

***Interactive comment on* “Commentary on
“Measurements of ice supersaturations exceeding
100% at the cold tropical tropopause” by E.
Jensen et al.” by D. M. Murphy**

Anonymous Referee #2

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This commentary points out that instrumental artifacts may be responsible for the high saturation ratios presented by Jensen et al. In particular it is suggested that the routine temperature corrections applied will not be valid while the aircraft is in a banked turn. This systematic error would then propagate through the humidity calculations to give the high saturation ratios reported by Jensen et al.

While Murphy is right to be suspicious of measurements made in maneuvers that were not considered during calibration, there are a number of points to the argument that require some clarification.

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i) Figure 1. There is some correlation between roll and saturation ratio, but it is not totally convincing. I would like to see more examples.

ii) Figure 2 (and the text) indicates that the majority of the flight was flown with a 1-degree roll. This is very unlikely. A constant roll would mean that the pilot would have to fly with some rudder permanently applied to compensate, otherwise the aircraft would constantly be in a turn. If that were the case a constant offset in the yaw (yaw can be obtained through the combination of the gust system and inertial navigation system) should also be observed. Is this seen? It is more likely that there is simply a calibration problem with the roll variable for these flights. This possibility should be checked with the WB-57F operators.

iii) What was the average roll for the other flights? If the average roll on the other flights was zero, as suggested in the text, then the black curve in fig. 2 is the strongest evidence that the observed saturation ratios of ~ 2.2 are systematically overestimated by $\sim 30\%$ during a roll of 2degrees.

This commentary makes a valid statement about the accuracy of aircraft measurements during non-straight-and-level maneuvers. I have some concern with the analysis of the aircraft roll presented here, but if point iii (above) is borne out then this is a strong argument against the validity of the high saturation ratios presented by Jensen et al.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 2463, 2005.

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