

## JRA-55 FAMILY

JRA-55C (conventional) and JRA-55AMIP are provided as unique extra JRA-55 products to highlight the impacts of observational systems and model biases. JRA-55C is suitable for studies of climate change and multi-decadal variability because it is a homogeneous dataset covering an extended period.

**JRA-55:** Full observing system reanalysis

**JRA-55C:** Fixed observing system reanalysis

with conventional observations only, such as surface, radiosonde, tropical cyclone retrieval and windprofiler

**JRA-55AMIP:** AMIP-type run

without observation assimilation

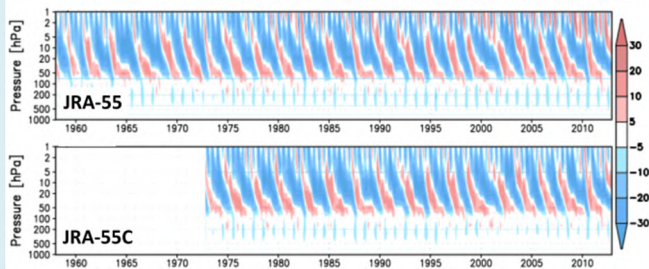


Fig: Time-height cross section of equatorial (5°S – 5°N) zonal mean U-wind from 1958 to 2012 shown in JRA-55 and JRA-55C. The unit is m/s.

The Quasi-Biennial Oscillation in the lower stratosphere is apparent in JRA-55C despite the low number of assimilated observational data.

## REFERENCES

### JRA-55:

Kobayashi, S. et al., 2015: The JRA-55 reanalysis: General specifications and basic characteristics, *JMSJ*, 93(1), 5-48, doi:10.2151/jmsj.2015-001.

Ebita, A. et al., 2011: The Japanese 55-year reanalysis "JRA-55": An interim report, *SOLA*, 7, 149-152, doi:10.2151/sola.2011-038.

### JRA-55C:

Kobayashi, C. et al., 2014: Preliminary results of the JRA-55C, an atmospheric reanalysis assimilating conventional observations only, *SOLA*, 10, 78-82, doi:10.2151/sola.2014-016.

## PRODUCT AVAILABILITY

JRA-55 can be downloaded free from the website shown below. Near-real-time data are updated daily on JDDS. JRA-55 provides data on a variety of physical elements in GRIB format. Basic JRA-55C and JRA-55AMIP products are scheduled for release in the future.

**Register to set up an account!**

### JMA Data Distribution System (JDDS)

[http://jra.kishou.go.jp/JRA-55/index\\_en.html](http://jra.kishou.go.jp/JRA-55/index_en.html)

### Data Integration and Analysis System (DIAS)

<http://dias-dmg.tkl.iis.u-tokyo.ac.jp/dmm/doc/JRA-55-DIAS-en.html>

### NCAR

Daily three- and six-hourly data

<http://rda.ucar.edu/datasets/ds628.0/>

Monthly Means and Variances

<http://rda.ucar.edu/datasets/ds628.1/>

**For more details, see the JRA-55 website**

[http://jra.kishou.go.jp/JRA-55/index\\_en.html](http://jra.kishou.go.jp/JRA-55/index_en.html)

## JRA-55 – the Japanese 55-year Reanalysis

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### Latest News

#### 29 September 2014 **NEW**

The JRA-55 comprehensive report (Kobayashi et al. 2015) has been accepted on 18th September 2014 for an article for publications in *JMSJ* volume 93, No. 1.

Early Online Release of the article has been uploaded. [New / Update !](#)

#### 06 June 2014

The JRA-55 manual 1.25-degree latitude/longitude grid data is updated. [New / Update !](#)

The JRA-55 manual model grid data (TL319L60) is updated. [New / Update !](#)

#### 10 March 2014

The JRA-55 manual 1.25-degree latitude/longitude grid data is updated.

The JRA-55 manual model grid data (TL319L60) is released.

The JRA-55 model grid data (TL319L60) distribution has been started.

#### 29 January 2014

Near-real-time JRA-55 latitude/longitude gridded data distribution begins.

JRA-55 latitude/longitude gridded data (2013) distribution begins.

## CONTACT ADDRESS

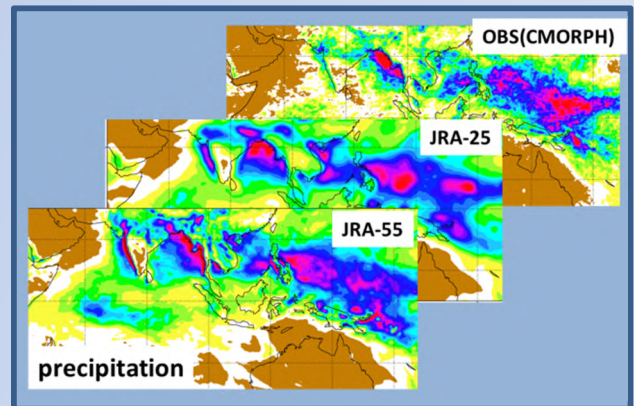
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# JRA-55

## The Japanese 55-year Reanalysis



The number five is pronounced **go** in Japanese. So the JRA-55 is called **JRA go! go!**



**Japan Meteorological Agency**



## OUTLINE

In response to the success of JRA-25, JMA conducted the second Japanese global reanalysis, called **JRA-55**. The project involved comprehensive global atmospheric reanalysis based on four-dimensional variational analysis (**4D-Var**) for the last half of the 20th century (**1958 onward**). As a result, the two major biases found in JRA-25 have been significantly alleviated and the temporal consistency of temperature analysis is also better than that of previous analysis products.

The high-quality and long-term JRA-55 data produced are suitable for studies on climate change and multi-decadal variability as well as for the monitoring of current climate systems.

## DATA ASSIMILATION SYSTEM

The data assimilation system is based on JMA's operational model as of December 2009, and improves on JRA-25 in many ways. Enhancements include a revision of the radiation scheme and the introduction of 4D-Var and variational bias correction (VarBC) for satellite radiances. These upgrades significantly reduce model biases, enhance the dynamical consistency of analysis fields and advance the handling of satellite radiances.

Resolution & levels	TL319 (~ 55 km), 60 levels up to 0.1 hPa
Advection scheme	Semi-Lagrangian
Assimilation	4D-Var, 6h time window, T106 inner model
Satellite radiance bias correction	VarBC (Dee and Uppala 2009)
Radiative transfer model for satellite	RTTOV-9.3 (Saunders et al. 2008)
Long wave radiation scheme	Line absorptions; Pre-computed Transmittance Tables and k-distribution (Chou et al. 2001) Water vapor continuum (e-type and p-type); Zhong and Haigh (1995) with MK_CKD V1.0 Radiatively active gases; H <sub>2</sub> O, O <sub>3</sub> , CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, CFC-11, CFC-12, HCFC-22

Short wave radiation	Absorptions by H <sub>2</sub> O; Briegleb (1992) Absorptions by O <sub>2</sub> , O <sub>3</sub> and CO <sub>2</sub> ; Freidenreich and Ramaswamy (1999)
Ozone	Until 1978; Climatology From 1979 onward; T42L68 version of MRI-CCM1 (Shibata et al. 2005)
Greenhouse gases	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, CFC-11, CFC-12, HCFC-22 (historical concentrations)

## DATA

The observational data adopted for JRA-55 were primarily those used in ERA-40 in addition to information archived by JMA. The ERA-40 observational dataset was supplied to JMA by ECMWF for use in JRA-25.

Observations for the period from 1979 onward are basically the same as those used in JRA-25. Newly available observational datasets were also collected and used whenever possible.

### Major data source

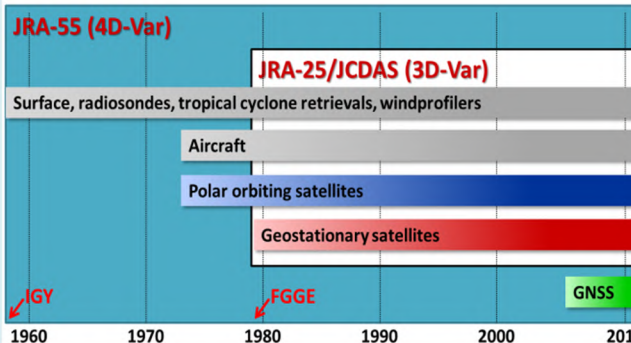
The ERA-40 observational dataset supplied by ECMWF

### Homogenization

RAOBCORE v1.4 (Haimberger et al. 2008) 1958 – 2006  
RAOBCORE v1.5 (Haimberger et al. 2012) 2007 – 2012

### Reprocessed satellite observations

GMS, GOES-9 and MTSAT-1R (MSC/JMA), METEOSAT (EUMETSAT), TMI (NASA, JAXA), AMSR-E (JAXA), QuikSCAT (NASA/PO.DAAC), AMI (ESA), GNSS-RO (UCAR)



## RESULTS

Thanks to a state-of-the-art assimilation system and sophisticated observational data handling incorporating QC, the JRA-55 datasets generally shows better quality than other products.

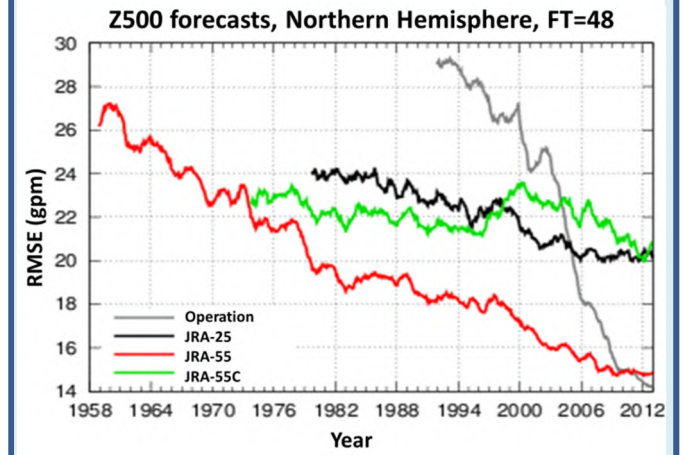


Fig: Time-series representation of RMS errors in 48-hour forecasts for geopotential height (gpm) at 500 hPa verified against own analysis.

RMS errors are significantly reduced in JRA-55 thanks to the application of the latest JMA data assimilation system.

### Frequency of daily precipitation correlation against TRMM

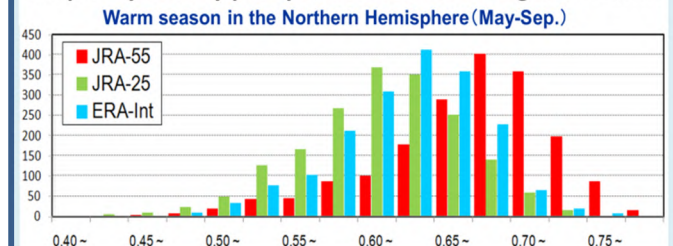


Fig: Frequency of spatial correlation for daily precipitation over the tropical region (22°S – 22°N) against TRMM from 1998 to 2009.

JRA-55 shows a higher spatial correlation for daily precipitation against TRMM observational data than JRA-25 and ERA-Int.