The Japanese 55-year Reanalysis

JRA-55

--- progress and status ---

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Japan Meteorological Agency (JMA)

Japanese Reanalysis

1st JRA-25

By JMA and CRIEPI

- CRIEPI :
  Central Research Institute of Electric Power Industry

2nd JRA-55

By JMA

JRA-55 Nickname

→ JRA Go! Go!

JRA-25 (ni-go)

Contents

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1. JRA-55 Reanalysis System

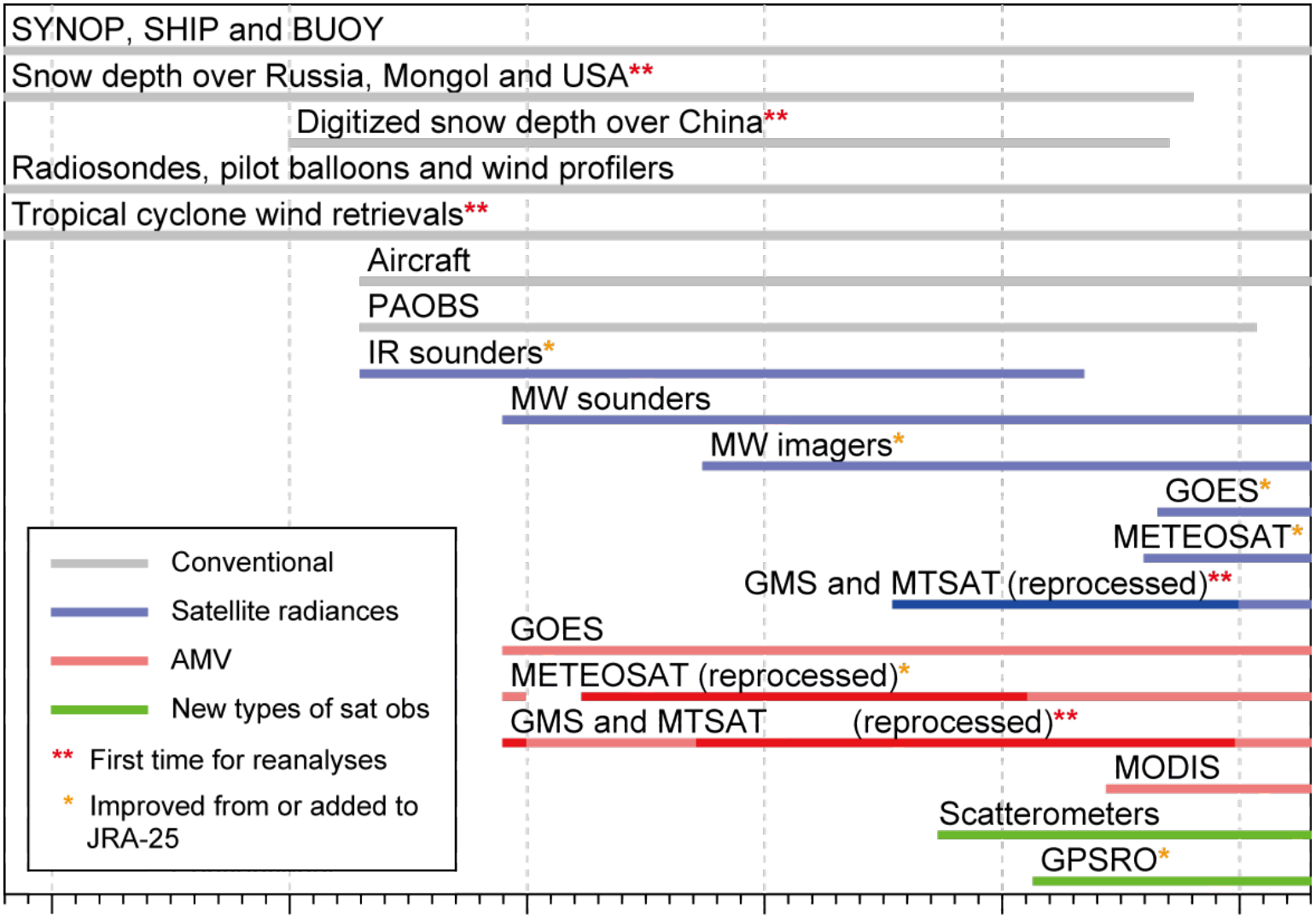
JRA-55 Reanalysis system

	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) *(top layer at 0.4 hPa)*	**TL319L60 (~60km)** ***(top layer at 0.1 hPa)***
Time integration	Eularian	**Semi-Lagrangian**
Assimilation scheme	3D-Var	**4D-Var** ***(with T106 inner model)***
Bias correction (satellite radiance)	Adaptive method (Sakamoto et al. 2009)	**Variational Bias Correction (Dee et al. 2009)**
Tropical Cyclone	Wind profile retrievals (TCRs) provided by Dr.Fiorino were assimilated.	**Same as JRA-25**

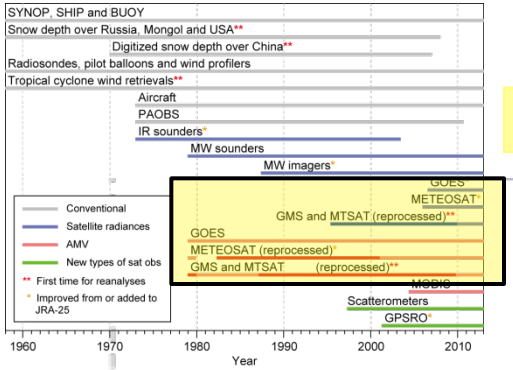
Boundary and forcing fields

	JRA-25	**JRA-55**
Radiatively active gases	H_2O, CO_2, O_3	**H_2O, CO_2, O_3, CH_4, N_2O, CFC-11, CFC-12, HCFC-22**
GHG concentrations	Constant at 375 ppmv (CO_2)	**Annual mean data are interpolated to daily data (CO_2,CH_4,N_2O)**
Ozone	Daily 3-D ozone *(produced by AED/JMA)*	**(-1978) Monthly climatology (1979-) New daily 3-D ozone *(produced using a revised CTM)***
Aerosols	Annual climatology for continental and maritime aerosols	**Monthly climatology for continental and maritime aerosols**
SST Sea ice	COBE SST (Ishii *et al.*, 2005, *I.J.Clim.*)	**COBE SST (ver. 1.5)**

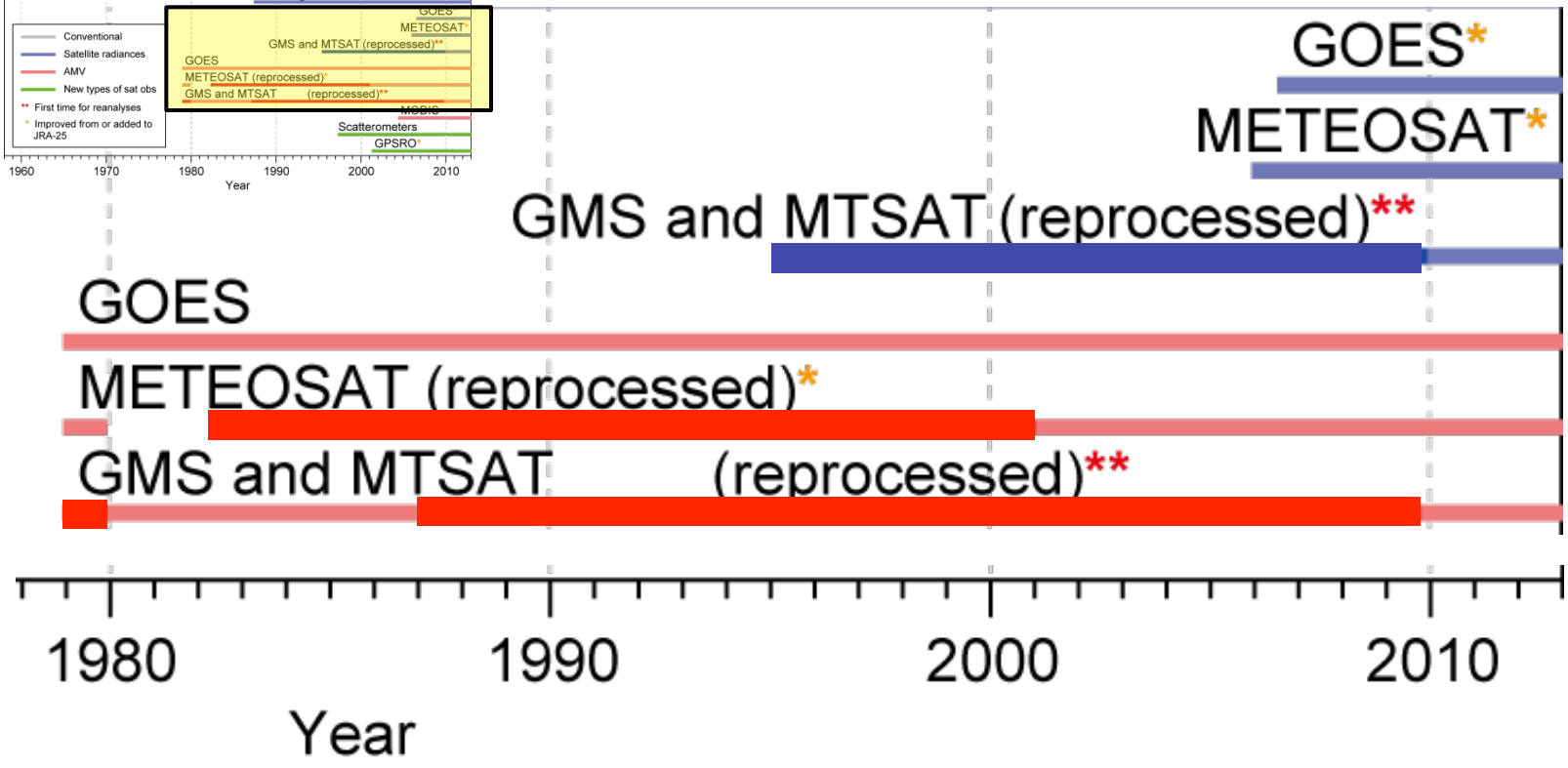
Observational data used in JRA-55



Available Reprocessed AMV and CSR data

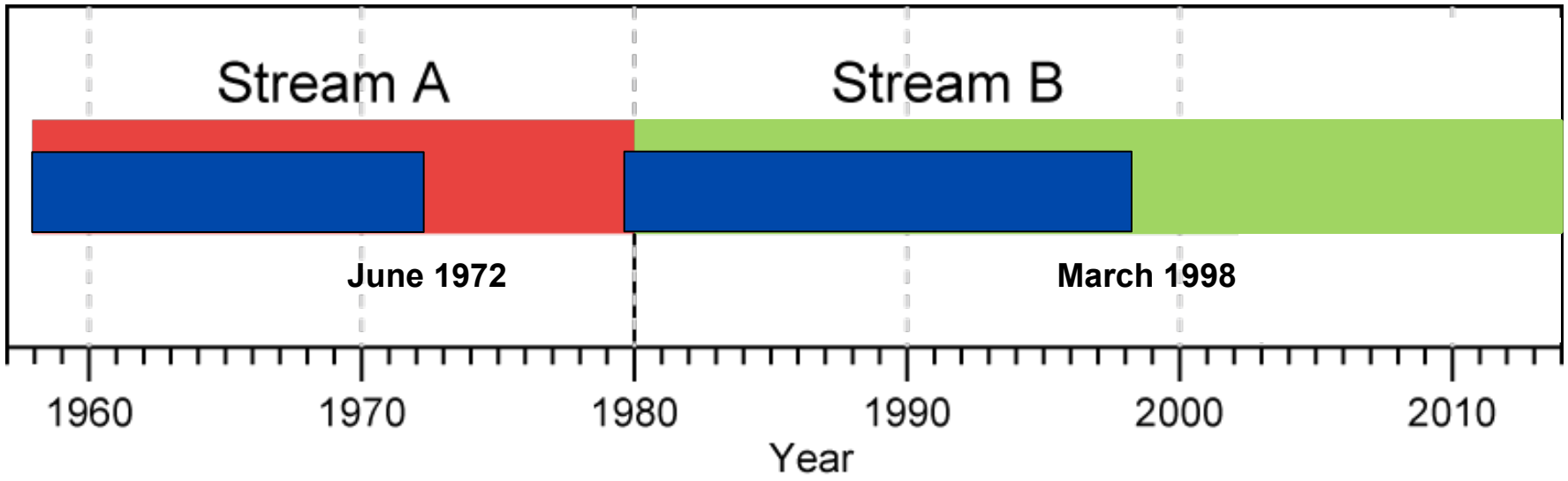


Expanding yellow part in the obs. data table



Thick line : reprocessed period

JRA-55 progress status



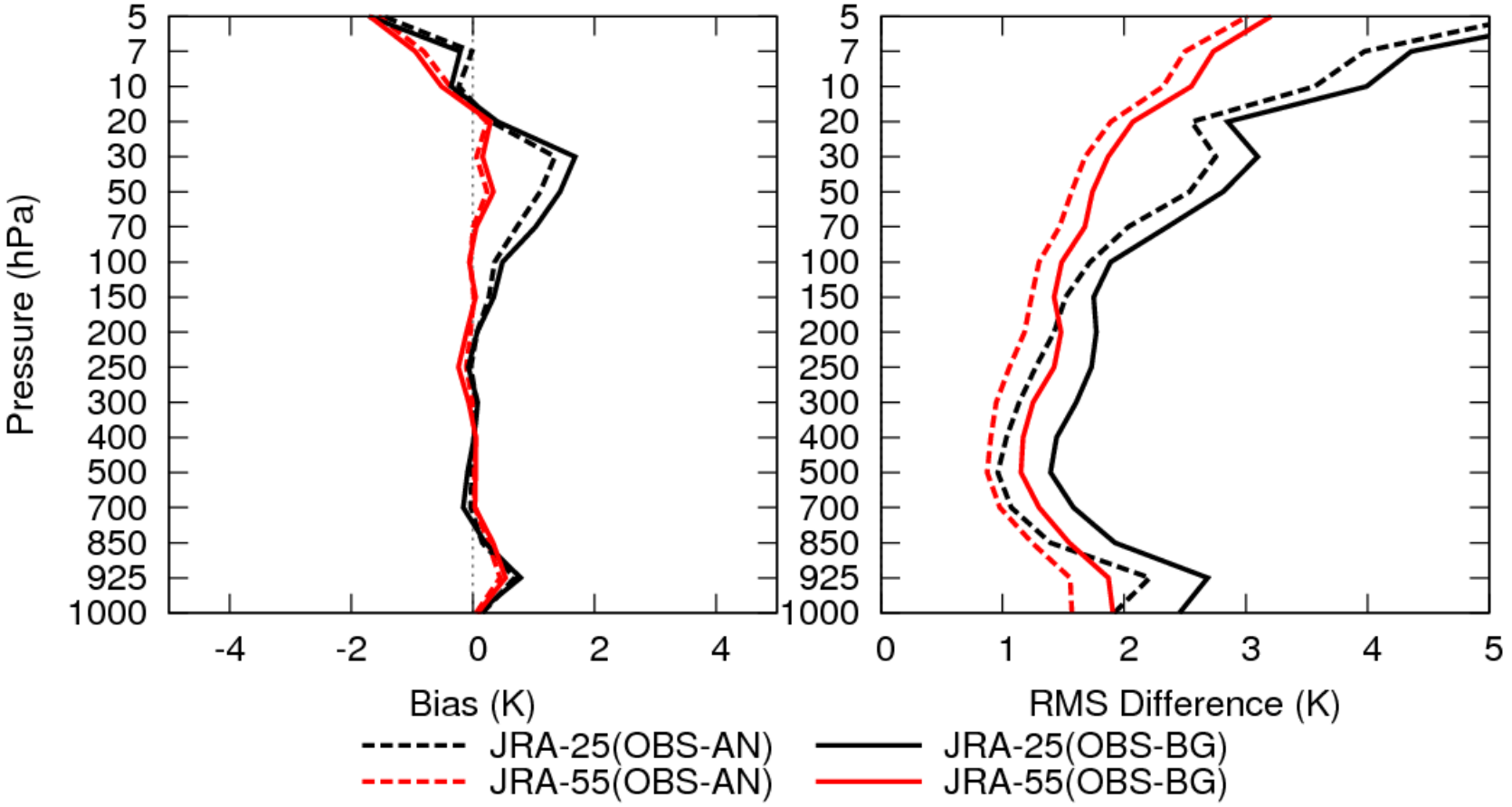
Completed as of 2 April, 2012

JRA-55 will be completed in the first half of 2013.

2. Early result

Red line is JRA-55 in the following graphs.
Note that only completed years are plotted.

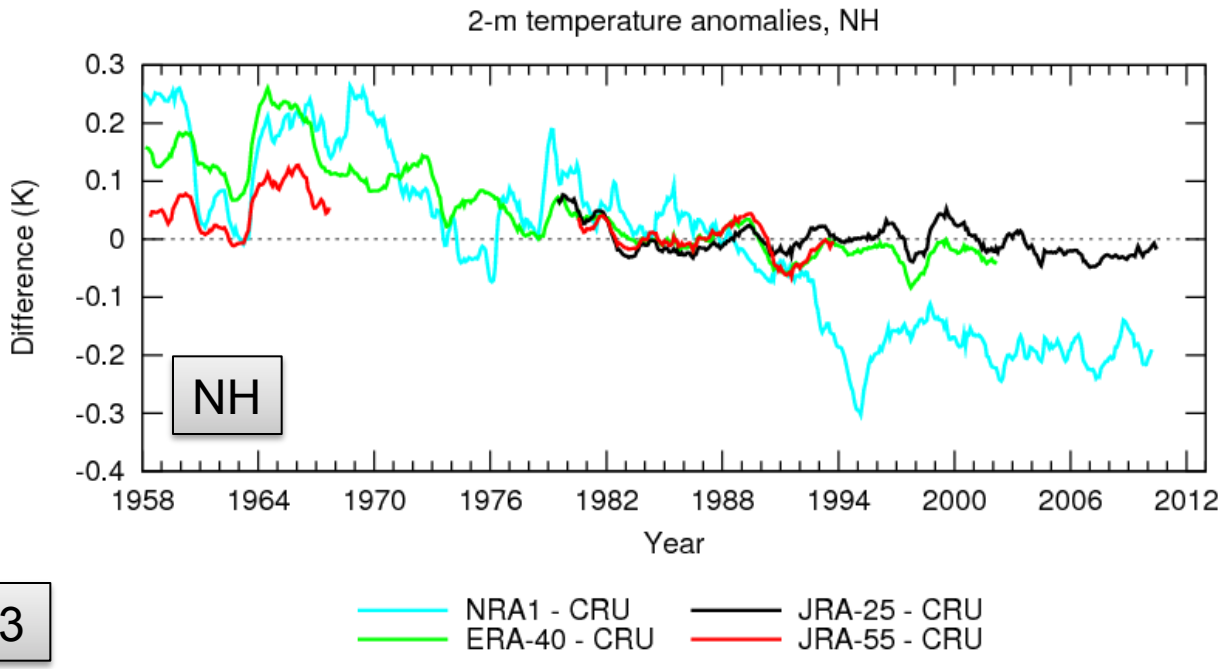
Improvement of vertical temperature profiles

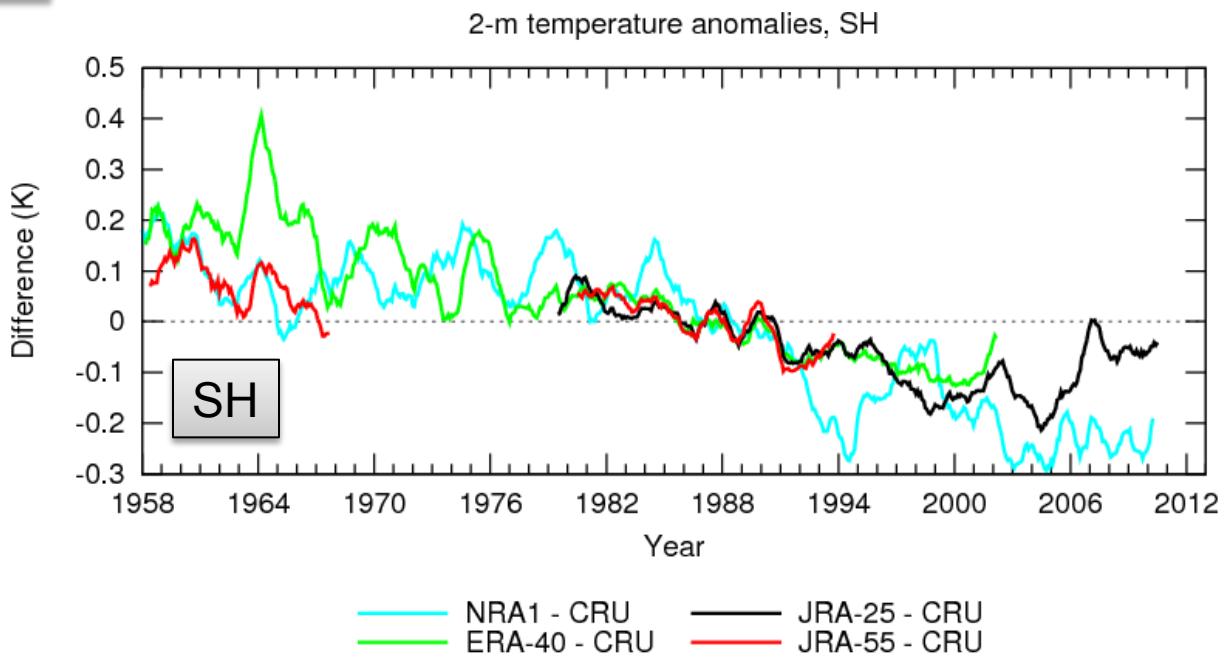


Vertical profiles of global mean bias and RMS difference between radiosonde temperature measurements and the background (solid lines) / analyzed fields (dotted lines) from JRA-25 (black) and JRA-55 (red) in January 1981.

Surface (2m) temperature

Reanalysis - CRUTEM Ver. 3



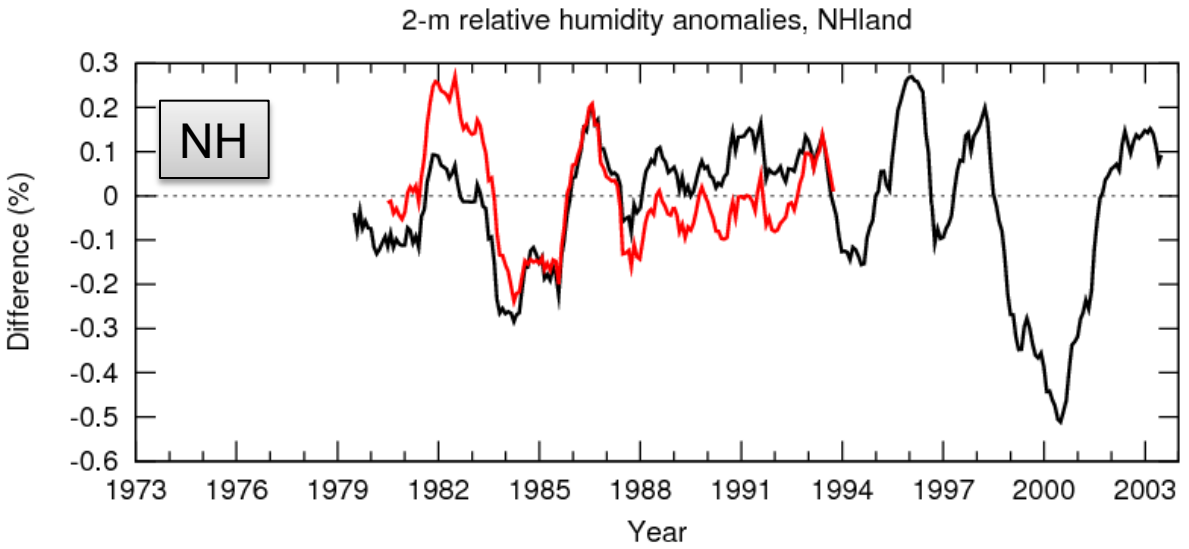


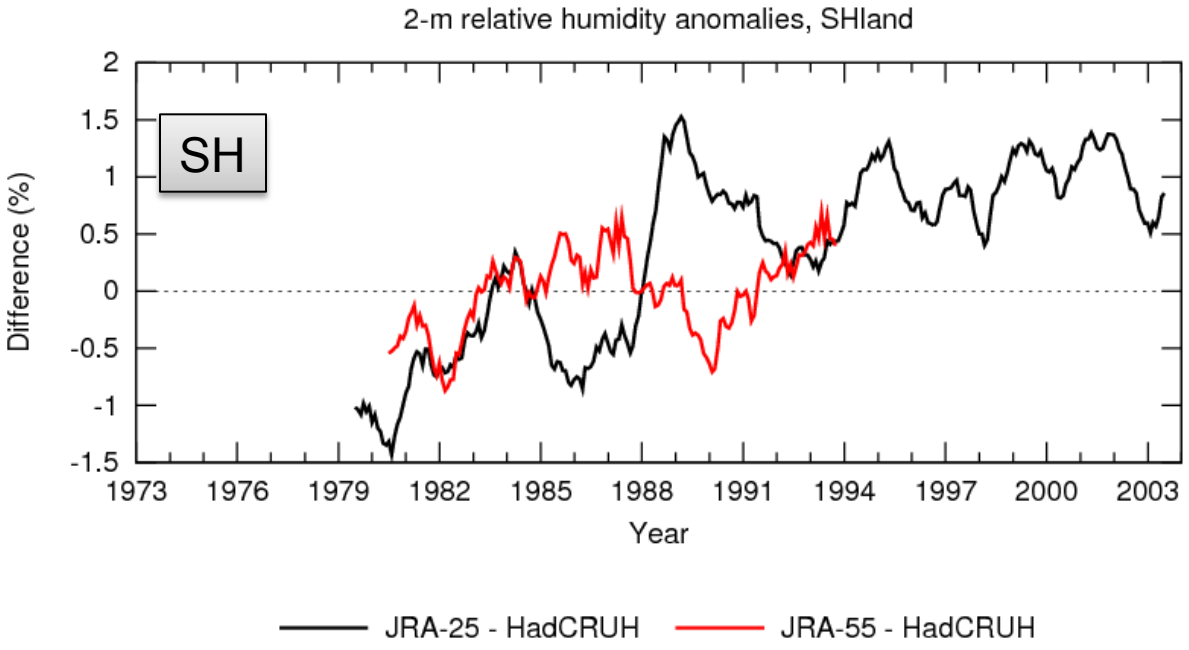
JRA-55 is the best among these reanalyses.

Land Surface (2m) Relative Humidity

JRA - HadCRUH

JRA-55 is better than JRA-25.





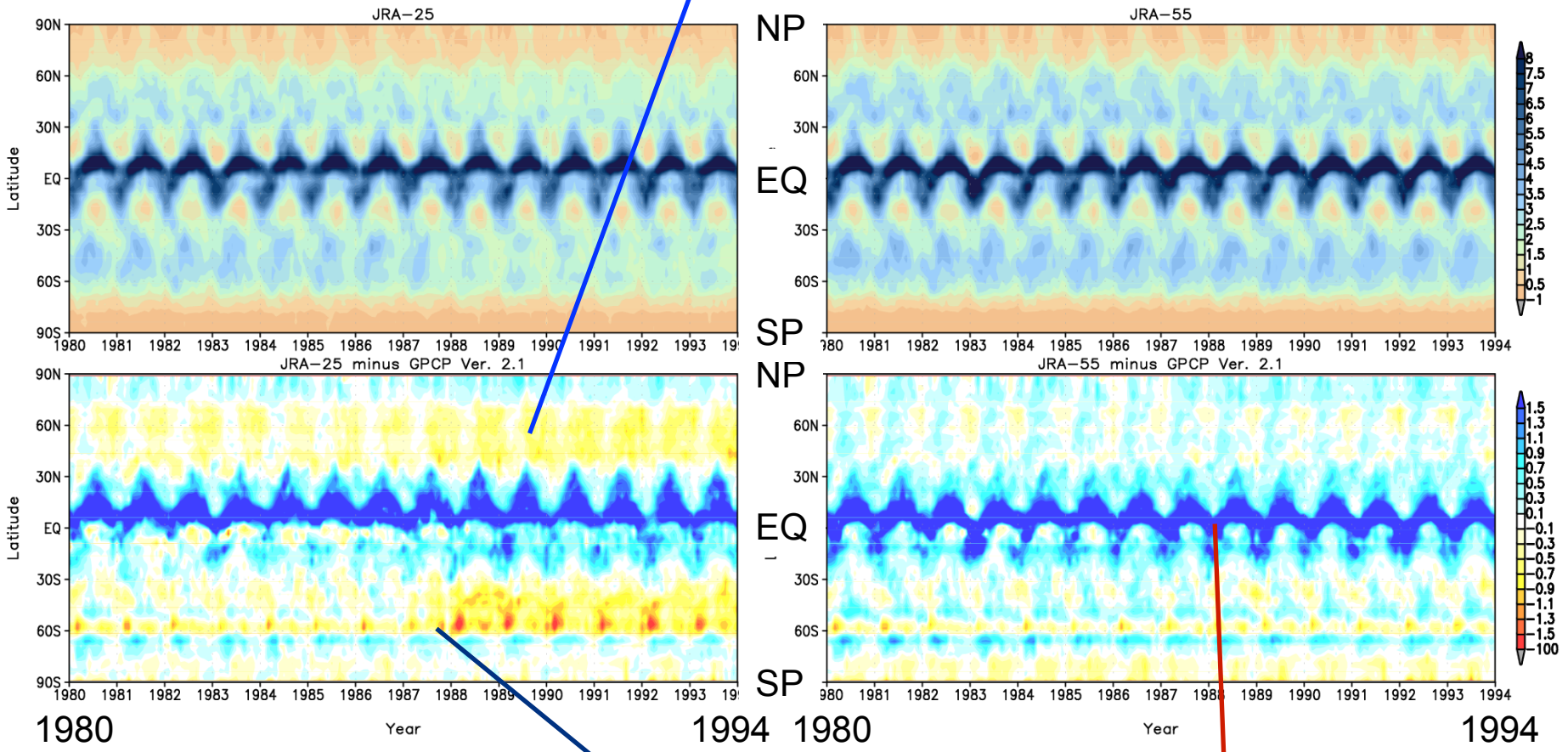
Zonal Mean Precipitation

Reanalysis

JRA-25

JRA-55

dry bias



Reanalysis - GPCP

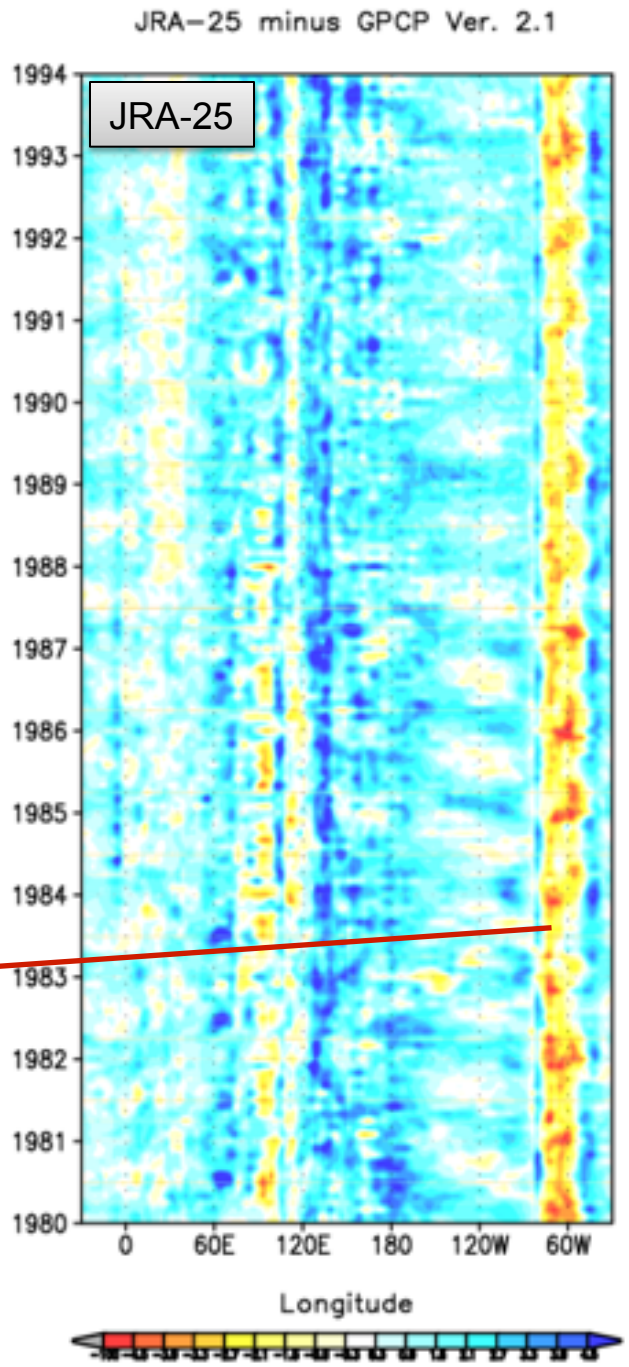
jump

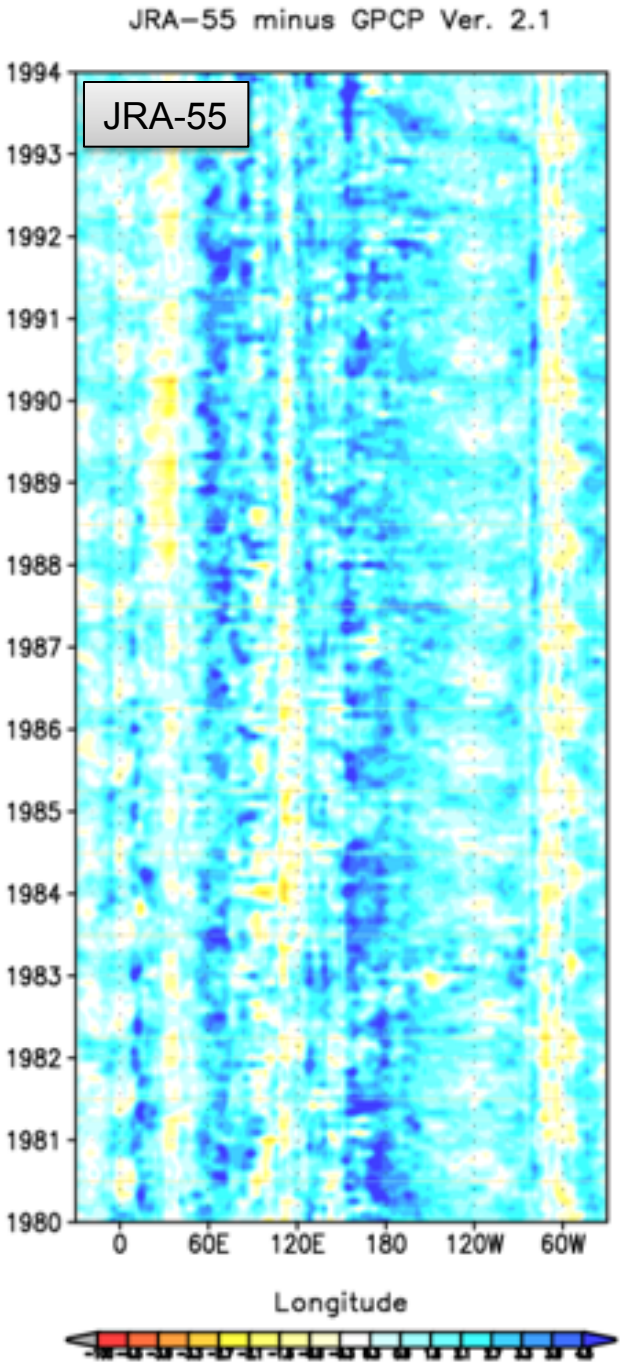
overestimation

Precipitation in the tropics

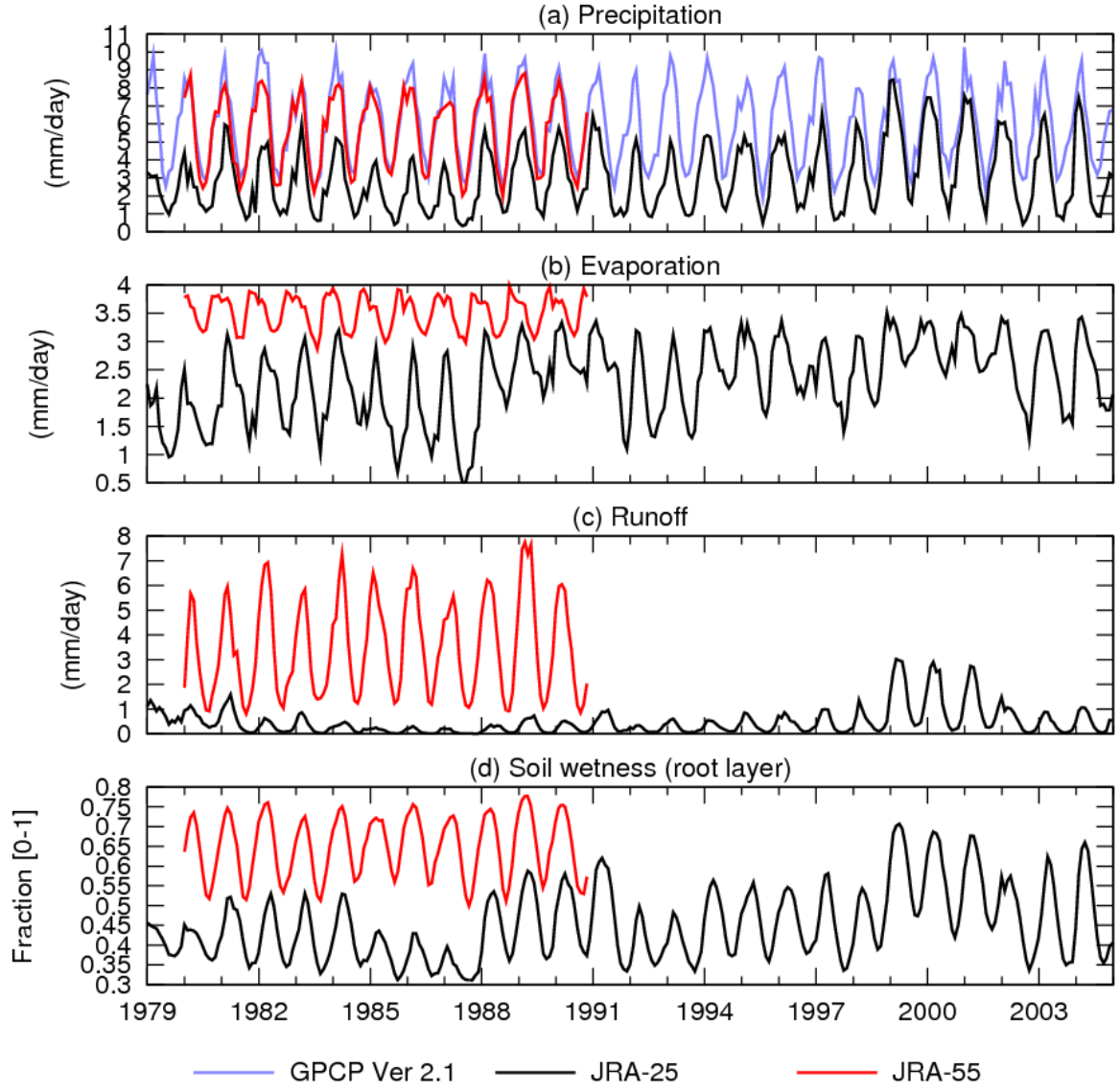
JRA - GPCP

Dry
Amazon basin





Water budget in Amazon

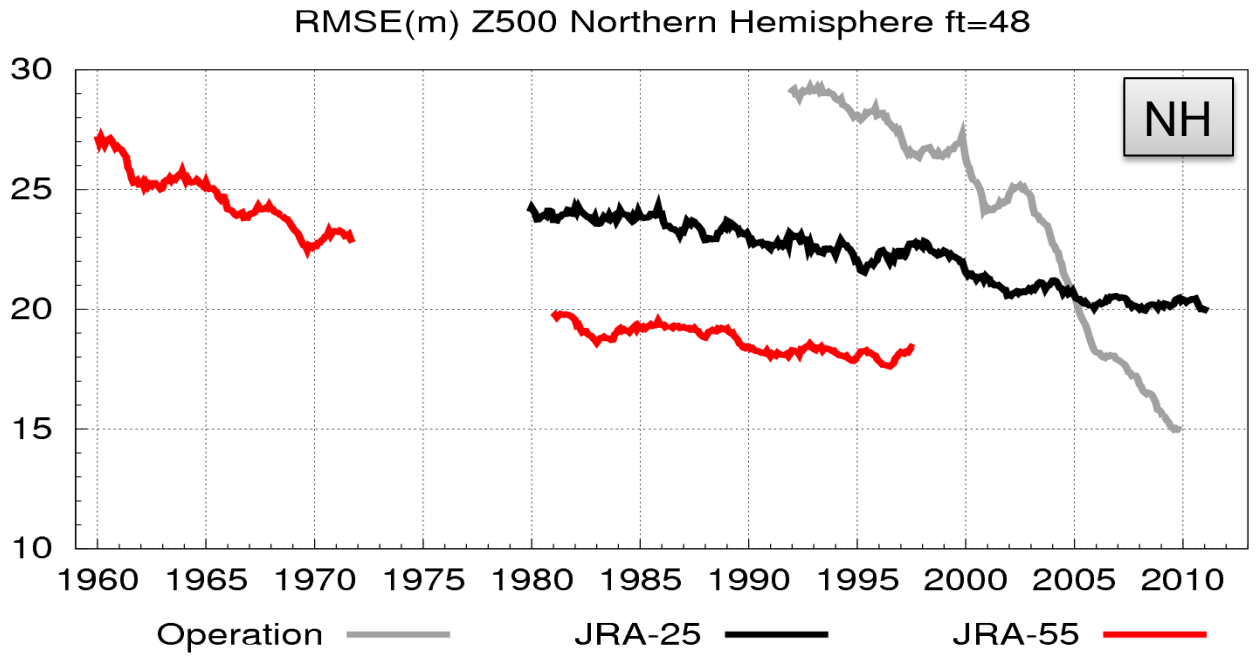


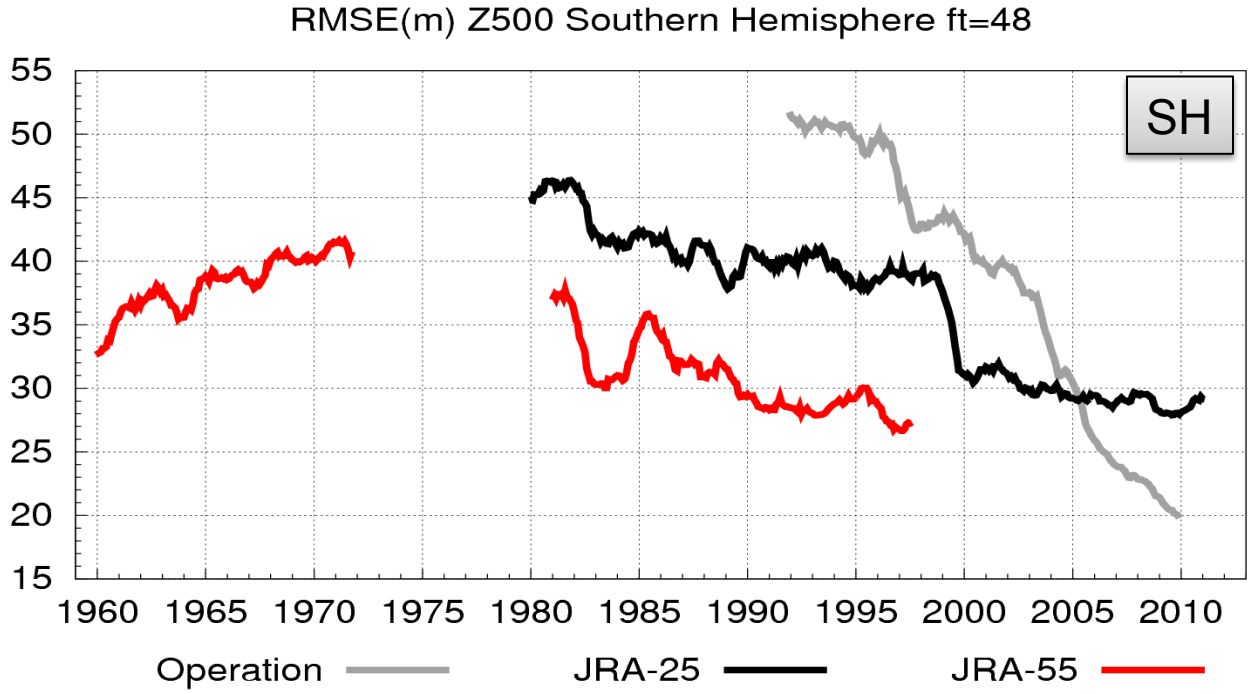
←Good agreement with GPCP

In JRA-25, *Unrealistic dry bias* is found over the Amazon River basin.

Comparison of Forecast Scores

RMSE of Z500 (48-hour forecast) for NH and SH





JRA-55 reference

- **Ebita et al. 2011**
  - Ayataka Ebita, Shinya Kobayashi, Yukinari Ota, Masami Moriya, Ryoji Kumabe, Kazutoshi Onogi, Yayoi Harada, Soichiro Yasui, Kengo Miyaoka, Kiyotoshi Takahashi, Hirotaka Kamahori, Chiaki Kobayashi, Hirokazu Endo, Motomu Soma, Yoshinori Oikawa and Takahisa Ishimizu
  - "The Japanese 55-year Reanalysis "JRA-55": An Interim Report", **SOLA,** Vol. 7, pp.149-152 (2011) .
  - http://www.jstage.jst.go.jp/article/sola/7/0/7_149/_article

- JRA-25 reference (Onogi et al. 2007, JMSJ)
  - http://www.jstage.jst.go.jp/article/jmsj/85/3/85_369/_article
  - So far, about 2,000 registered users from 66 countries

Thank you for your attention