

JRA-3Q Usage

Local issues with sea ice parameters

Outline

The Japanese Reanalysis for Three Quarters of a Century (JRA-3Q) contained errors in ice cover for the period from June 1985 to April 2013. As a result, values within around 250 km surrounding the relevant area (with coverage of 0.1 or above), which should be 0.0, is reported as an average of 0.15. However, the difference is only a fraction of the standard deviation in year-to-year variation, and effects on JRA-3Q quality are local and minor.

Cause

In this processing, values for ice cover analysis in the 0.25-degree latitude/longitude grid (horizontal resolution: approx. 25 km) for June 1985 onward were converted to the forecast model grid system (horizontal resolution: approx. 40 km) and used as lower boundary conditions. To prevent unintended open-ice areas in coastal areas due to differences in land-sea distribution between the two systems, sea ice areas were expanded by several grids before the system transformation. For ice cover from June 1985 to April 2013, this treatment (used only for coastal areas) was also applied to sea ice in open-ocean areas.

Effects

Table 1 shows the related period and relevant parameters. Figures 1 to 4 show differences between pre-/post-error experiments conducted to evaluate effects for February 2017 (the Northern Hemisphere sea ice maximum period). The area within around 250 km of the sea ice area averages approximately 0.15, where ice cover should be 0.0. Other effects include increased surface upward short-wave radiation flux, reduced surface upward long-wave radiation and sensible/latent heat fluxes, reduced 2-m temperature and increased 2-m relative humidity. These differences represent only a fraction of standard deviation in year-to-year variation, but should be noted in reference to sea ice data for this period.

There are no errors in grid system data outside June 1985 to April 2013.

Table 1 Quality issues relating to sea-ice errors

Period	June 1985 to April 2013
Parameters	<p>(Around sea ice areas)</p> <ul style="list-style-type: none"> • Ice cover • Surface upward short-wave radiation flux • Surface upward long-wave radiation flux • Sensible/latent heat fluxes • Surface temperature/relative humidity

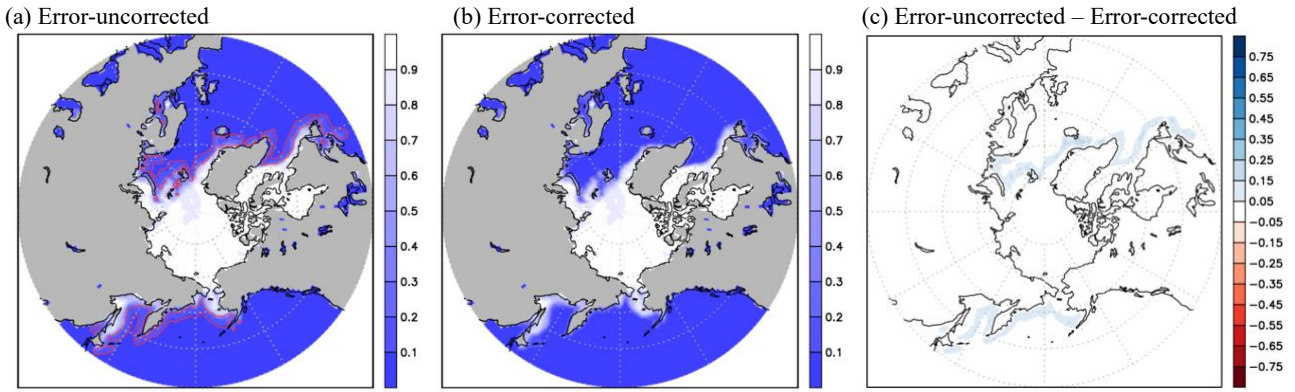


Fig. 1 Effects of incorrect ice-cover handling for the Northern Hemisphere (1)

Ice cover (proportions) for February 15, 2017. The red line in (a) indicates erroneous sea ice spread. Since the value of the adjacent grid is used, the average is around 0.15.

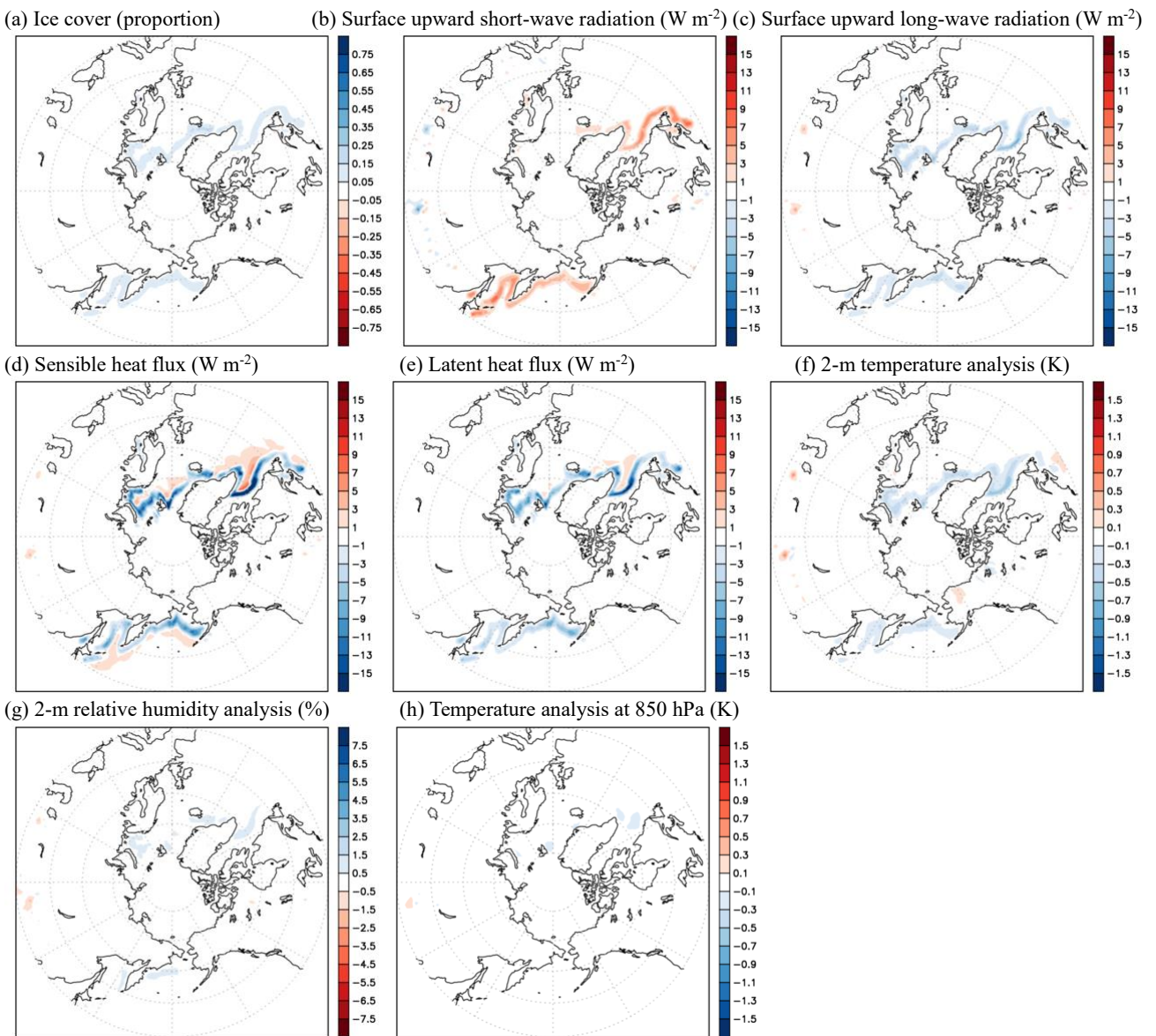


Fig. 2 Effects of incorrect ice-cover handling for the Northern Hemisphere (2)

Monthly mean differences between incorrect and correct handling of ice cover for February 2017

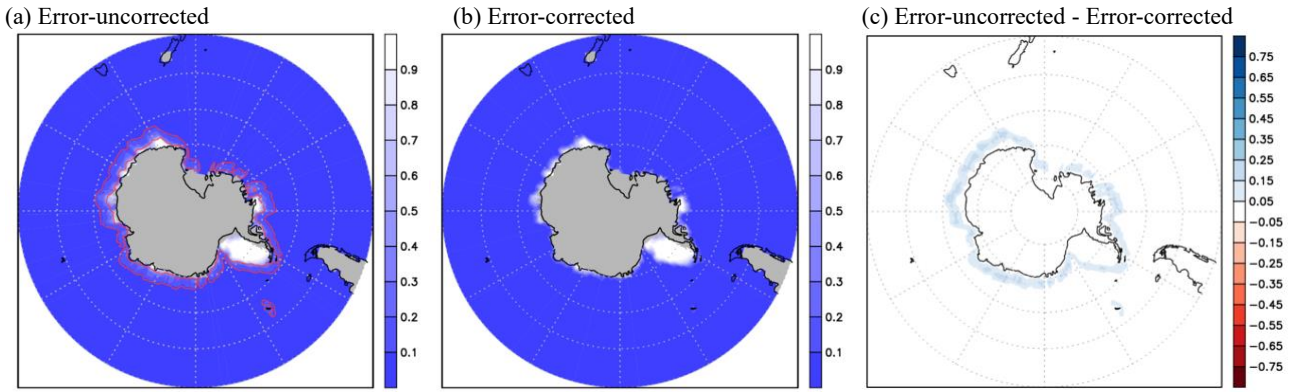


Fig. 3 Effects of incorrect ice-cover handling for the Southern Hemisphere (1)

Ice cover (proportions) for February 15, 2017. The red line in (a) indicates erroneous sea spread. Since the value of the adjacent grid is used, the average is around 0.15.

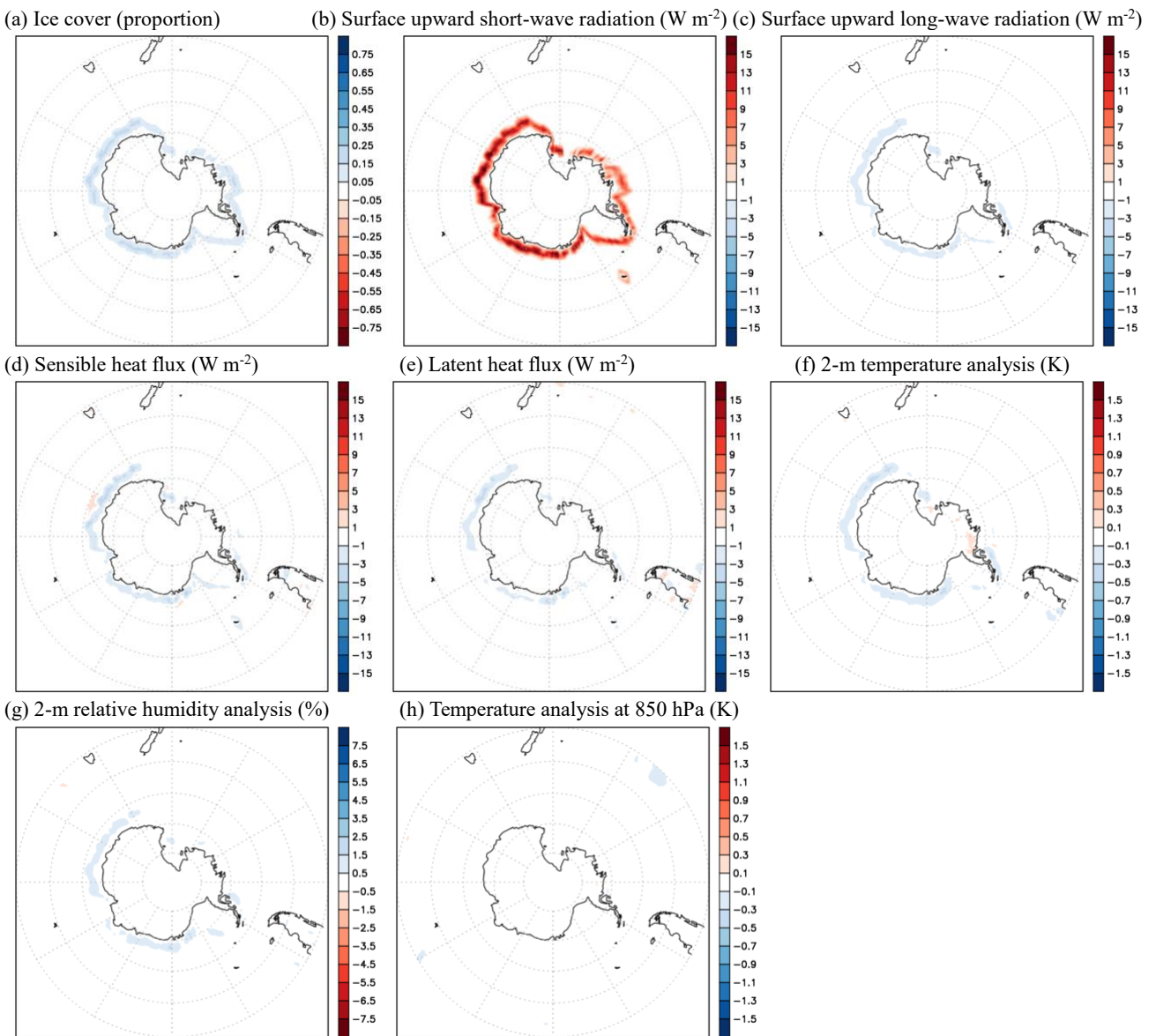


Fig. 4 Effects of incorrect ice-cover handling for the Southern Hemisphere (2)

Monthly mean differences between incorrect and correct handling of ice cover for February 2017