

Impact of snow depth analysis bugs on the JRA-55 product

Related document: JMA notice of 18 December 2015

Impact of snow depth analysis bugs on the JRA-55 product

Present

- Snow depth (and water equivalent of accumulated snow depth)
- Upward solar radiation flux
- Sensible heat flux

Absent

- Other products including atmospheric variables* such as temperature and wind

JMA's notice of 18 December 2015 gave an overview and described the causes of bugs in JRA-55 snow depth analysis in relation to the data assimilation system used. The present document details the variables affected by the bugs and provides points to be noted in conjunction with the use of these data.

- Snow depth (and water equivalent of accumulated snow depth)
For some areas within 600 km of the coast, snow depth values were found to be unrealistically high or low.
- Upward solar radiation flux
In places where snow depth values were found to be unrealistically low, values for upward solar radiation flux (mainly reflected solar radiation flux at the surface) were insufficient due to erroneous underestimation of surface reflectivity.
- Sensible heat flux
In places where snow depth values were found to be unrealistically low, surface reflectivity was erroneously underestimated. Consequently, values for sensible heat flux from the atmosphere to the surface became insufficient to offset the over-absorbed solar radiation energy.

Section S1 of the supplement provides a list of files containing variables affected by the bugs, and the JRA-55 website provides masking data (JRA-55_mask_en.zip) to specify affected grid points and periods. Users are advised to check the masking data in order to determine potential impacts (Section S2 of the supplement).

JMA's notice of 18 December 2015 contained several errors in the list of periods and grid points affected by the bugs. For details, see Section S3 of the supplement.

JMA sincerely apologizes for any inconvenience caused by this problem, and remains committed to implementing all necessary measures for the prevention of any recurrence.

Questions regarding this matter can be directed to jra@met.kishou.go.jp.

- Supplement
 - Impact of snow depth analysis bugs on the JRA-55 product (detailed version):
quality_issues_20160518_supp_en.pdf
- Numerical information
 - Masking data for reference in determining grid points and periods affected by the bugs:
JRA-55_mask_en.zip

* Notes on atmospheric variables such as temperature and wind

The bugs impact only values for snow depth, upward solar radiation flux and sensible heat flux. The quality of atmospheric variables such as temperature and wind remains unaffected.

There are no impacts on atmospheric data assimilation, which is performed separately from the snow depth data assimilation that contained the bugs. The issue had a detrimental effect on upward solar radiation flux and sensible heat flux data, which are closely linked to snow presence/absence and were not constrained by observation through data assimilation. Atmospheric variables such as temperature and wind were unaffected due to such constraint.

Data assimilation is essentially a technique for observation-based correction of forecasts from numerical weather prediction models, thereby producing analysis (i.e., physically consistent, spatially homogeneous estimates of atmospheric conditions) for a particular point in time. In JRA-55, it is performed using as many observations as possible from various sources such as surface stations, radiosondes, ships and satellites.