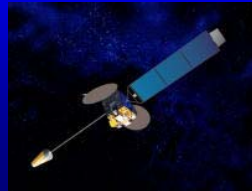




Progress in reanalysis activities at JMA

Japan Meteorological Agency
WGNE 24



The 3rd WCRP International Conference on Reanalysis

At University of Tokyo (Komaba campus)
28th Jan. to 1st Feb. 2008

Co-host : JMA, CRIEPI and the University of Tokyo

http://jra.kishou.go.jp/3rac_en.html

The 3rd Reanalysis Conference Agenda

- Introduction of reanalysis
- Applications of reanalysis products
- Characteristics of reanalysis products
- Data assimilation techniques for reanalysis
- Future reanalysis
- Panel Discussion

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The 3rd Reanalysis Conference

- 178 presentations applied (from 31 countries).
- 260 participants (from 21 countries) .
- History --- 1st(1997), 2nd(1999)
 - Research and applications on reanalysis data are greatly progressed during the 8 years.

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Data distribution of JRA-25/JCDAS

For research purpose

- More than 740 researchers (45 countries) downloaded
<http://jra.kishou.go.jp/>
- NCAR
Data is available from NCAR'S data storage server.
<http://dss.ucar.edu/datasets/ds625.0/>
JCDAS data will be stored in NCEP-NCAR Annual Analyses DVD
http://dss.ucar.edu/pub/reanalysis/rean_cdroms.html
Cooperation of NCAR Data support section is highly appreciated.
- JAMSTEC
- The university of Tokyo (for CEOP/GEWEX related study)
- Tsukuba university

For commercial use

- Japan Meteorological Business Support Center
<http://www.jmbosc.or.jp/english/index-e.html>

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Applications

- Exhibition of 'Miraikan' museum
The new permanent exhibition "Earth Environment and Me"
 - Assessment of solar power plant, etc
http://www.miraikan.jst.go.jp/e/info/2008/if_1001_01.html
- Atmospheric reference for launching a rocket (JAXA)
 - Evaluation of strength of rocket body
- Precipitation climatology map (Chronological Scientific tables: "Rika Nenpyo")
 - Japanese general science handbook
- Database for agricultural meteorological application
- NIPR Trajectory Model
Meteorological Field Display System
<http://www.firpnitram.nipr.ac.jp/en/index.html>

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Data Service

JRA-25 & JCDAS official data



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JRA-25 Atlas



<http://ds.data.jma.go.jp/gmd/jra/atlas/eng/atlas-tope.htm>

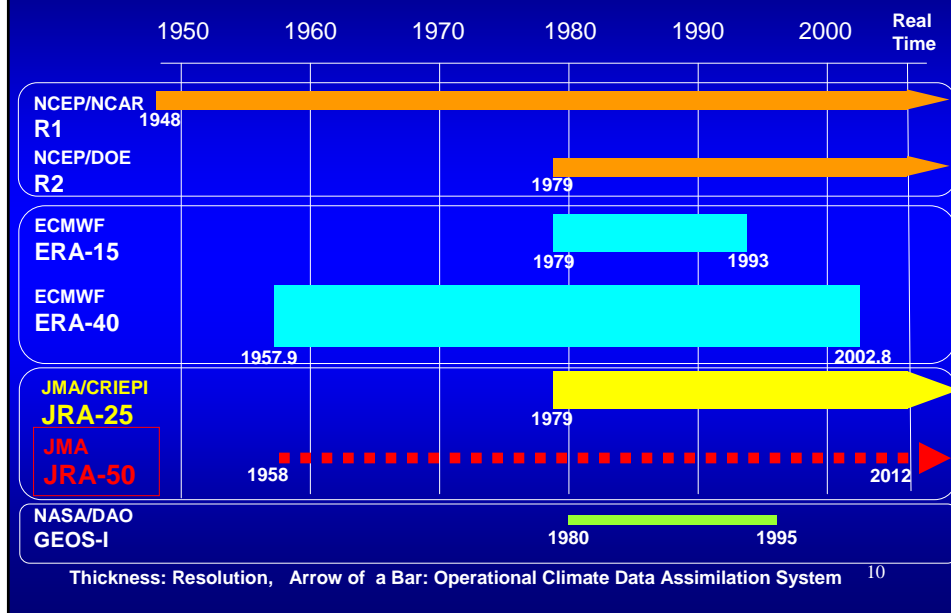
8

Recent Progress of JMA global NWP

- Improved radiation (Dec. 2004)
- 4D-var (Feb. 2005)
- Updated statistics for DA (Feb. 2005)
- Semi-Lagrangian scheme (Feb. 2005)
 - 3 time level
- Assimilation of Brightness Temperature of microwave radiometer (SSM/I etc.) (May 2006)
- Variational bias correction (May 2006)
- Resolution increased (Nov. 2007)
 - TL319L40 to **TL959L60**
 - 2 time level semi-Lagrangian scheme
- Assimilation of new satellite data

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Long-term Reanalyses



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Future plan of Reanalysis

- Target period
 - 1958 to 2012 (55 years)
- Purpose
 - Longer climate database with higher quality than JRA-25
 - To fix deficiencies of JRA-25
 - Analysis of past extreme events (eg. Typhoon)
 - Contribution to the future IPCC report
 - Enable longer-term analysis for climate changes including the recent warming phase
 - Produce less bias product by utilizing the latest version of JMA's operational model

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Future plan of Reanalysis

- JMA GSM TL319L60 (top at 0.1hPa)
- 4D-var, varBC for sounder data.
- 1958 to present
 - More than 50 years
- Increase of greenhouse gasses are considered.
 - Carbon dioxide
- Observational feedback information from JRA-25
- Production starts in 2009.

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Schedule and resource

- **Schedule**

- Preparation and test run : 2008
- Production start : early 2009
- Production complete : end of 2013
 - JMA's supercomputer will be replaced in March 2012.

- **Resources**

- Models : based on JMA's operational DA system
- Supercomputer : 8 nodes of Hitachi SR-11000 till Feb. 2012 and more after Mar. 2012.
- Staff : 4 full time members
 - Data service and support of JRA-25 and JCDAS are also our duty.

JMA and Japanese researchers promote reanalysis activities.

JRA-25 vs future plan

	JRA-25	tentative future plan
Years	1979 - 2004	1958 - 2012
Model Resolution	T106L40 top at 0.4hPa	TL319L60 top 0.1hPa (14 lyrs above 10hPa.)
Data Assimilation	3D-var (Inner T106)	4D-var (Inner T106), VarBC for radiances
Numerics	Eular scheme	Semi-Lagrangean scheme
Physics	Previous version except cloud scheme	Improved radiation scheme (bias reduced) Improved land surface scheme
Forecast score (FT=24 Z500 RMSE)	13m (NH), 19m (SH) (as of Mar.2004)	9m (NH), 12m (SH) (as of Dec. 2007, to be improved more)
Sounder data	TOVS 1d, ATOVS 1c	TOVS 1c, ATOVS 1c, VTPR 1c etc.
Microwave imager	Retrieved precipitable water	Direct assimilation of radiances
New satellite instruments		GPSRO, High spectral resolution sounders, SSM/IS
Reprocessed AMV	Met-2 and GMS-3,4,5	Met-2 to 7 and GMS-3,4,5 (revised), GOES?
Historical observation	Specified QC and handling for TOVS data Andrae et al.(2004) for RAOB	Data QC that draws on experience from ERA-40, ERA-Interim and JRA-25 Homogenized RAOB (Haimberger, 2007)
CO2	constant (space & time) 375 ppmv	historical
Ozone	3D-daily profile	3D-daily profile (revised)