Naoe, H., C. Kobayashi, S. Kobayashi, Y. Kosaka, and K. Shibata, 2025: Representation of Quasi-Biennial Oscillation in JRA-3Q. *J. Meteor. Soc. Japan*, **93**, http://doi.org/10.2151/jmsj.2025-012.

Plain Language Summary: This study evaluates the representation of the quasi-biennial oscillation (QBO) in zonal wind and temperature in JRA-3Q, with a focus on its temporal consistency during both the post- and pre-satellite eras. To achieve this, we compare the low-frequency variability and trends in the JRA-3Q QBO during the post-satellite era with those from other reanalyses, including JRA-55, -55C, ERA5, and MERRA2, as well as observational datasets.

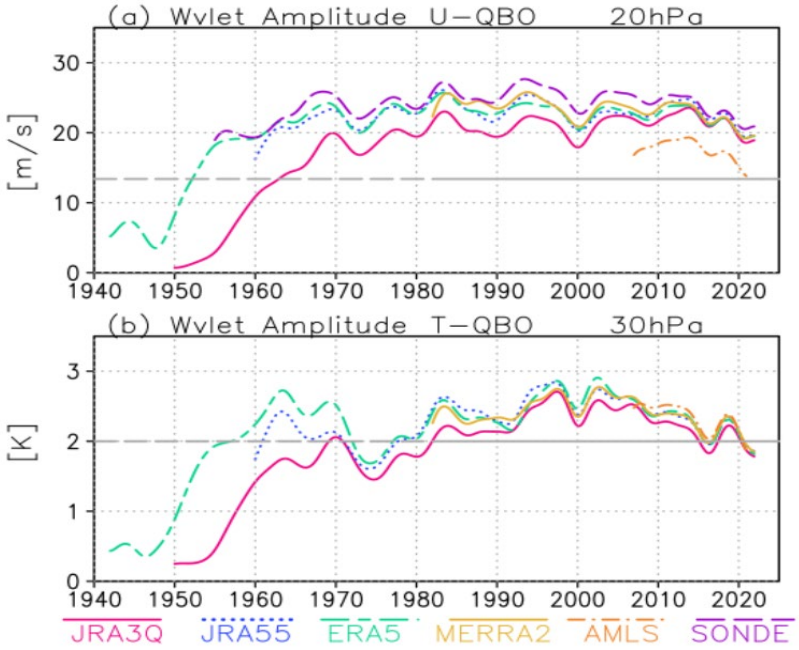

Figure 1. Time series of amplitude of wavelet power over the range of 20 to 40 months (QBO) for (a) zonal wind at 20 hPa and (b) temperature at 30 hPa for JRA-3Q (solid magenta), JRA-55 (dotted blue), ERA5 (long short dash aqua), MERRA-2 (solid yellow), AMLS (dot dash orange), and sonde observations (long dash purple). the gray horizontal line represents the 95% confidence level, evaluated from satellite era in 1980–2022. The dashed part is its extension to the pre-satellite era.

- A novel feature of the validation is the quantification of disagreement between the post- and pre-satellite eras, derived from the red noise background spectrum based on the post-satellite era.
- In the satellite era, the QBO amplitudes of the zonal wind and temperature at 20–30 hPa are somewhat reduced in JRA-3Q by about 8% and 4%, respectively, compared to other reanalyses.
- QBOs remain a challenge especially with high-resolution models. 1) How to tune the high-resolution-version QBOs to match lower-resolution versions set up for climate when restricted to outputs over the short numerical weather prediction timescales. 2) How to sustain QBO amplitudes further into the past with limited data availability.