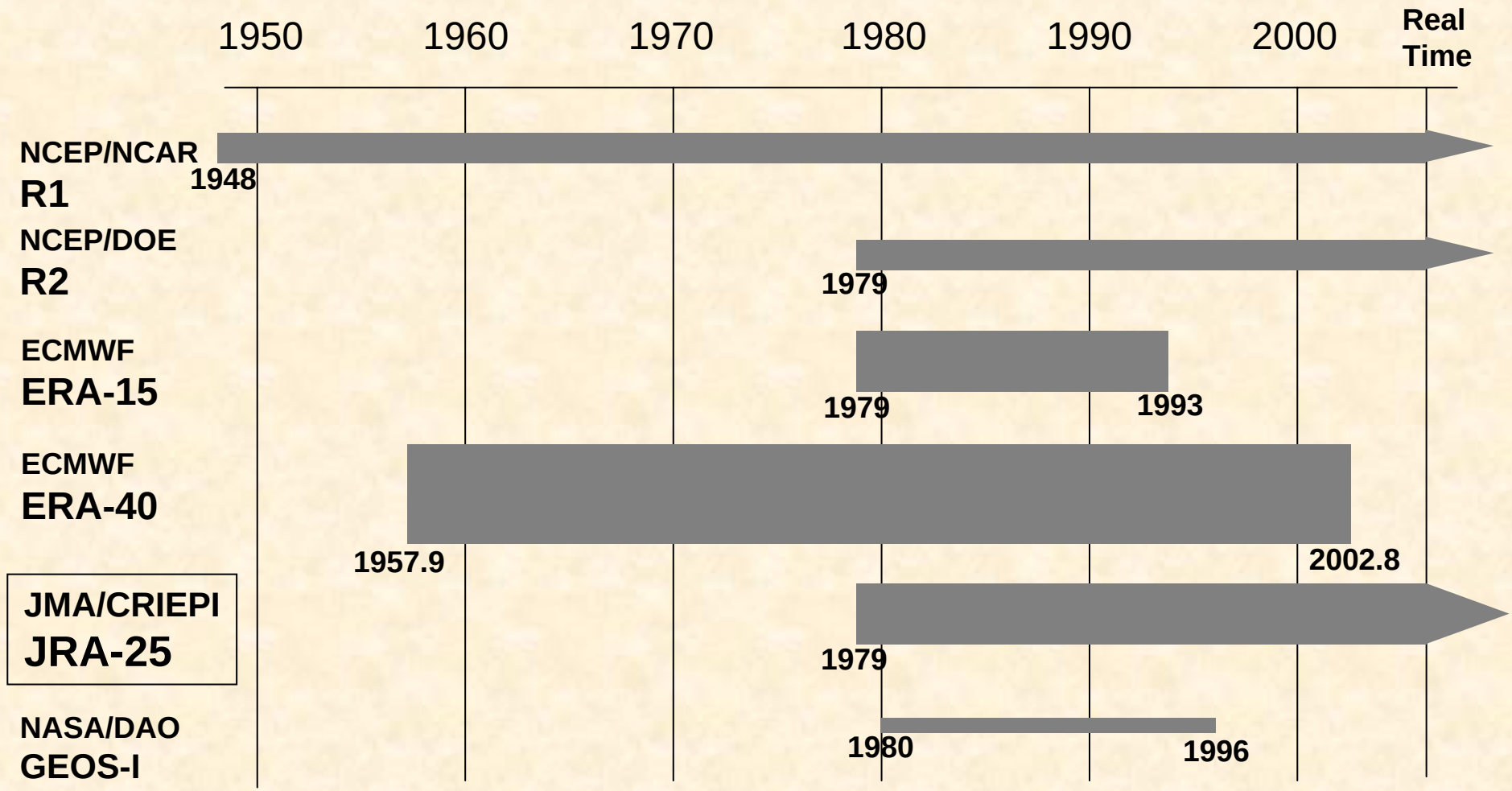
Completed Reanalyses



JRA-25 Overview

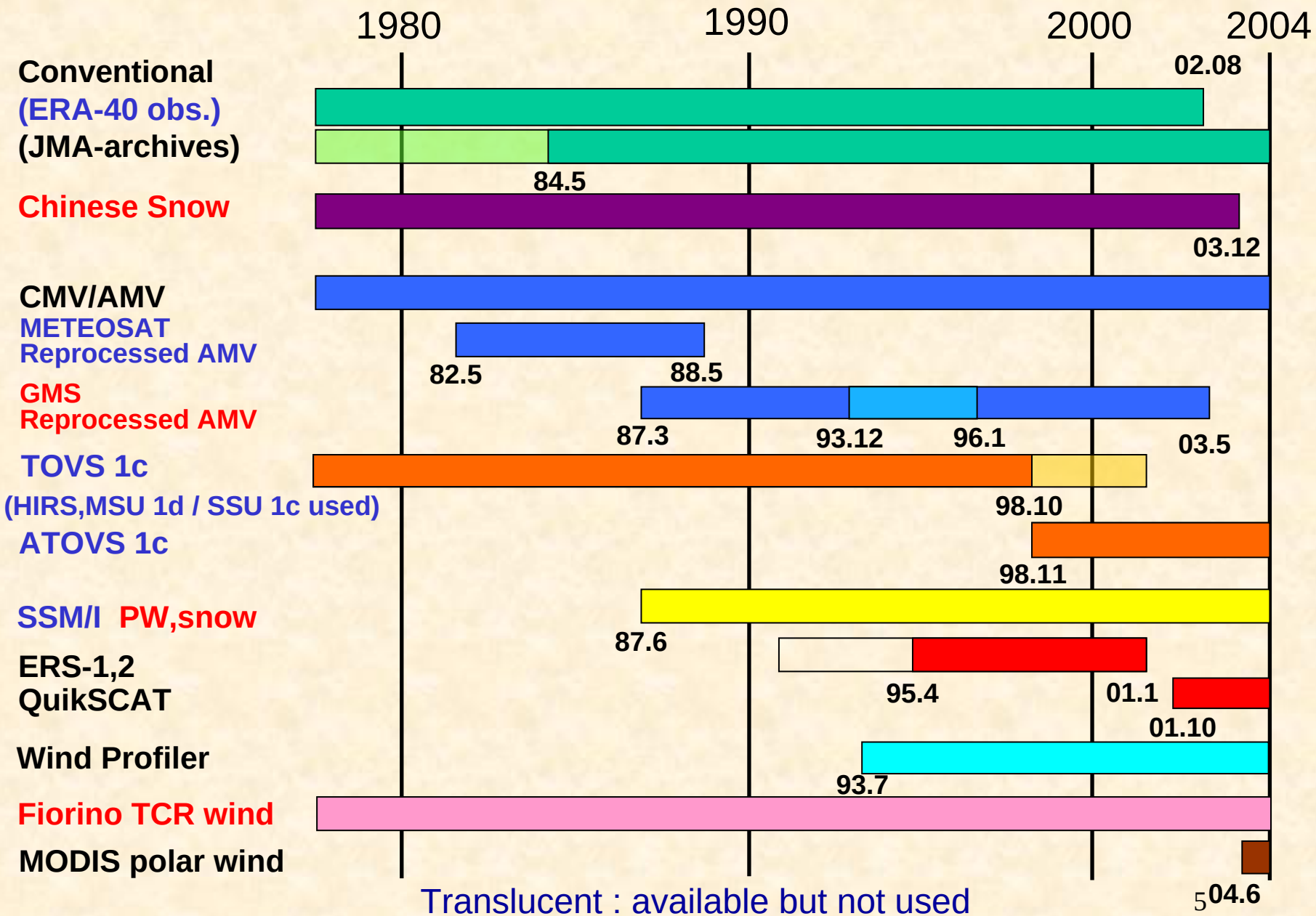
- Joint research project of JMA and CRIEPI
- Period：1979.1 - 2004.12 (As JCDAS 2005.1-)
- Resolution : T106L40 with top level at 0.4hPa
- Assimilation Scheme : 3D-Var
- Version : JMA operational system as of April 2004
- JRA-25 original or firstly used observational data

  TCR, SSM/I snow coverage, digitized Chinese snow depth data, reprocessed GMS-AMV
- JRA-25 original boundary/forcing data

  Daily COBE SST and sea ice (Ishii 2005, IJC)

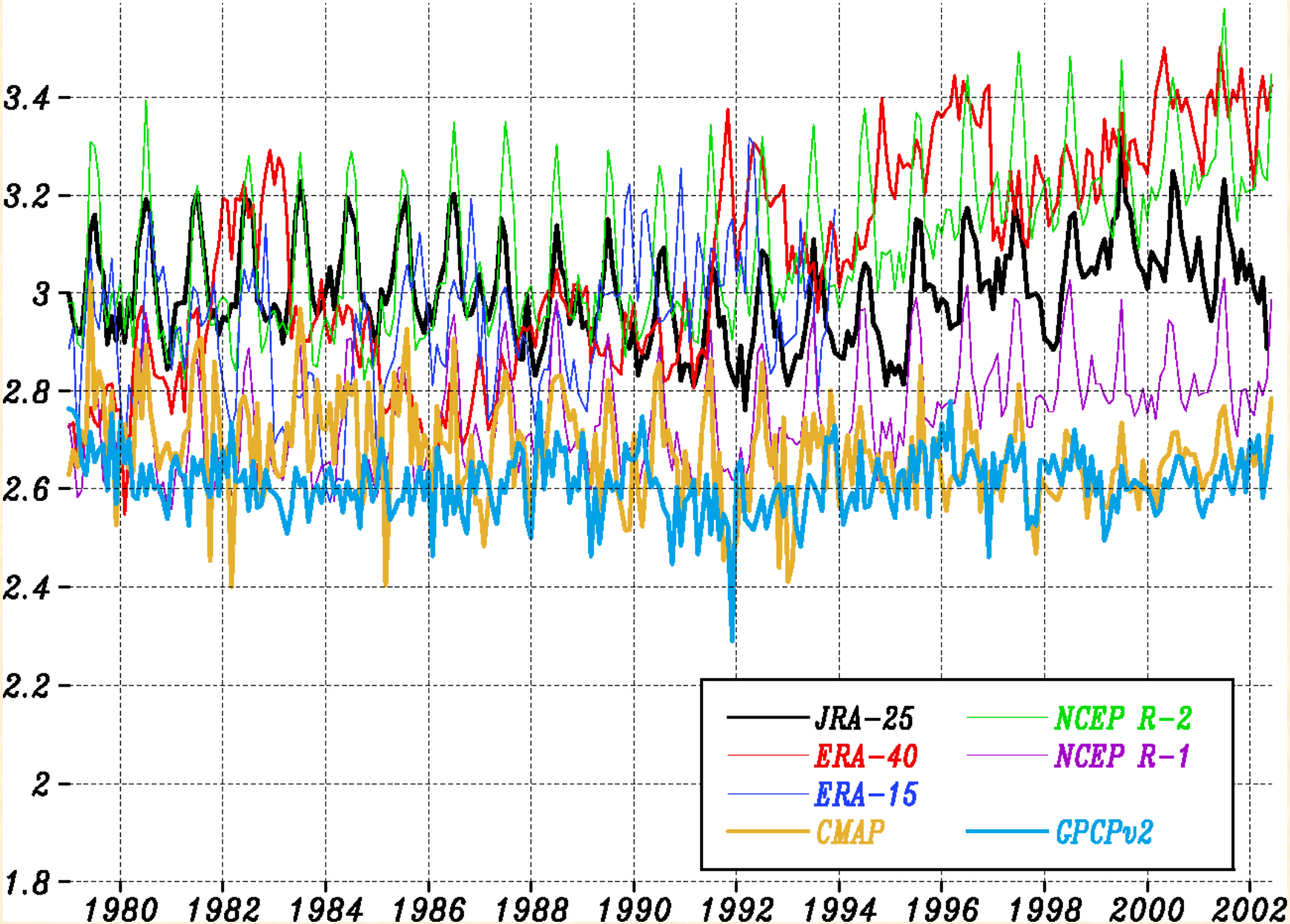
  Daily 3D-ozone profile produced with a chemical transport model

Observation availability in JRA-25



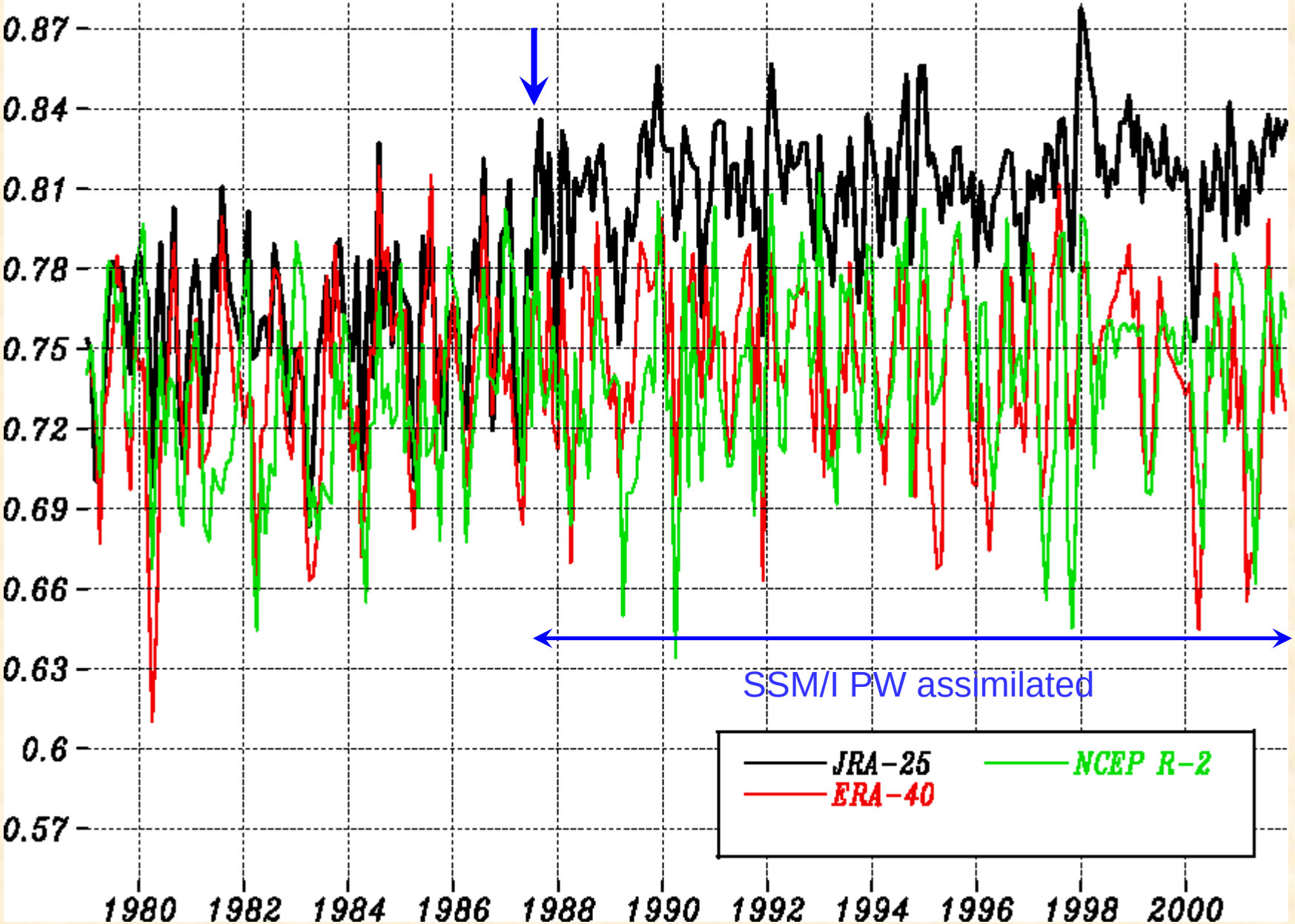
Translucent : available but not used
White : not in JMA

Global Mean Monthly Precipitation



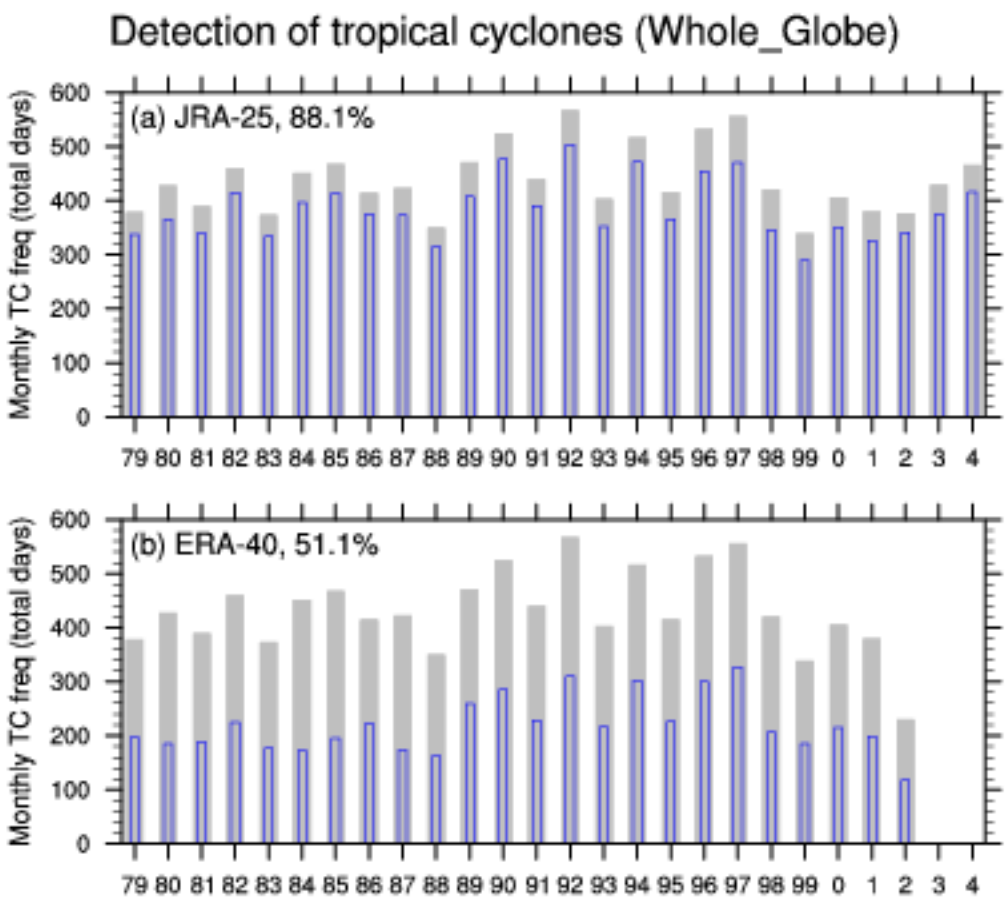
Courtesy: H. Koide

Correlation of Monthly Precipitation with GPCPv2



Courtesy: H. Koide

Global Detection Rate of Tropical Cyclones



Grey : Observed TC (Best track)

Blue : Detected TC

The detecting method is based on relative vorticity, sea level pressure (SLP) and middle to upper tropospheric thickness.

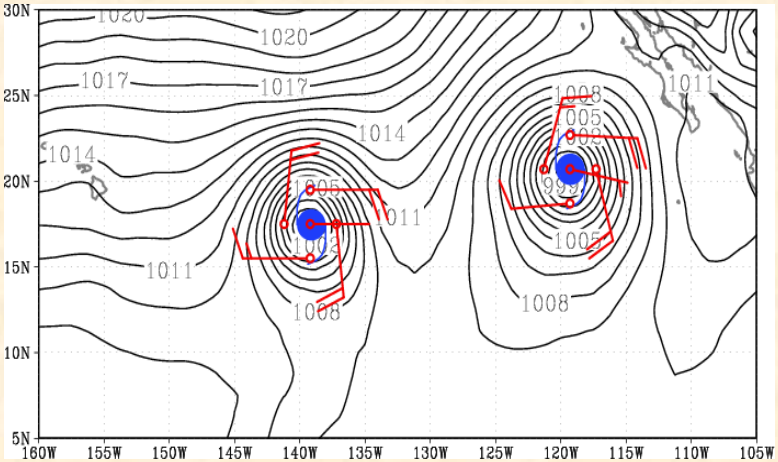
Courtesy: H. Hatsushika

Impact of Fiorino's TC Wind Data

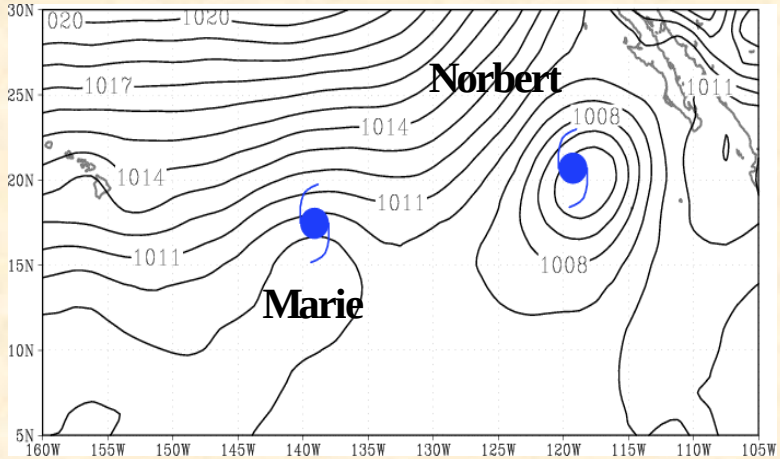
Hatsushika et al., 2005

1200 UTC 15 September 1990 in the eastern North Pacific

JRA-25

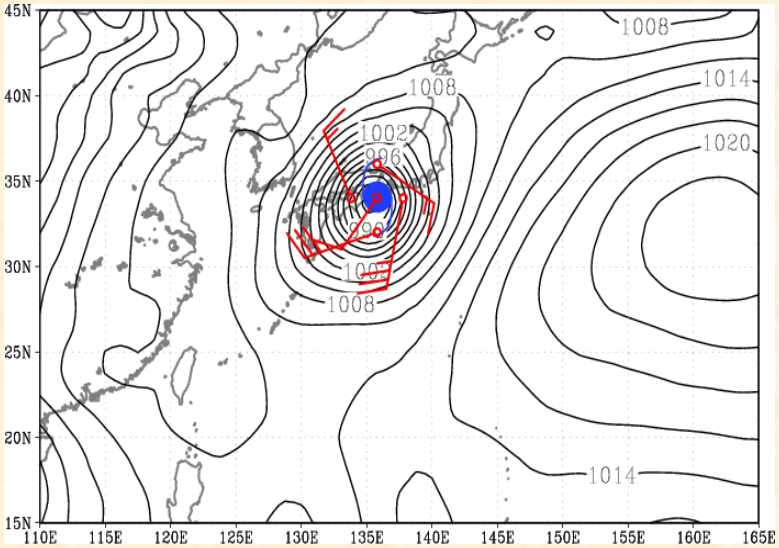


Control

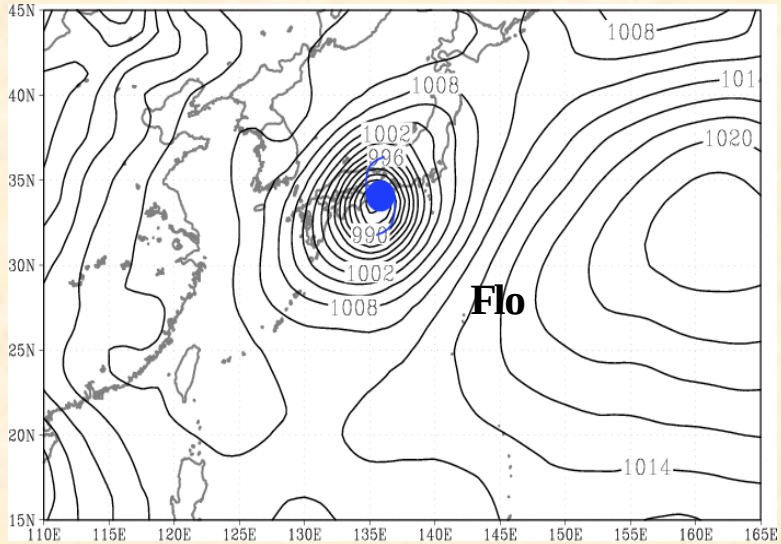


1800 UTC 19 September 1990 in the western North Pacific

JRA-25

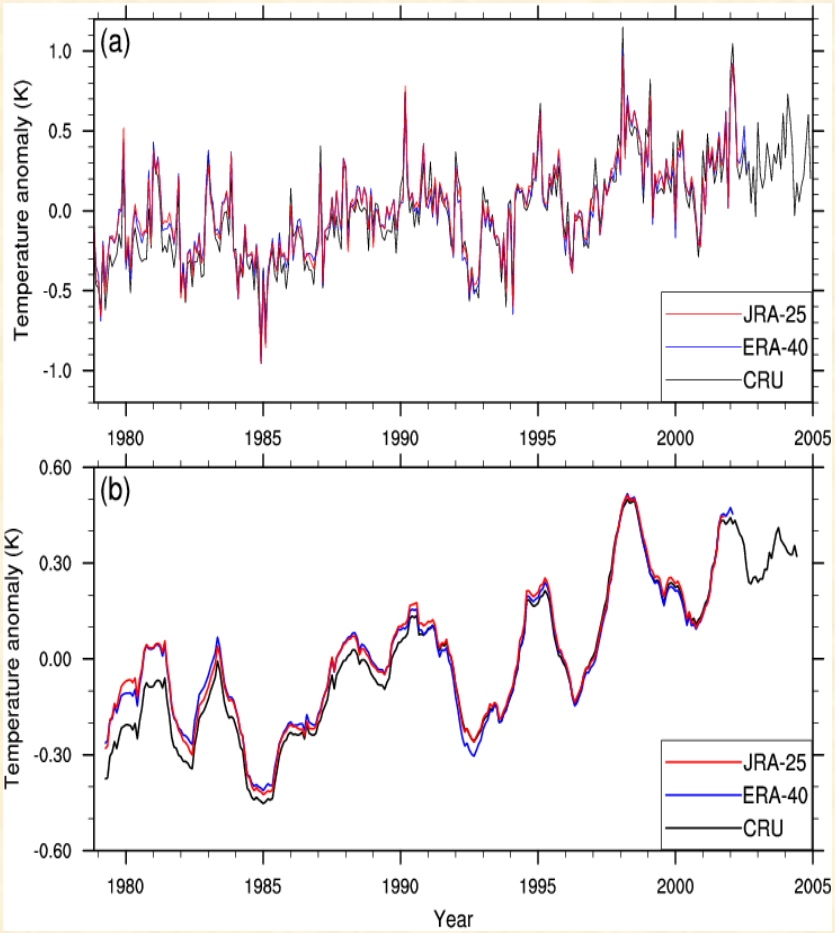


Control



Surface temperature Trend

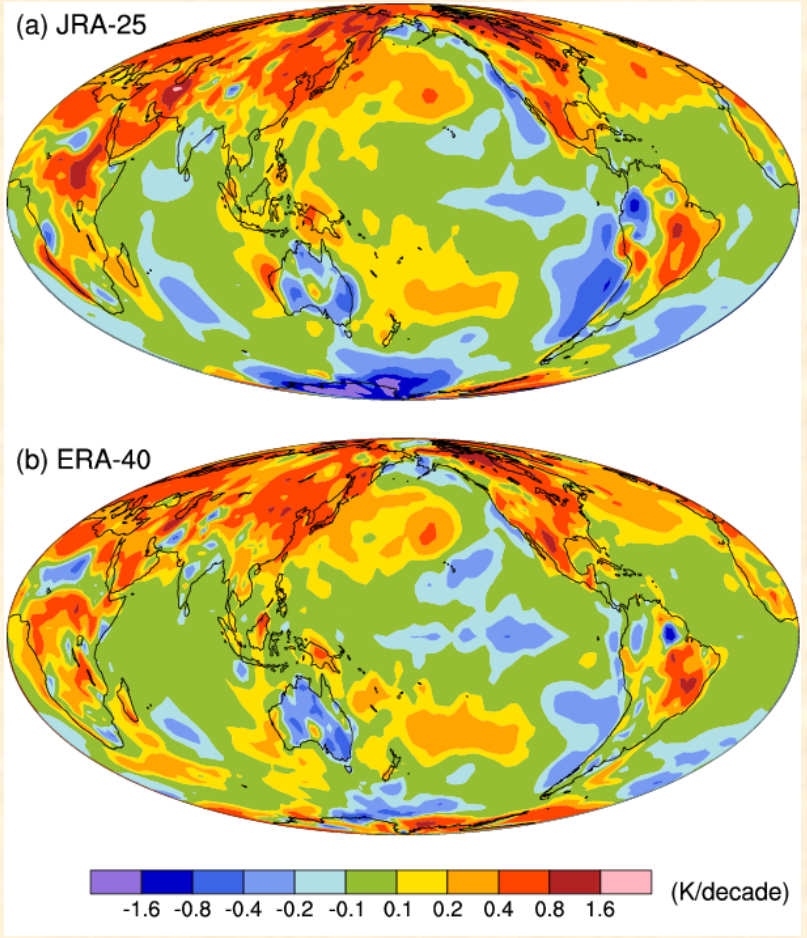
JRA-25 and ERA-40



Global Temperature Anomaly

JRA-25, ERA-40, CRU(Jones)

Top : monthly mean, Bottom : 5-year moving avarage



Distribution of tendency (K/decade)

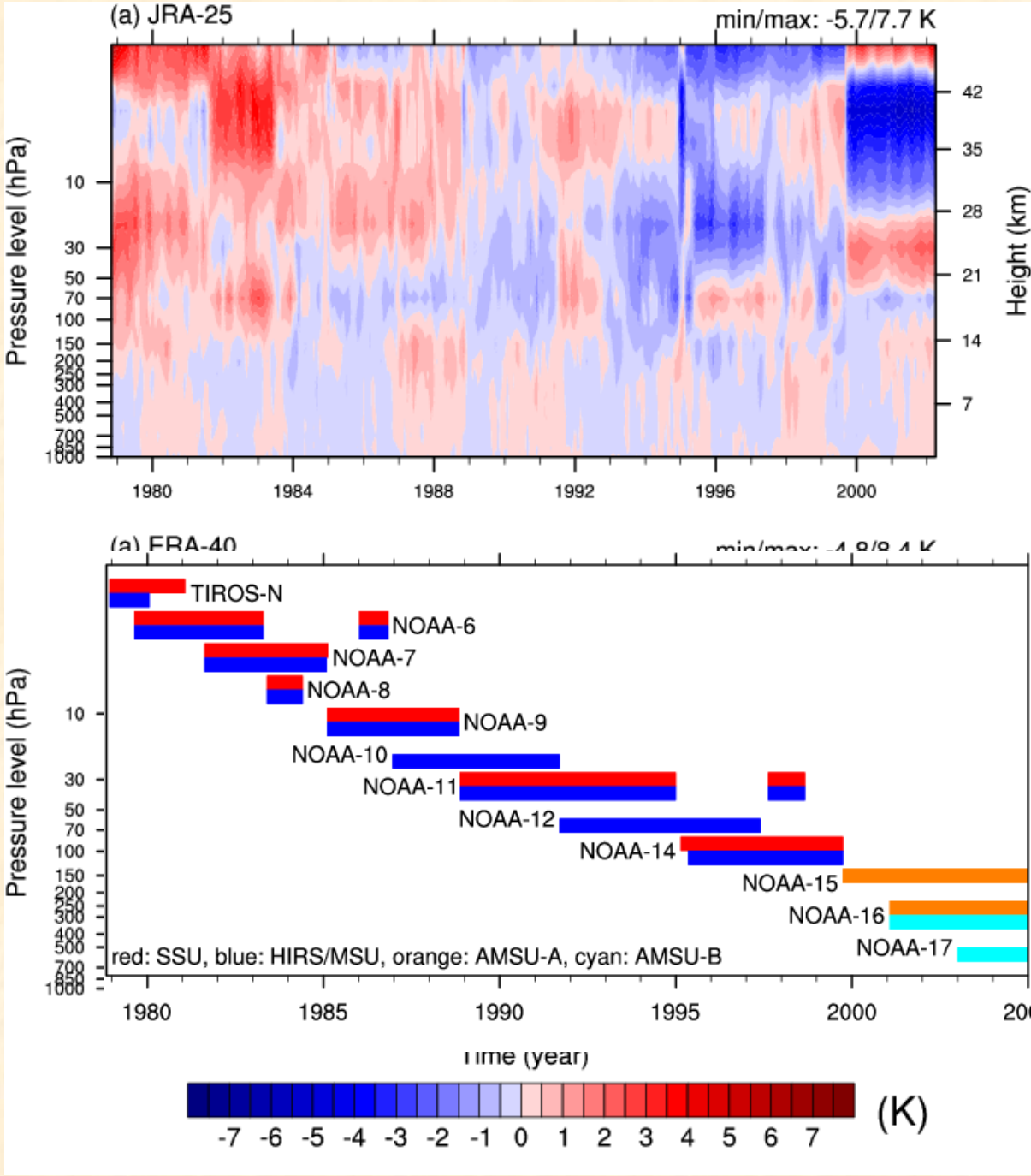
Courtesy: J. Tsutsui

Global Temperature Anomaly

Anomaly from averaged temperature of each level for each reanalysis

Natural variability in troposphere with ENSO

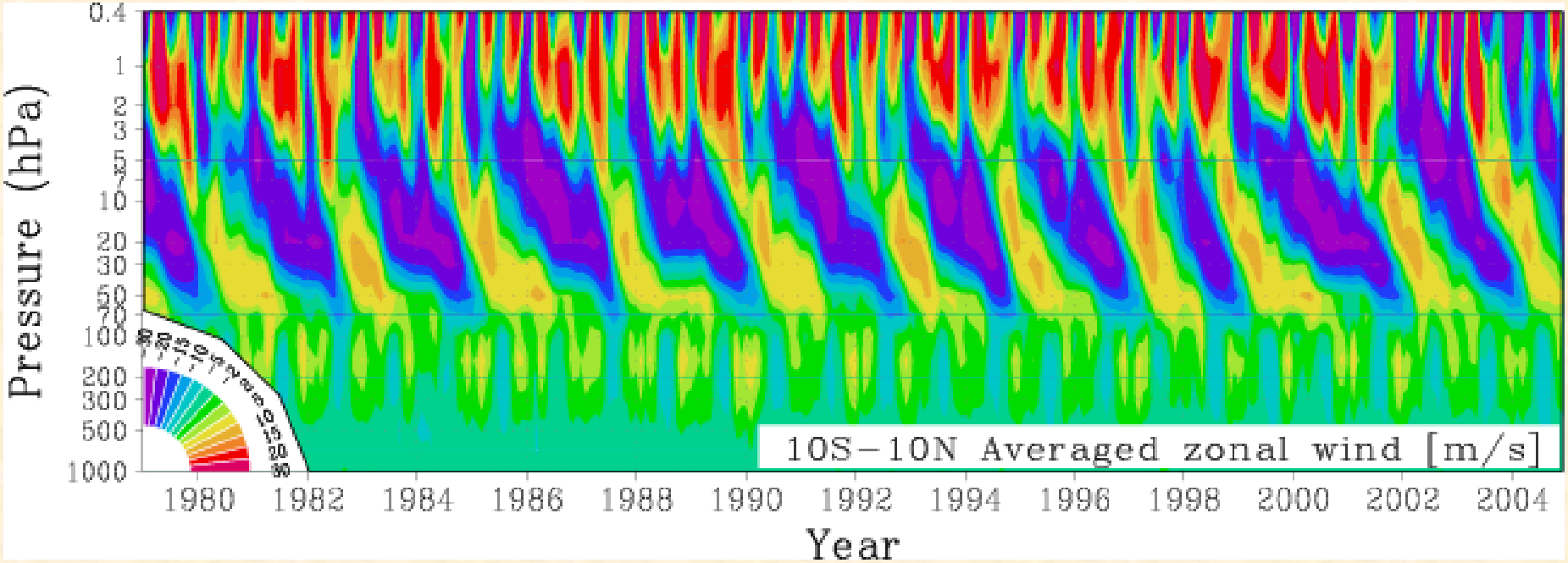
Artificial variability in stratosphere with Satellite data



Courtesy: J. Tsutsui and M. Sakamoto

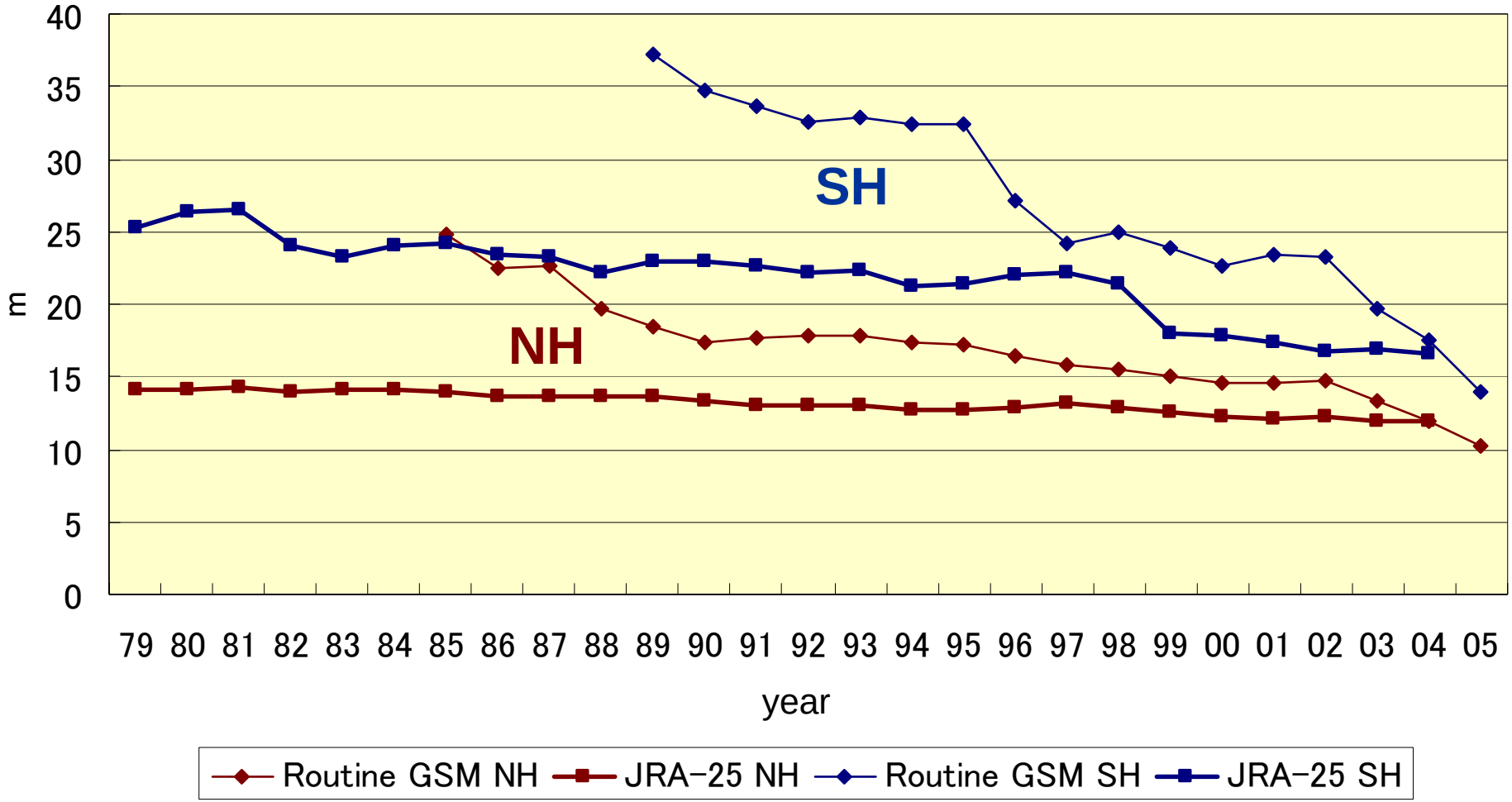
QBO with JRA-25

10S-10N averaged zonal wind cross section



Courtesy: H. Hatsushika

Forecast Score (Z500 FT=24 RMSE)



Heavy Rain event

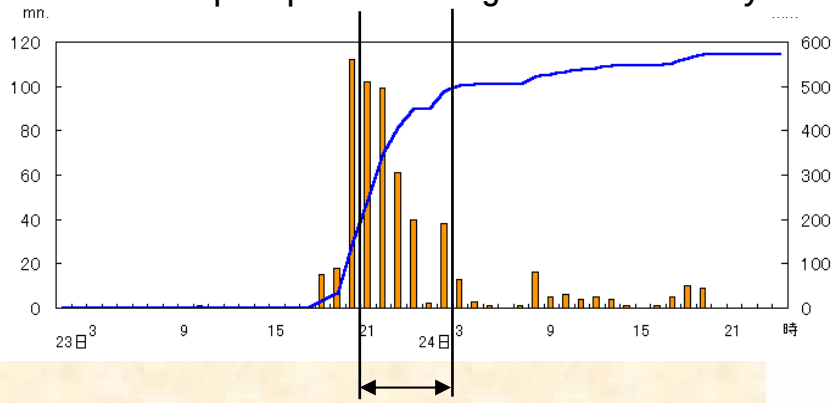
- Nagasaki Gou -

1982. 7.24. 03JST

Surface Weather Chart

Synoptic fields are properly analyzed, while resolution is not sufficient.

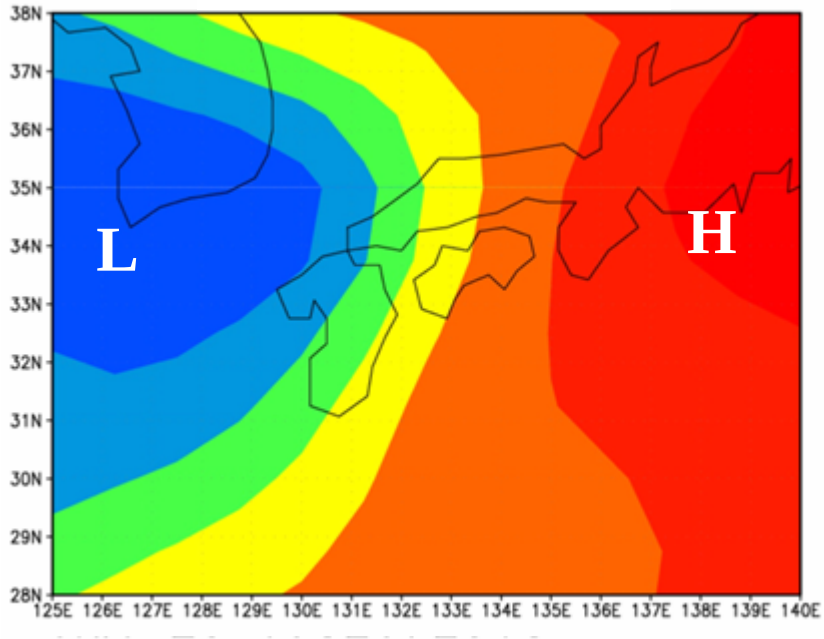
Observed precipitation at Nagasaki observatory



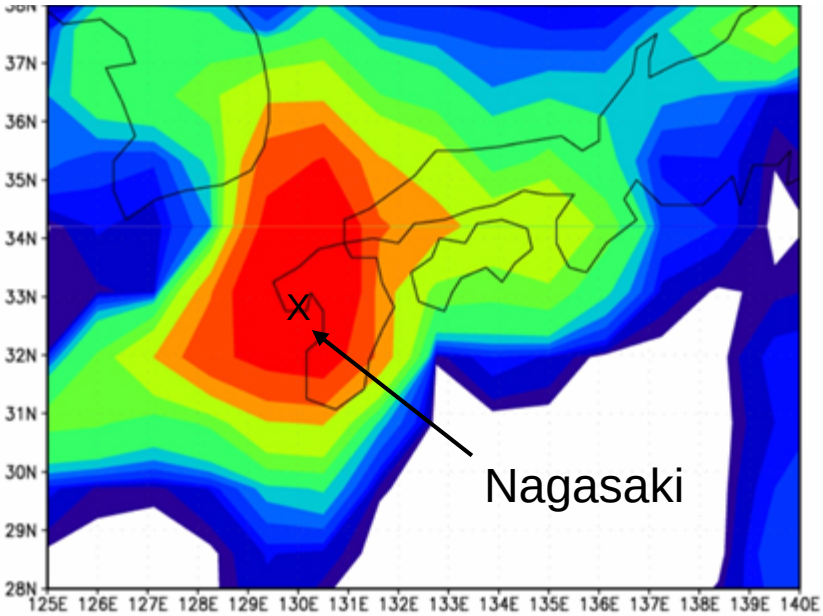
hourly precip. total precip.

299 persons died.

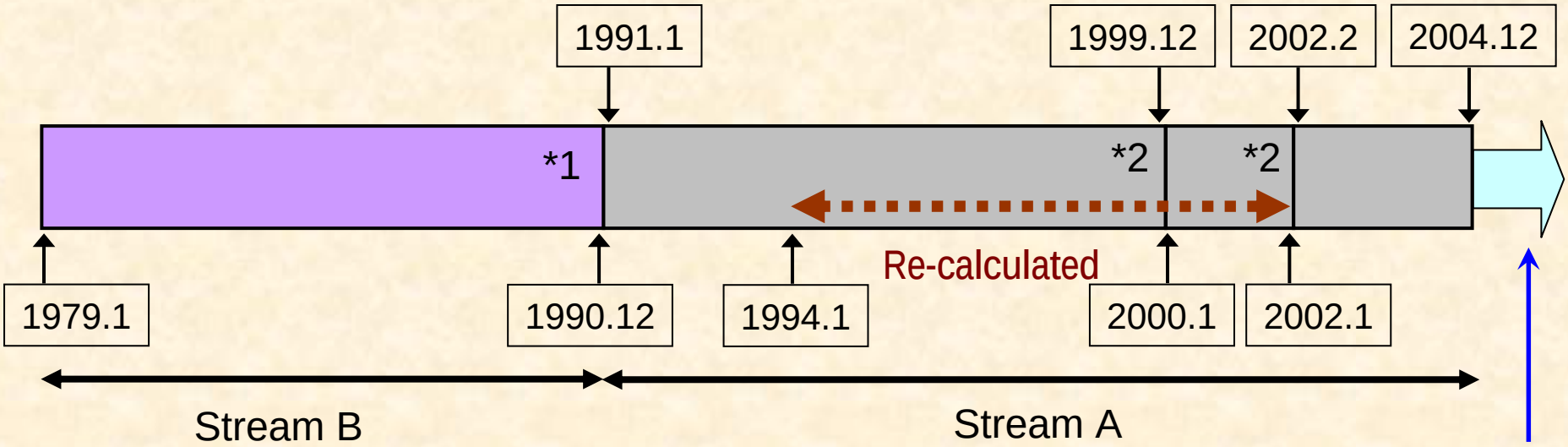
JRA-25 MSLP (hPa)



JRA-25 6hour precip. (232100 - 240300JST) (unit:mm/day)



JRA-25 Final Streams



*1:discontinuities
*2:small discontinuities

JRA-25 is transitioned to JMA-CDAS (JCDAS) for after 2005.

Re-calculation

1994.1 to 1999.12 : Large number of low quality GMS-AMV data were unexpectedly assimilated.

2000.1 to 2002.1 : TCR data were not assimilated due to Y2K problem. (Lower quality of TC analysis)

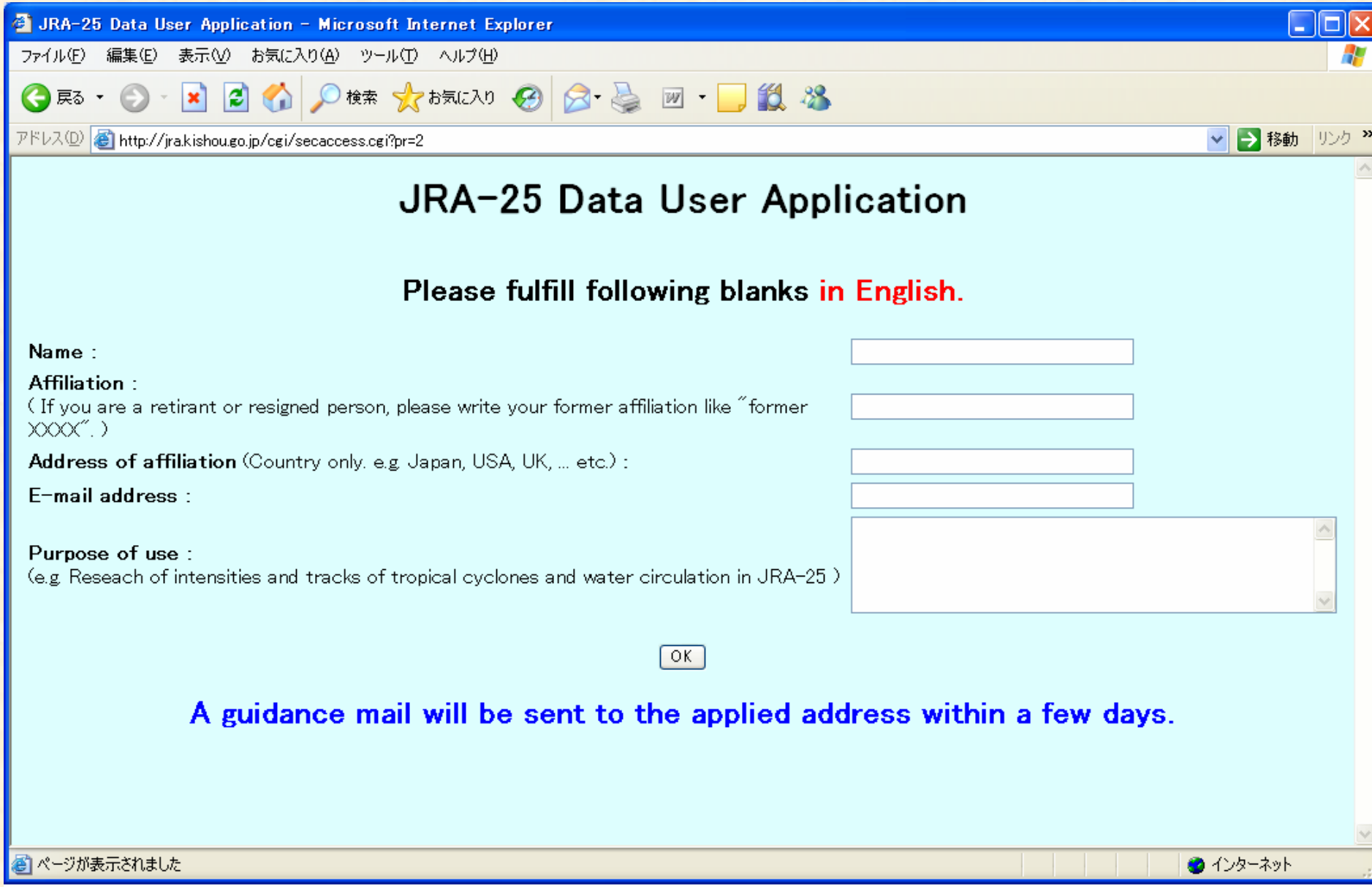
1982.1, 1992.1,2 and 11 : no TCR data were given around the date line (with little influence) .

JRA-25 official data

- Data from 1979 to 2004
- Released on 18th July 2006
- Data for the re-calculated period are replaced.
- The official data is supplied from a JMA data server.

http://jra.kishou.go.jp

JRA-25 data available via internet



JRA-25 paper / report

- **The JRA-25 Reanalysis**

  Submitted to **JMSJ** (Journal of Meteorological Society of Japan)

  K. Onogi, J. Tsusui, H. Koide, M. Sakamoto, S. Kobayashi, H. Hatsushika, T. Matsumoto, N. Yamazaki, H. Kamahori, K. Takahashi, S. Kadokura, K. Wada, K. Kato, R. Oyama, T. Ose, N. Mannoji and R. Taira

- JRA-25 : Japanese 25-year Reanalysis

  – progress and status –

  Onogi et al., QJRMS special issue of the WMO 4th DA workshop (April 2005), Vol.131, 3259-3268.

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

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. 2008	: program fixed

Thank you very much !

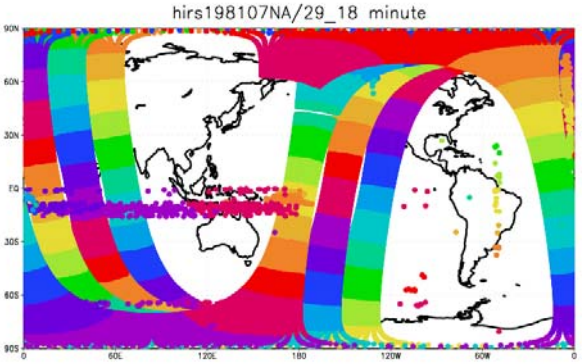
JMA

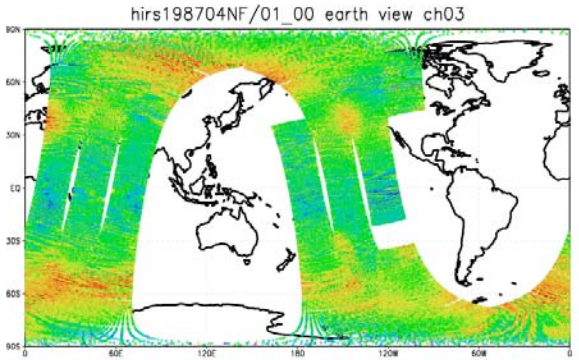
Quality monitoring of TOVS data

Typical examples of poor quality data

Bad earth location(1)

Out of orbit

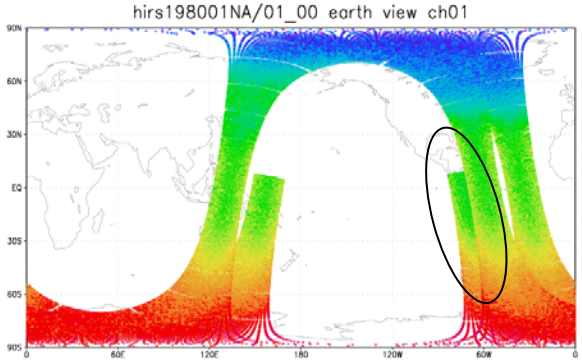


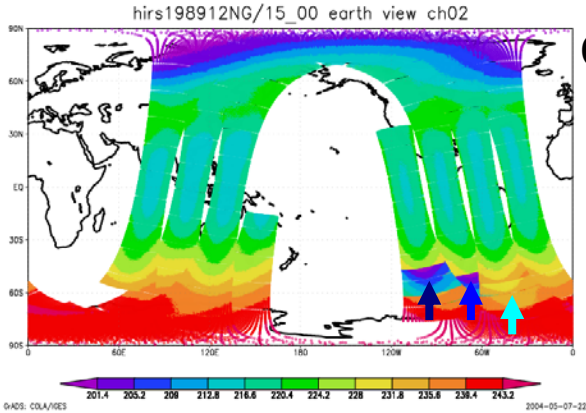


Noisy data

Bad earth location(2)

Error of time

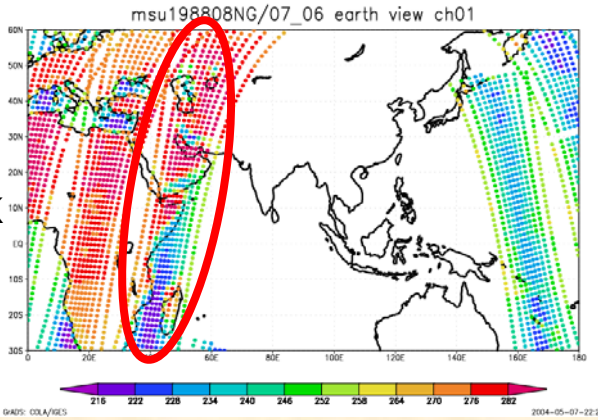




Calibration error

Bad earth location(3)

Slip along track



To detect these types of error, we developed systematic detecting method.

Courtesy: S. Kobayashi

Application of JRA-25 for operation and research

Extreme Event / Seasonal Forecast

Monitoring worldwide extreme events and climate system

Atmospheric, terrestrial and oceanic initial and verification data for seasonal prediction model, El Nino prediction model

Forcing data for ocean models

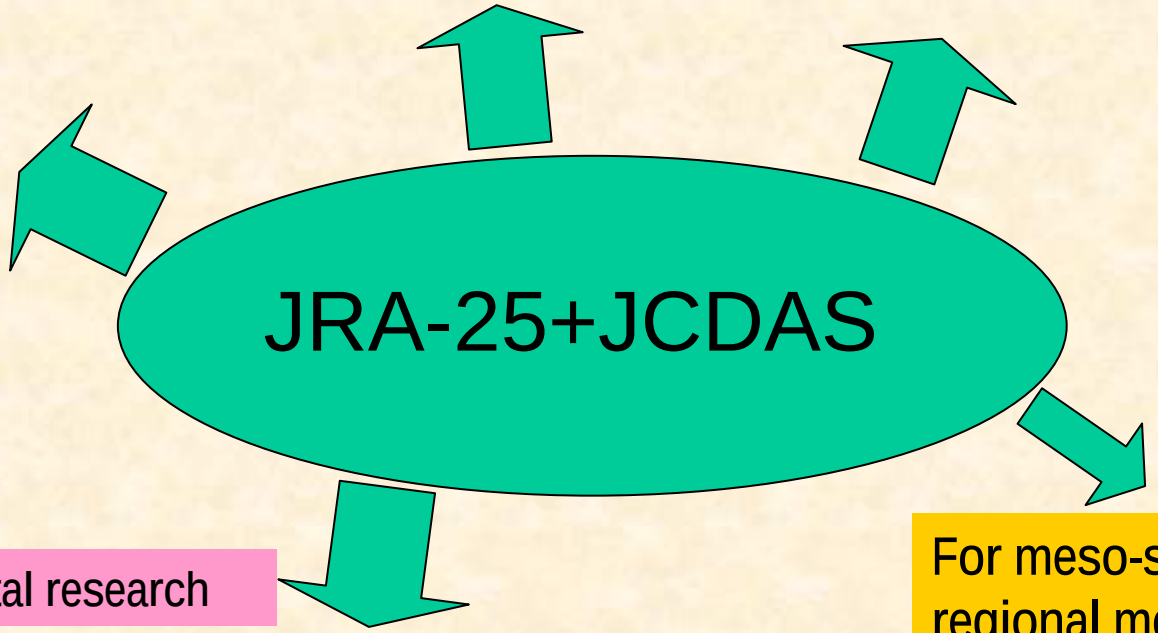
Earth Environment

Carbon cycle, reference data for ozone analysis

Forcing data for a chemical transport model

Climate information

- Time series of a point
- JRA-25 Atlas



Climate and environmental research

Extreme events, climate change, development and improvement of seasonal prediction model

Analysis of Energy and water cycle.

For meso-scale regional models

To provide proper initial and boundary data to perform numerical experiments for severe events in the past.

JRA-25 & JCDAS data are available for research use via internet.

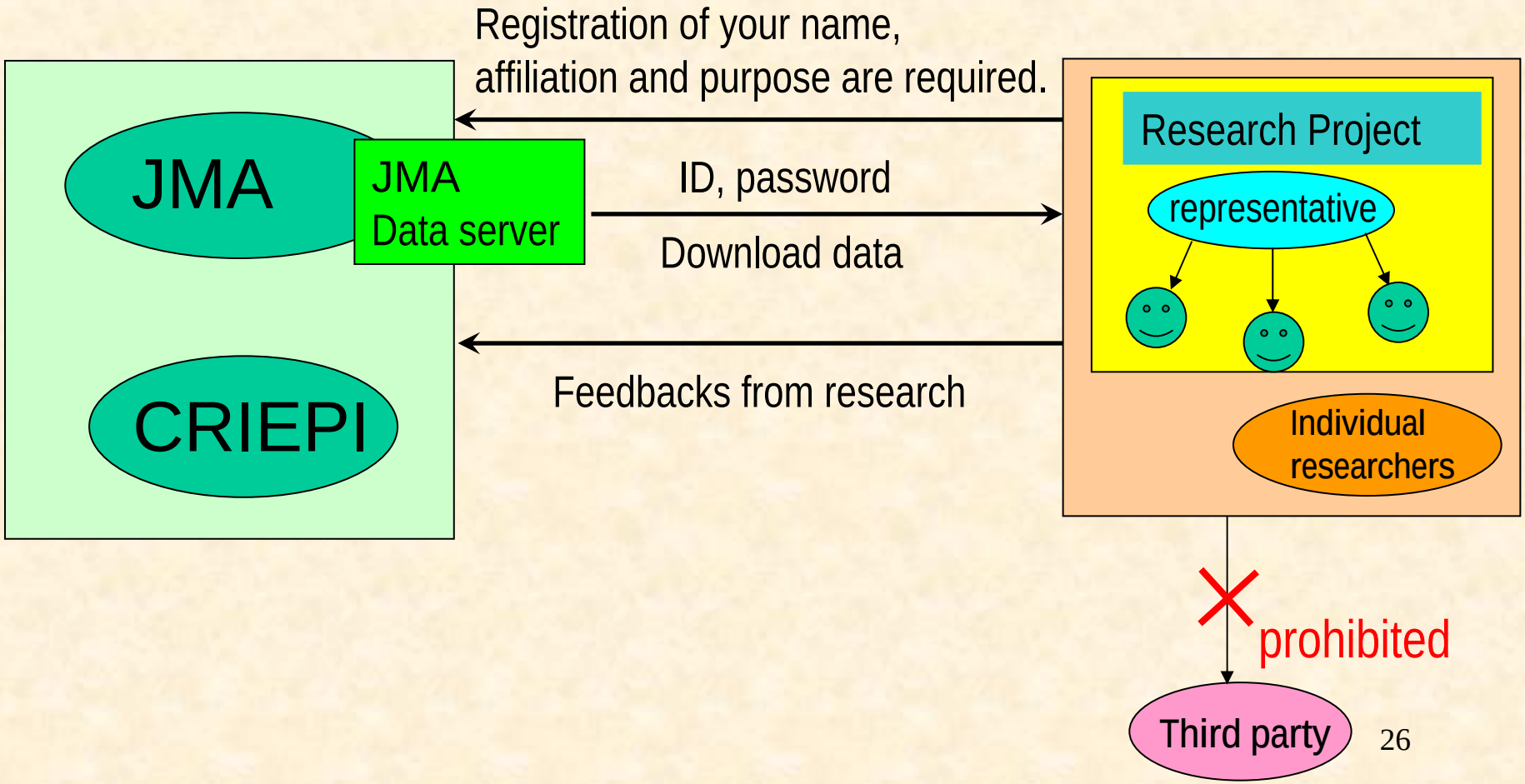
Reminder for using JRA-25 data

- Discontinuity at the stream change from STB to STA (1990.12 to 1991.1)
  - Temperature and height above 200hPa, specific humidity above 150hPa, soil wetness, snow depth, ….
- Surface parameters except pressure were assimilated with 2D-OI, separately from 3D-Var for upper air. Hence, inconsistency between the parameters can exist.
- Jumps in time series (temperature …) are often found mainly in the stratosphere due to changes of satellites in the biased model background.
- Snow depth in Siberia is less before the winter 1982-83 than after, because part of SYNOP snow data were not assimilated by mistake.
- Problem of the land surface process:

  less precipitation in Amazon basin than the other reanalyses.

JRA-25 data available via internet

For research use only



The 3rd Reanalysis Conference

Provisional Agenda

(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'