

Details of the bug in JRA-25/JCDAS isobaric three-dimensional diagnostics (fcst_phy3m25)

1. The cause of the bug

In the JRA-25 reanalysis / the JMA Climate Data Assimilation System (JCDAS), the isobaric three-dimensional diagnostics (fcst_phy3m25) are produced by vertical interpolation from the model-level¹ three-dimensional diagnostics (fcst_phy3m). In this vertical interpolation, pressures at full-levels (near the centre of each model layer) should have been used as pressures representing each model layer, but actually, those at half-levels (at boundaries with the layers above and below) were used (more specifically at the boundary with the layer below). Consequently, interpolated vertical profiles of the isobaric diagnostics were shifted downward by half a model layer. As an example, Fig. 1 shows vertical profiles of solar radiative heating rates, in which the isobaric data (red) should by rights follow the model-level data (black), but are shifted slightly downward.

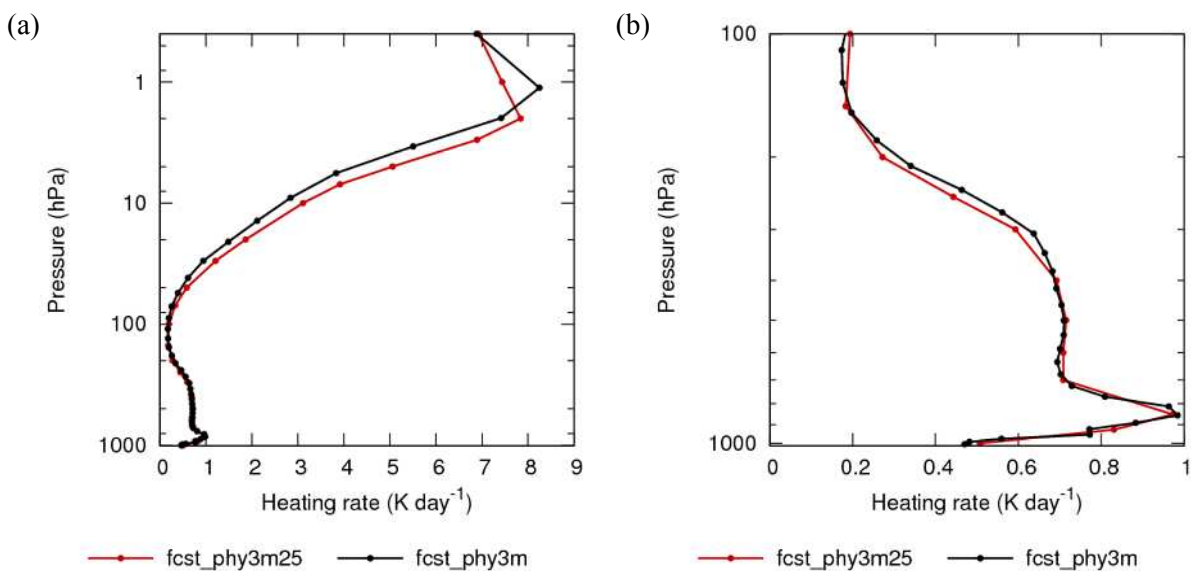


Fig. 1. Vertical profiles of solar radiation heating rates.

(a) 1000 – 0.4 hPa and (b) 1000 – 100 hPa, averaged over ocean for December 2004. Red lines indicate isobaric three-dimensional diagnostics (fcst_phy3m25) and black lines model-level three-dimensional diagnostics (fcst_phy3m).

2. Affected data

The aforementioned bug has affected the fcst_phy3m25 data over the whole reanalysis period of JRA-25/JCDAS (from January 1979 to January 2014).

As for the other data, there is no impact.

¹ For more details of the model levels, see http://jra.kishou.go.jp/JRA-25/hybrid_definitions_en.html.