CORRESPONDENCE

Comments on "A Comparison of Temperature and Wind Measurements from ACARS-Equipped Aircraft and Rawinsondes"

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This comment is intended to identify an error in the label for Table 7 in Schwartz and Benjamin (1995, hereafter SB95). The label should have read "Statistics for rawinsonde − ACARS matched data...," meaning that for this sample, rawinsondes were warmer than aircraft data by a mean value of 0.22 K for these ascent/descent aircraft observations from 0 to 9144 m ASL (flight level 300), thus excluding en route levels for 300–150 hPa. Other tables and text in SB95 correctly identified rawinsonde observations as being slightly warmer than aircraft in the lower–middle-troposphere layer considered in that collocation study.

Figure 1 shows new results from 2015 to 2016, also with rawinsonde − aircraft temperature differences. This new result uses gridded fields from the Rapid Refresh (RAP) model (Benjamin et al. 2016) for 0-, 3-, and 12-h forecasts valid at 0000 UTC over the conterminous United States (CONUS) as a common comparison for both rawinsondes and aircraft. Relative to the same RAP forecasts, rawinsonde observations appear to be slightly warmer than aircraft observations in the lower troposphere, which is partially consistent with SB95, including its corrected label for Table 7. At the same time, for the upper and midtroposphere (600–150 hPa), rawinsonde observations are cooler than aircraft observations (or conversely, aircraft observations are warmer than rawinsonde observations), which is also consistent with many studies, including Cardinali et al. (2003), Ballish and Kumar (2008), and Petersen et al. (2016, their Fig. 10).

The results shown here assume that aircraft observations are sufficiently evenly distributed geographically across the CONUS to allow this rough comparison with rawinsonde observations, which have an even geographical spread by network design. Approximately the same dependence with height for this temperature bias difference is apparent at all three forecast duration times (0, 3, and 12 h), less so for 1000–800 and more so for 700–200 hPa. Overall, rawinsonde − aircraft observation temperature differences are shown to be approximately 0.1–0.2 K (rawinsondes warmer) in the 1000–800-hPa layer and decreasing with height to −0.4 K (aircraft warmer) for 400–200 hPa, very

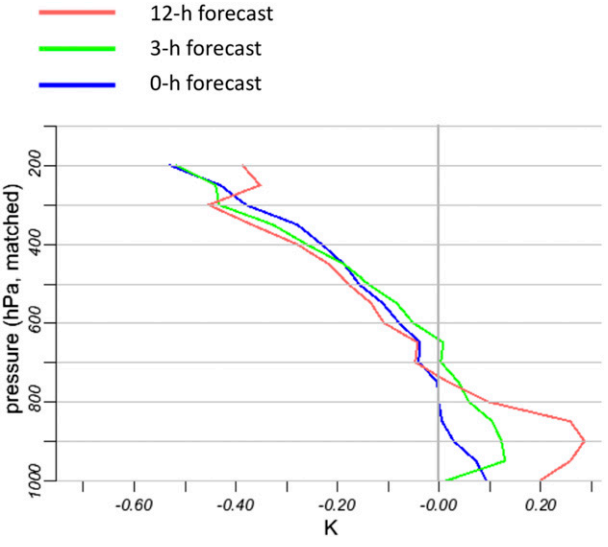

FIG. 1. Rawinsonde − aircraft temperature mean observation increments (observation − background) for RAP forecasts over the lower 48 United States for 14 Mar 2015–13 Apr 2016, excluding the period from mid-May through October 2015.

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roughly consistent with SB95 (corrected) and also with other studies focused on aircraft warm bias with respect to rawinsondes in the upper troposphere.

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