

Kobayashi, S., Y. Ota, Y. Harada, A. Ebata, M. Moriya, H. Onoda, K. Onogi, H. Kamahori, C. Kobayashi, H. Endo, K. Miyaoka, and K. Takahashi: The JRA-55 Reanalysis: General specifications and basic characteristics. *J. Meteor. Soc. Japan*, **93**, 5-48.

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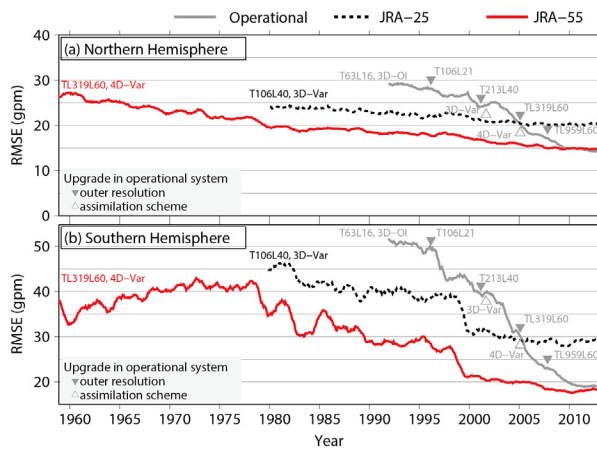


Figure 1. RMS errors of 2-day forecasts of the geopotential height at 500 hPa averaged over the extratropics of the (a) Northern and (b) Southern Hemispheres from JRA-25, JRA-55 and JMA operational system, verified against their own analyses. Changes in the assimilation scheme and resolution of the outer model are also noted. Each value represents the average for the last 12 months.

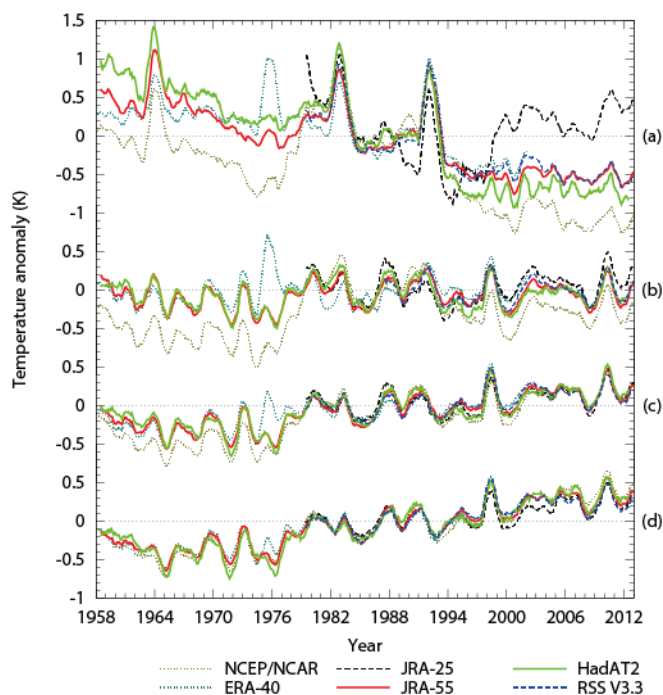


Figure 2. Twelve-month running mean temperature anomalies for the (a) lower stratosphere, (b) upper troposphere, (c) middle troposphere and (d) lower troposphere averaged over 82.5°N to 82.5°S. Time series from RSS V3.3 represents measurements by the MSU channel 4, 3 and 2, and the lower tropospheric extrapolations, whereas those from HadAT2, the NCEP/NCAR reanalysis, ERA-40, JRA-25 and JRA-55 are MSU equivalent brightness temperatures. Anomalies for each dataset were defined relative to their own climatological monthly means over 1979–1998.

- The Japan Meteorological Agency (JMA) conducted the second Japanese global atmospheric reanalysis, called the Japanese 55-year Reanalysis or JRA-55. It covers the period starting in 1958, when regular radiosonde observations began on a global basis. JRA-55 is the first comprehensive reanalysis that has covered the last half-century since the European Centre for Medium-Range Weather Forecasts 45-year Reanalysis (ERA-40), and is the first one to apply four-dimensional variational analysis to this period.
- JRA-55 has been produced with the TL319 version of JMA's operational data assimilation system as of December 2009, which was extensively improved since the Japanese 25-year Reanalysis (JRA-25). It also uses many newly available and improved past observations. The resulting reanalysis products are considerably better than the JRA-25 product (Fig. 1).
- Two major problems of JRA-25 were a cold bias in the lower stratosphere, which has been diminished, and a dry bias in the Amazon basin, which has been mitigated.
- The temporal consistency of temperature analysis has also been considerably improved compared to previous reanalysis products (Fig. 2).