Reply to referee #2

Thank you for your helpful comments. Our replies are denoted in cursive lettering.

The whole paper describes in detail the technique, how to derive the fractionation in the best way. This is good, and worth publishing. The only 'science' is in Fig. 9. Although AMT concentrates on the technique, a few words describing the meaning and importance of Figure 9 would be nice. This would enable the reader to understand why this detailed study is necessary for future studies of the water cycle.

A plot with curves on the delD-H2O space, like Figure 9, only makes sense if both delD and H2O are representative for the same water mass (i.e., only if H2O and delD have more or less the same kernels). This is far from being trivial for remote sensing data and the paper shows how it can be achieved.

In the context of Fig. 9 we will add a brief discussion about the kind of information that delD can add if observed together with H2O: conditions at source region, vertical transport processes, cloud processes, temperature at last condensation, etc. A good example is also given in the accompanying paper of Schneider et al., 2014 (accepted for AMTD).

All Figures need a more clear description in the panels and captions what is shown, indicating what is IASI, what in NDACC, what is H2O, dD etc.

We will go through all Figures and captions and improve the descriptions where necessary.

Fig. 1: It is not so easy to understand what is shown in the panels. A better description and/or abbreviations in the panels are necessary.

We will write in the Caption of Fig. 1 that it is kernels A, in the Caption of Fig. 2 that it is kernel A', and in the caption of Fig 4 that it is kernel A''. By the way: these Figures are very similar to what has been shown in the works of Schneider et al. (2012) and Pommier et al. (2014).

The explanation of Fig. 6 in the text is confusing, and the relation to Fig. 4 is not clear.

Fig. 6 shows simply the results of Eqs. 9 and 10. We will try to make this even more clear in the text. Better relating Fig. 6 and Fig. 4: we will write in the caption of Fig. 4 that it is the kernel A_l as used in the Equations (9) and (10).
