Aonashi K., T. Tashima, T. Kubota, and K. Okamoto, 2021: Introduction of a mixed lognormal probability distribution function and a new displacement correction method for precipitation to the ensemble-based variational assimilation of the all-sky microwave imager brightness temperatures. *J. Meteor. Soc. Japan*, **99**, 1201-1230.
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Plain Language Summary: The brightness temperatures (TBs) obtained from the satellite microwave imager (MWI) provide global information about water substances. To achieve improved assimilation of all-sky MWI TBs into a cloud-resolving model (CRM), this study introduced a mixed lognormal distribution for the precipitation probability distribution function (PDF) model and a new displacement correction method using PDF pseudo-regimes for precipitation to an ensemble-based variational assimilation scheme.

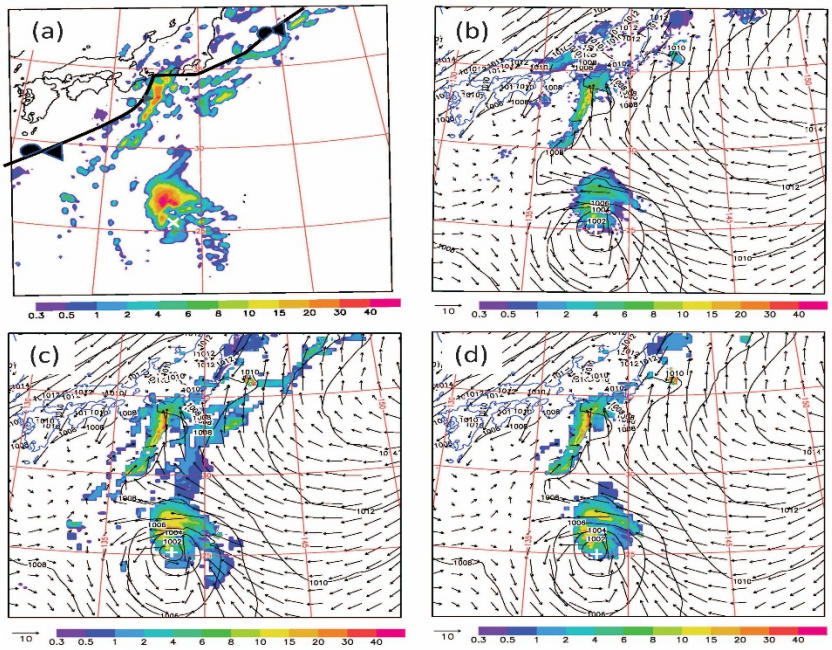

Figure 1: The GSMaP surface precipitation in mm h^{-1} for 14 UTC, September 7, 2015.
(b) The analyses for precipitation in mm h^{-1} (shade), pressure in hPa(contours), and horizontal winds at surface (arrows) given by a conventional scheme adopting a single normal PDF regime.
(c) Same as (b) but by the scheme of this study.
(d) Same as (b) but by the experiment using only the mixed lognormal PDF.

Highlight

- The mixed lognormal PDF strengthened the precipitation analysis of heavy-rain areas.
- The pseudo-regimes reduced the precipitation displacement error of the analysis.
- The assimilation of TBs improved the CRM forecasts for precipitation distribution up to 12 h and the typhoon position and central surface pressure for >24 h.