

The Japanese 55-year Reanalysis “JRA-55”

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Japanese Global Atmospheric Reanalysis

1st JRA-25

By JMA and CRIEPI (1979~2004)

(Central Research Institute for Electric Power Industry)

JMA operates JCDAS

(JMA Climate Data Assimilation System) for the years after 2005 in real time basis.



2nd JRA-55 (JRA Go! Go!)

By JMA (1958~2012)

JRA-55 is the first reanalysis which covers more than 50 years since 1958 with 4D-var data assimilation system.

JMA operates JRA-55 continuously in real time basis after 2013.





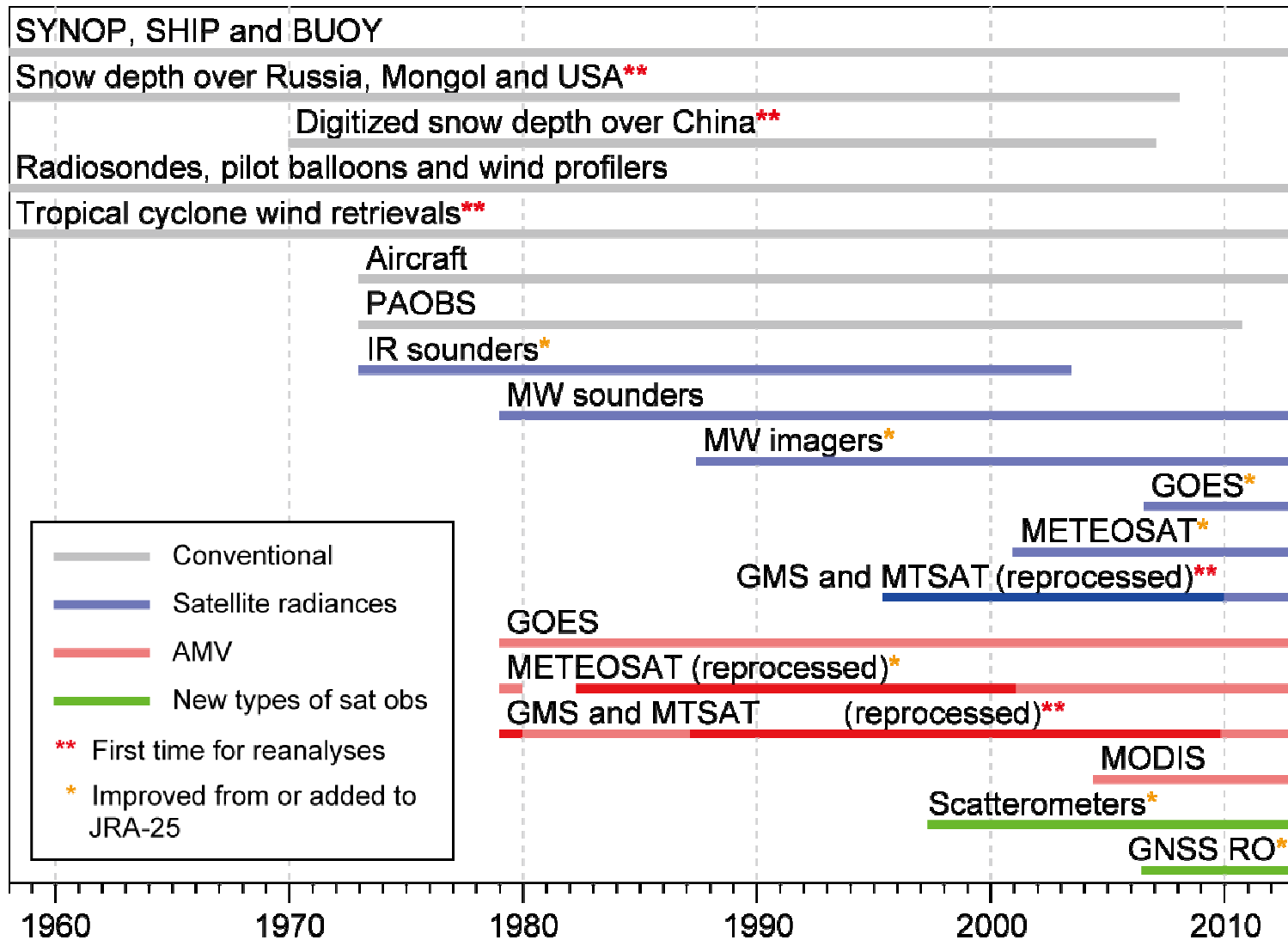
JRA-55 Reanalysis system



	JRA-25	JRA-55
Reanalysis years	1979-2004 (26 years)	1958-2012 (55 years)
Equivalent operational NWP system	As of Mar. 2004	As of Dec. 2009
Resolution	T106L40 (~120km) <i>(top layer at 0.4 hPa)</i>	TL319L60 (~60km) <i>(top layer at 0.1 hPa)</i>
Time integration	Eularian	Semi-Lagrangian
Assimilation scheme	3D-Var	4D-Var <i>(with T106 inner model)</i>
Bias correction (satellite radiance)	Adaptive method (Sakamoto et al. 2009)	Variational Bias Correction (Dee et al. 2009)
GHG concentrations	Constant at 375 ppmv (CO ₂)	Annual mean data are interpolated to daily data (CO ₂ ,CH ₄ ,N ₂ O)



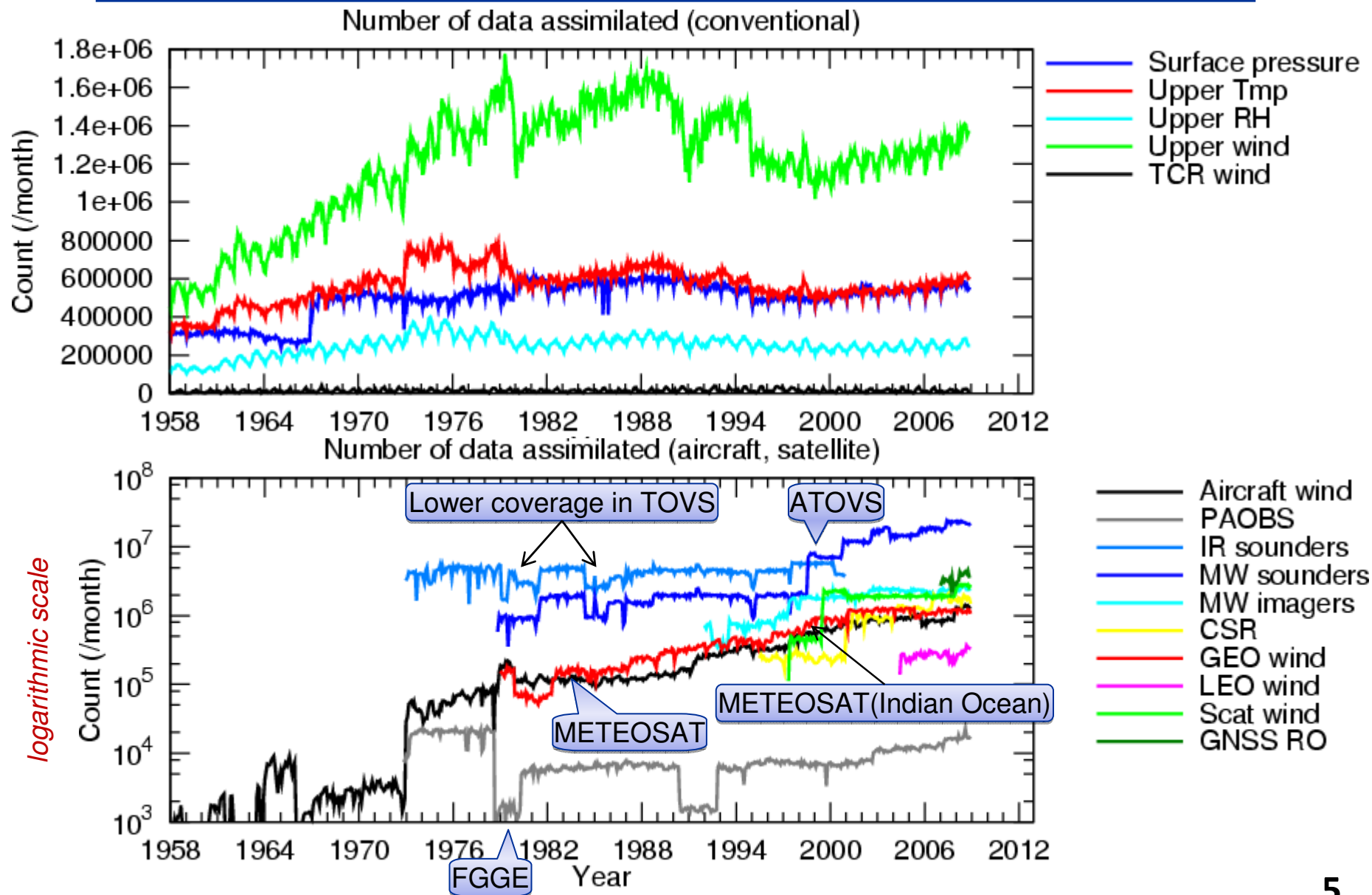
Observational Data available for JRA-55



GNSS: Global Navigation Satellite System



Number of observations assimilated (Global)

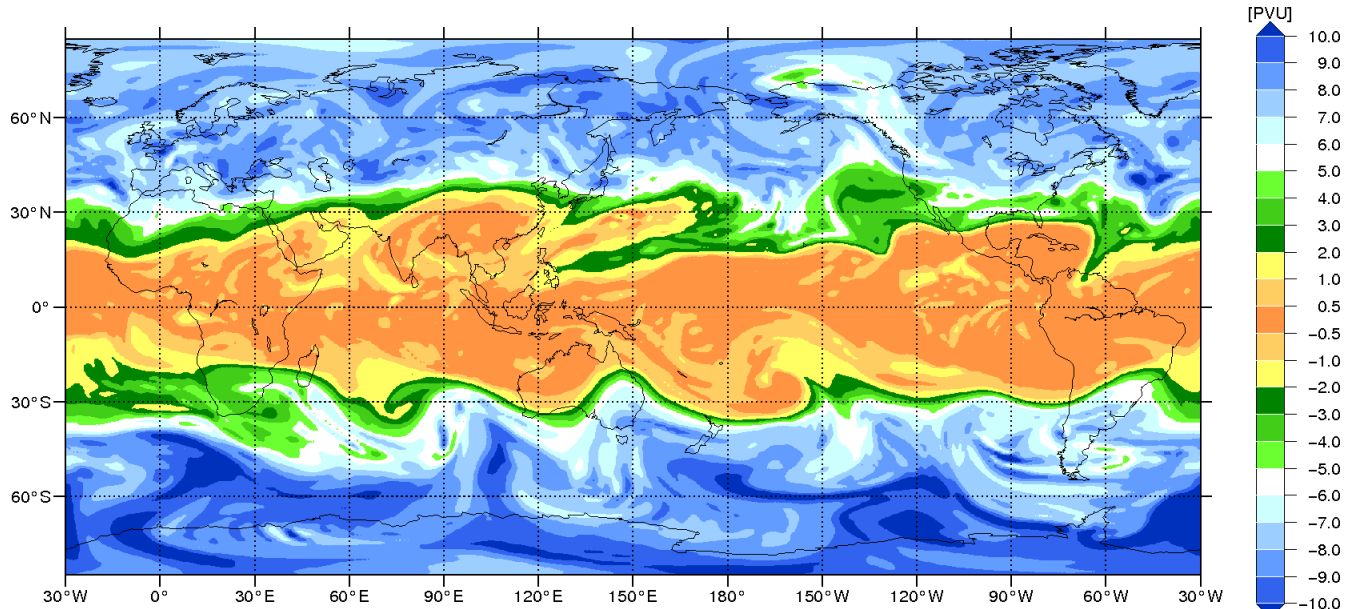




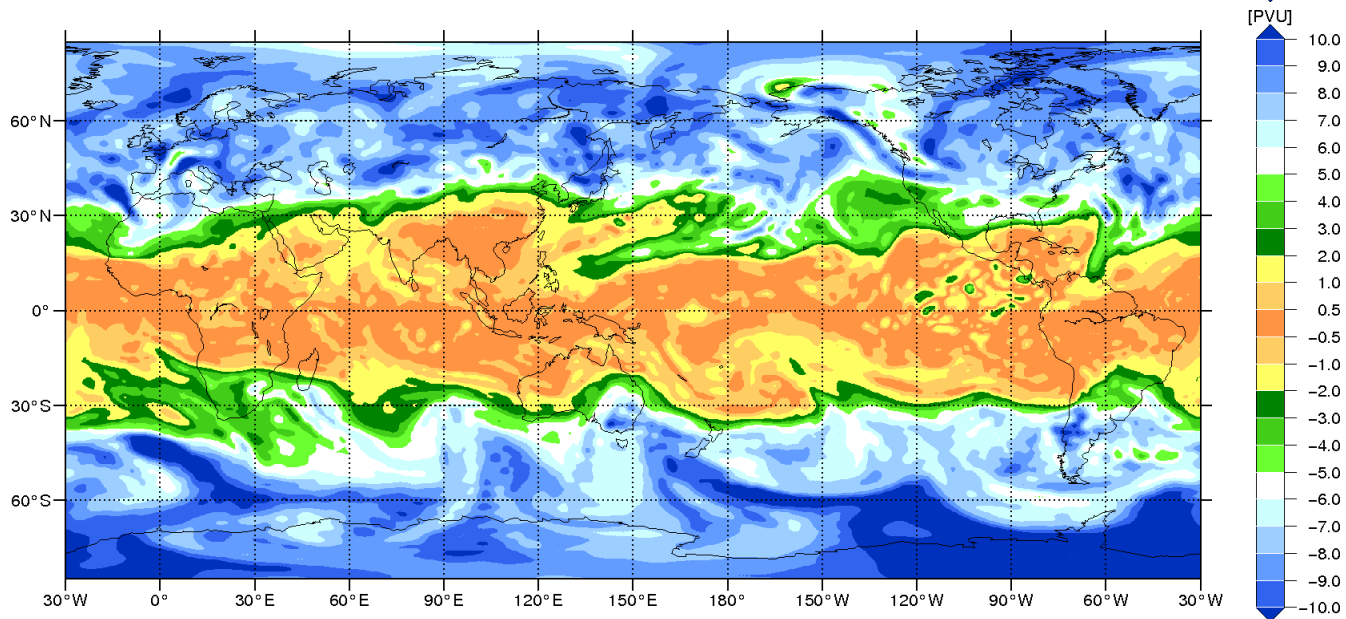
Isentropic Potential Vorticity (at 360 K) 1 June 1983 00UTC – 6 June 1983 00UTC



JRA-55
(4D-var)



JRA-25
(3D-var)





Zonal Mean Precipitation

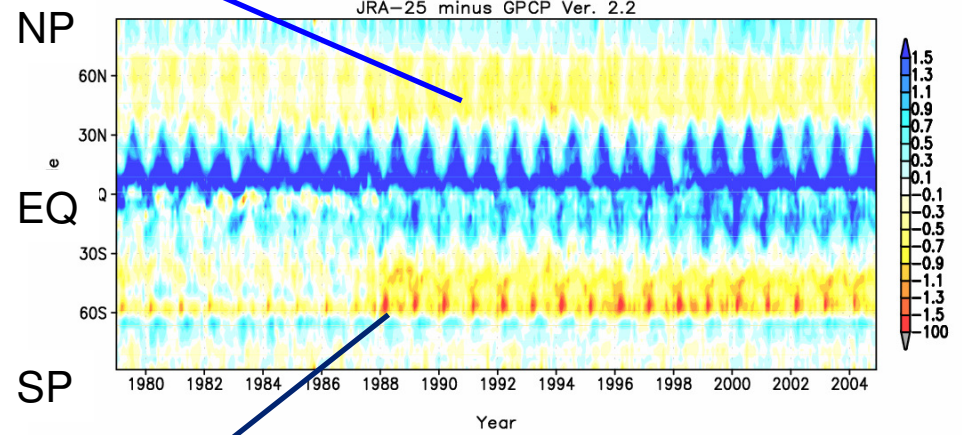
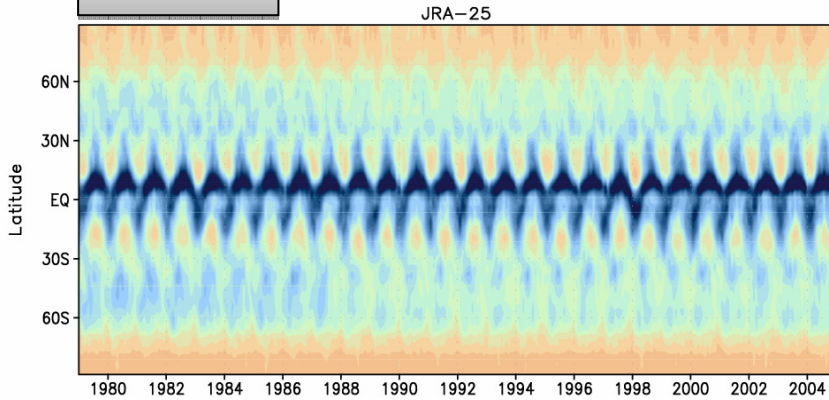


Reanalysis

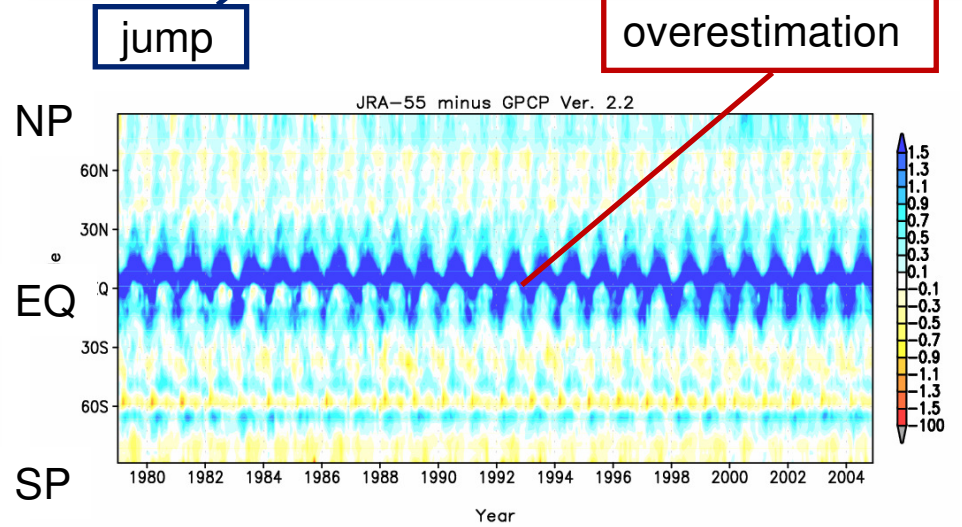
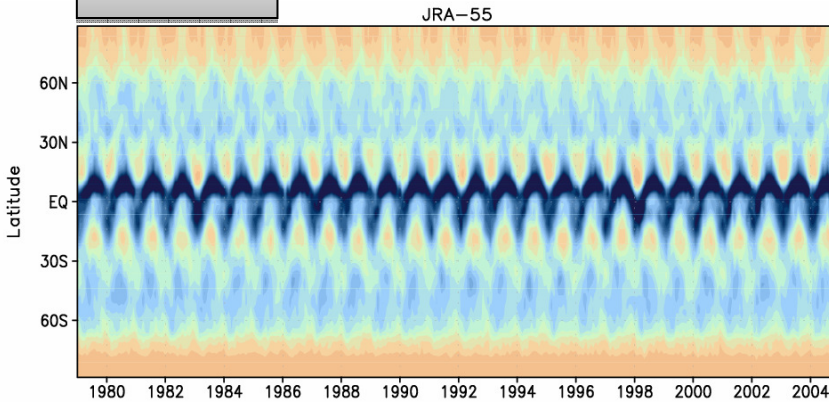
dry bias

Reanalysis - GPCP

JRA-25



JRA-55



1980



2005

1980

2005



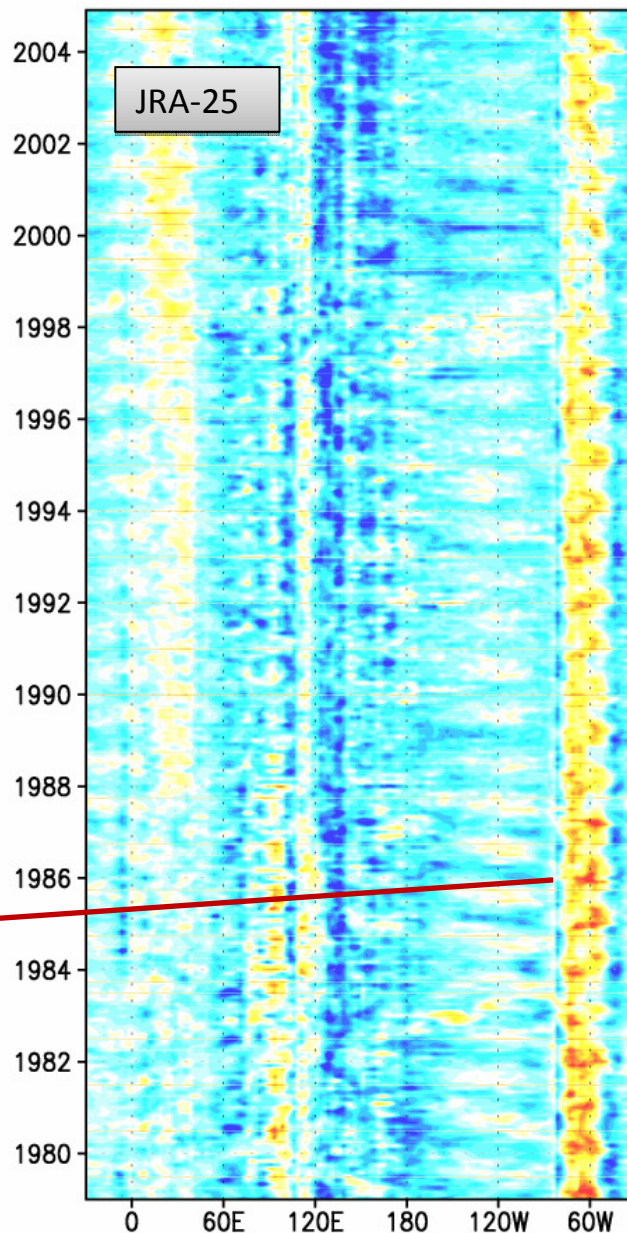
Precipitation in the tropics

JRA - GPCP

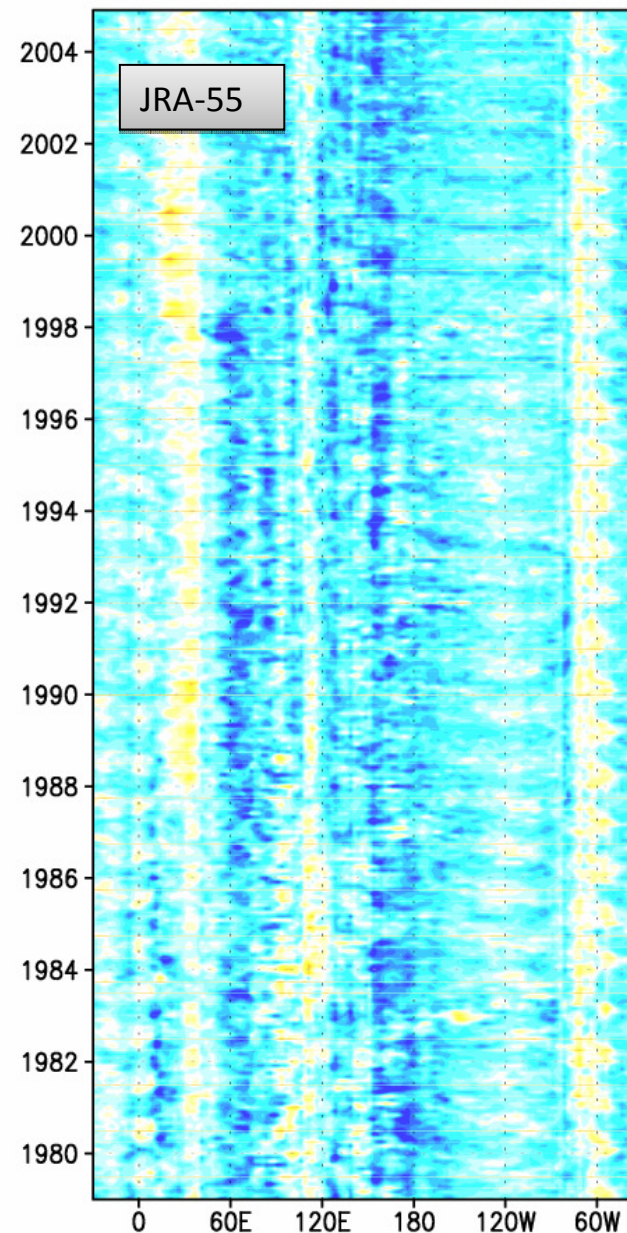
Dry Amazon basin



JRA-25 minus GPCP Ver. 2.2



JRA-55 minus GPCP Ver. 2.2

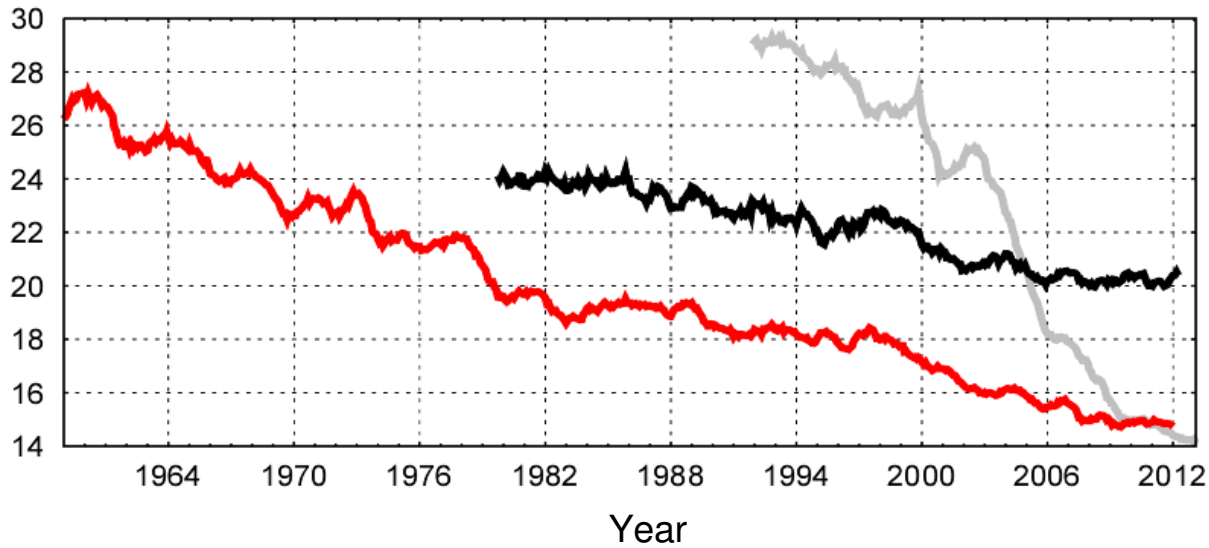




Forecast [FT=48] Scores RMSE of Z500 for N.H. and S.H. [gpm]



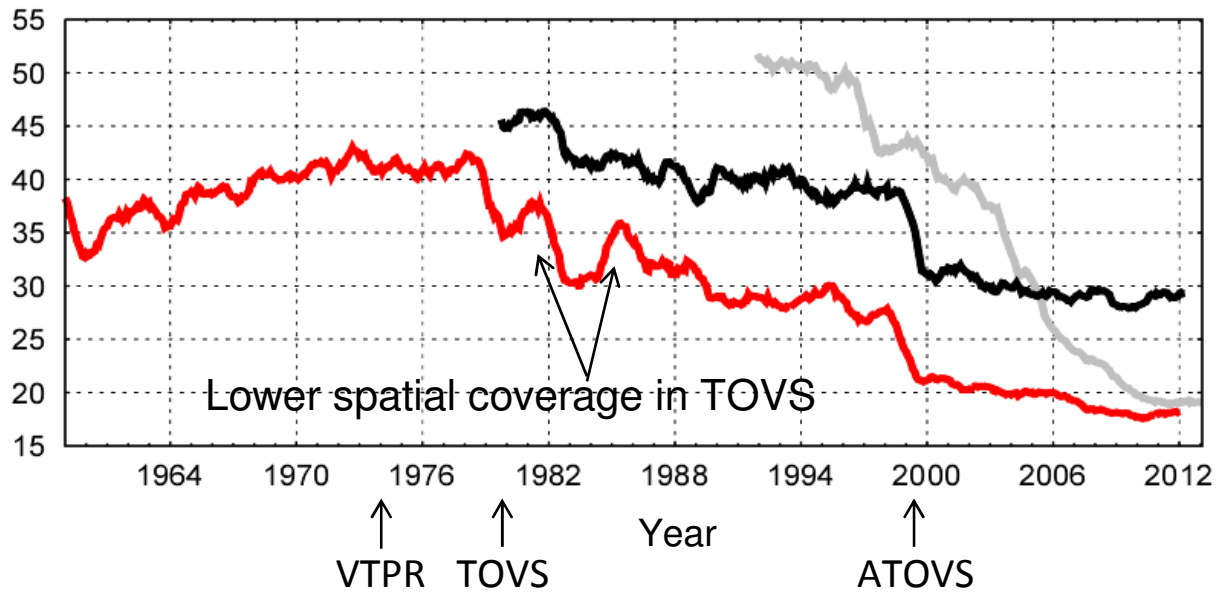
N.H.



JRA-55

JRA-25

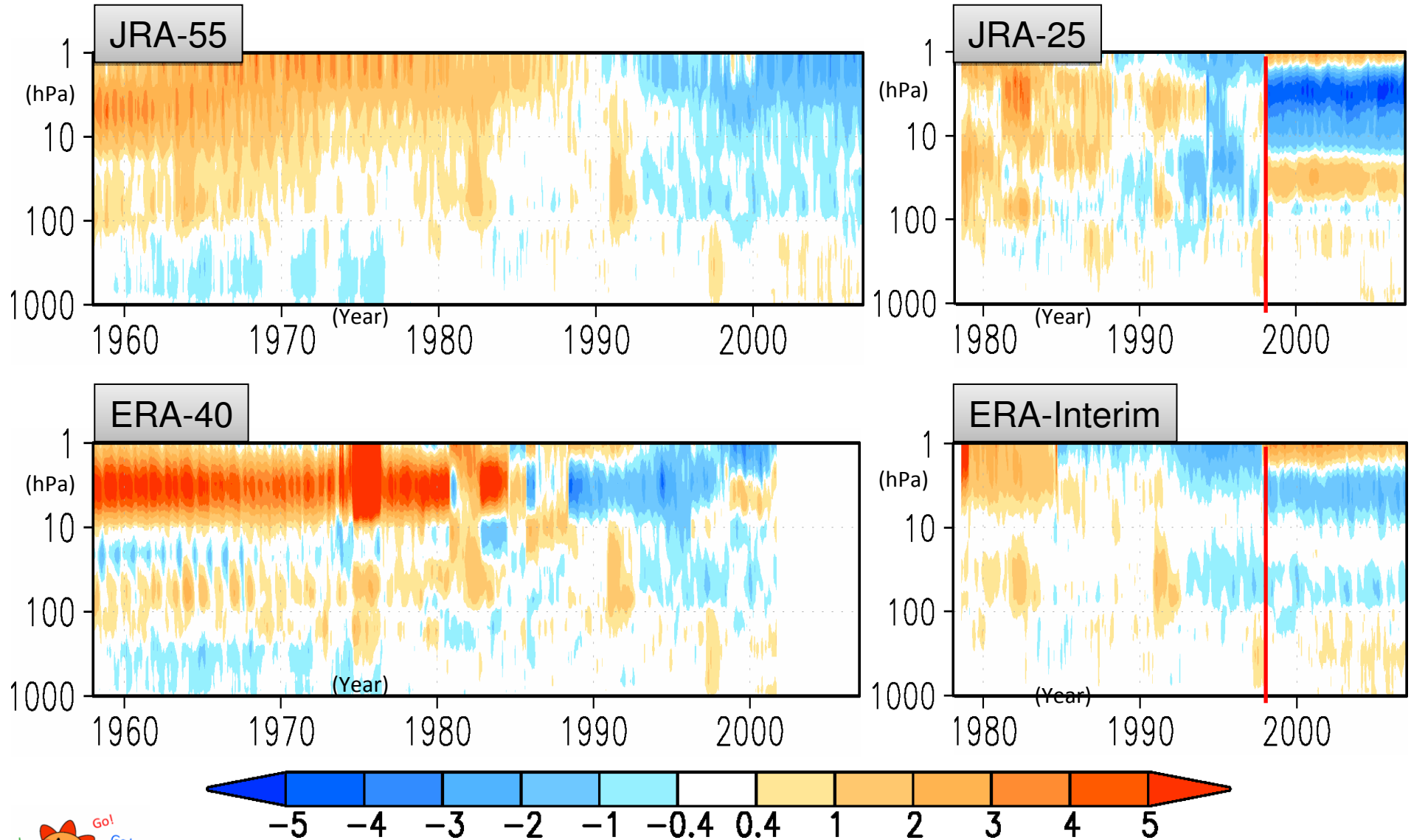
S.H.



Operation



Time-Height Cross Sections of global mean Temperature [K] anomalies in JRA and ERA reanalyses



Anomalies from the mean temperature at each pressure level for years 1980 to 2001 of each reanalysis, JRA-55, ERA-40, JRA-25 and ERA-Interim, respectively.



JRA-55 schedule



- **Autumn 2013**
 - JRA-55 products will be released for research use.
 - The data will be available from DIAS.
- **Spring 2014**
 - JRA-55 real-time products will be released.
 - Note that current JRA-25 based JCDAS will be replaced.
 - JCDAS: JMA Climate Data Assimilation System



Summary



- **Observational Data for JRA-55**
 - Improvement in both quality and quantity from JRA-25
 - Many reprocessed Satellite Data
 - Newly available data
- **Validation of JRA-55**
 - JRA-55 has much better quality than JRA-25.
 - Unnatural gaps have been significantly reduced.
- **References**
 - Ebita et al. (2011) SOLA, 2011, 7, 149-152
 - The Japanese 55-year Reanalysis “JRA-55”: An Interim Report
 - Interim report as of 2011
 - **Comprehensive reports are under preparation.**



Thank you for your attention

