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## Early results of the evaluation of the JRA-3Q reanalysis

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The Japan Meteorological Agency (JMA) is conducting the third Japanese global atmospheric reanalysis named Japanese Reanalysis for Three Quarters of a Century (JRA-3Q) using the JMA operational data assimilation system that has been upgraded and improved since the Japanese 55-year Reanalysis (JRA-55) was conducted. Main points of improvement in the specifications of the data assimilation system are as follows (specifications of the JRA-55 data assimilation system are shown in parentheses for comparison): Vertical levels are increased up to 100 (60) layers; The top level of the system is 0.01 (0.1) hPa; The inner model resolution for 4D-Var is also increased up to TL319 (T106); Various parameterization schemes have been improved and several new schemes have been implemented. In addition, we use observations newly rescued and digitized by the ERA-CLIM and other projects as well as newly reprocessed and improved satellite observations. As for GNSS radio occultation, bending angle is assimilated up to 60 km (refractivity up to 30 km).

The early results show that both overestimation of precipitation in the tropics and dry bias in the middle troposphere are diminished compared with those in JRA-55, and the representation of diabatic heating rate is also improved. In addition, biases of surface heat fluxes and radiation fluxes at the top of the atmosphere are also reduced.