Interactive comment on “Advancements, measurement uncertainties, and recent comparisons of the NOAA frostpoint hygrometer” by Emrys G. Hall et al.

Anonymous Referee #3
Received and published: 8 July 2016

General:
I agree with the assessment of the two reviewers which already appeared in the open discussion: this is a very thorough study describing the functional principle, history, accuracy and reliability of the NOAA frostpoint hygrometer FPH, that recorded the important 30-year stratospheric water vapor series at Boulder, USA. The paper is well organized and fluently to read. I recommend it for publication in AMT and have only some minor remarks which are listed below in the specific comments.

Specific comments:

1. Page 1, line 17: ’... decreasing the uncertainty in the thermistor calibration fit to less than 0.01 °C over the full range of frostpoint temperatures (-93 °C to +20 °C) ...’
   For T > 0 °C the temperature of phase change is the dewpoint, so maybe better say ’... over the full range of frost- or dewpoint temperatures ...’. 

2. Page 1, line 19: ’... water vapor intercomparisons are presented, including the excellent agreement during AquaVIT-2 chamber experiments ...’
   Excellent agreement of what is presented ?

3. Page 1, lines 24 - 26: To my feeling these statements need references.

4. Page 2, 2nd paragraph: Here you might want to include a new reference pointing to the importance of long term stratospheric water vapor monitoring by balloon sounding:

5. Page 2, lines 17 - 22: Another recent publication where core hygrometers are compared (also showing results from the AquaVit-1 and 2, MACPEX, etc.) is:
In this study it is stated that the agreement of hygrometers has improved from overall up to 30 % or more to about 5–20 % at < 10 ppmv and to 0–15 % at > 10 ppmv.

6. Page 8, section 3.1 ff: It would be nice to convert errors and uncertainties of the frostpoint measurement in H$_2$O mixing ratios.