The paper presents and interprets δD and {H2O,δD} pair distributions obtained from IASI spectra for the North Atlantic region. It gives interesting insight into the possibilities of such measurements for investigating tropospheric moisture pathways. Similar studies have already been made during the project MUSICA and the respective results are published in several papers: Schneider et al. (2015), Dyroff et al. (2015), González et al. (2016), Schneider et al. (2016). The MUSICA works have been focused on demonstrating the quality and the potential of the remote sensing data whereas this study focuses more on the scientific interpretation of the data. So there are similarities but also clear differences with respect to the MUSICA studies and this new work is very interesting for the scientific community. However, I think it would be important to relate this new work better to the previous MUSICA studies, mention the similarities, and highlight the new aspects.

First, I would very much like to see a statement in the Abstract and/or in the Introduction Section telling the reader that for this new study IASI data generated by the ULB IASI retrieval processor (Lacour et al., 2012; Pommier et al., 2014) are used. In this new study the subtropical North Atlantic moisture pathways are studied for the first time with the ULB IASI retrieval processor data. The here presented data are not generated by the MUSICA MetOp/IASI retrieval processor (Schneider and Hase, 2011; Schneider et al., 2016). The MUSICA MetOp/IASI data have already been used previously for documenting the different moisture pathways in the subtropical North Atlantic region.
The technical details of these retrieval processor differences should maybe not be discussed in an ACP manuscript however, I think it is important to mention that there are different processors. The reason is that the retrieval processor differences can importantly affect the products (Worden et al., 2012, http://www.atmos-meas-tech.net/5/397/2012/): For instance, while the MUSICA processor works with a broad spectral window (Frank and Hase, 2011; Wiegele et al., 2014) similar to the new TES retrieval processor (Worden et al., 2012), the ULB IASI processor fits smaller spectral windows (Lacour et al., 2012). A brief summary of the differences of the processors is given in the Appendix of Schneider et al. (2016).

Second, I would like to recommend setting the here presented data interpretation approaches and the achieved results better in relation to the respective MUSICA activities. In my opinion it would be good to clarify what aspects have already been addressed in the MUSICA papers and what aspects go beyond previous MUSICA works. For example the interpretation of the MUSICA NDACC/FTIR and MUSICA MetOp/IASI {H2O,δD} remote sensing data as shown in Schneider et al. (2015 and 2016) is very similar to what is shown in this new paper in the Sections 3.1, 3.2, and 3.3. Some differences exist in the use of the backward trajectories (in the MUSICA studies the trajectories end at the last condensation point and here they can go beyond the condensation point) and this new work provides an analysis of individual months (taking the summer 2012 as example), whereas the MUSICA studies are mainly limited to an analyses of the overall situation.
Aspects that have not been addressed by the respective MUSICA studies or that have been addressed by using a different approach could then be better highlighted: For instance, Section 3.4 presents a geographically expanded picture if compared to the MUSICA studies and Section 4 shows that quantifying the strength of the Saharan boundary layer mixing signal is possible by a simple backward trajectory analyses whereas in MUSICA the link to the Saharan boundary layer has been documented by coinciding observations of dust concentrations.
The discussion of pathways (Section 5) has similarities to the MUSICA works, but also offers interesting new aspects, like the consideration of a wider geographic region. The clear message from the example study of July 2012 is that such satellite data can be really helpful for investigating geographically varying moisture pathways.

I have furthermore an important remark on the discussion provided in Section 2.4 and on the use of {H2O,δD} pair remote sensing data. As shown in Schneider et al. (2016, and references therein) it is important to ensure that the H2O and δD remote sensing products represent the same vertical altitudes, otherwise defective interpretations of the {H2O,δD} pair distributions are very likely. For this purpose the MUSICA {H2O,δD} pairs are generated by an a posteriori processing (the Type 2 product, which ensures that the {H2O,δD} pair distributions can be correctly interpreted). I think it would be important to clarify how this problem has been addressed for the here presented {H2O,δD} pair data.

I think it would be also important to mention that the transport out of the Saharan boundary layer to the atmosphere above the Canary Archipelago has been studied since many years mainly by the aerosol community (there are leading experts at the Izaña Observatory) and there are a lot of publications available, which I would like to recommend considering (e.g. Rodriguez et al., 2011, http://www.atmos-chem-phys.net/11/6663/2011/ or Rodríguez et al., 2015, http://www.atmos-chem-phys.net/15/7471/2015/, and references therein). Also interesting in this context could be to have a look on the works published for a current ACP/AMT special issue (http://www.atmos-chem-phys.net/special_issue382.html).

As a minor remark I would like to recommend not talking about “data above Izaña” (Izaña is a hill on Tenerife Island and the name of an observatory on this hill). When talking about a region that covers actually the whole Canary Archipelago I would like to recommend using something like “data representative for the Canary Archipelago region”.

Finally, I would like to recommend considering for the Introduction Section a reference to the review of Galewski et al. (2016, Rev. Geophys., 54, doi:10.1002/2015RG000512).