

## Review of the paper “EMADDC: high quality, quickly available and high-volume wind and temperature observations from aircraft using the MODE-S EHS infrastructure “

Dear authors:

Your paper is very nice to read and gives a comprehensive overview of the processing operationally MODE-S EHS temperature and wind data by EMADDC including necessary bias corrections of temperature and aircraft heading and true airspeed. It also shows some information of the MODE-S data quality by comparing the data with a model background and radiosondes. I think the article is well prepared, interesting to read with good readable illustrations and should be published in the Atmospheric Measurements Techniques paper

In the following I have only than minor comments and suggestions

- 1) In the abstract a short paragraph is missing where you describe what is new in your paper namely the correction of pressure through an improved heading and air speed resulting in a new Mach number resulting in a better temperature.
- 2) There is no reference of Figure 1 and Figure 2 in the text
- 3) Equation 1 needs some references
- 4) In line 49-50 the last sentence is not clear understandable
- 5) In line 58 correct reseceivers
- 6) In your description of the Mode-S EHS interrogation it is not clear to me which time stamp the observations get. Is there also a register for that or does the receiving radar gives the observation a time stamp ?
- 7) I think you can combine Section 2.2 and section 2.3 to get one larger section about Aircraft Dependent Surveillance data.
- 8) In Section 3 it is not clear to me which way you chose operationally to get better resolved Mach numbers
- 9) In Section 2.2 you mentioned the possible assimilation of the difference between GNSS height and pressure altitude. Than you assigned a question mark. Is that a speculation of the authors or to you have other information which are ot published ? Can you reformulate that sentence without a question mark.
- 10)In line 89 correct conains.
- 11) In table 1 there are two Vertical Rates listed. What is the difference between them ?
- 12) What is the difference between airspeed and true airspeed ?
- 13) In section 6.2 you mentioned that a temperature correction is constructed using NWP temperature information but it is never explained further how and at which point you correct temperature by using NWP data.
- 14) How do you use the corrected pressure further on. Does it replace the ps value in the formula (4) of the Mach number or how do you use Pcor. The whole section 6.2 can be reformulate to make the temperature bias correction clearer.

- 15) Does the corrected True airspeed also makes the derived temperature via the Mach number better ?
- 16) In section 8 how do you handle the ADS-B data? In the same way as Mode-S EHS data ?
- 17) In your result section you talk about flight levels and kilometers or pressure levels. For clarification it would be nice to assign the flight levels also a height in kilometers or a pressure level.
- 18) The description "The tables below" is unclear. Better to say Table 3 to 6 or so
- 19) Do you use the ECMWF analyses or a first guess (which) for comparison ?
- 20) For the wind direction verification do you discard small wind speeds ? This can become important especially near the surface.
- 21) Are the biases and errors compared to the ECMWF model comparable to AMDAR temperature and wind comparisons? Are the values in table 3 and 4 high or low ? Can you classify the results ?
- 22) In Table 3 and 4 the units are missing
- 23) In line 252 Table below again
- 24) The sentence in line 257 is unclear.
- 25) Can you further discuss why the Mode-S EHS temperature data are of less quality in the boundary layer beneath 850 hPa
- 26) The conclusions do not clearly describe the novelty of the work. Also, the comparison results between Mode-S data and NWP forecasts or radiosondes can be described in more detail