Response to interactive short comment by M. Fromm, doi:10.5194/acp-2015-974-SC1, 2016

The short comment is concerned that the present paper is not properly reconcilable with prior Biondi et al. papers, in terms of the anomaly approach used, and that the application of this anomaly technique now to "volcanic clouds" rather than "convective water-ice clouds" comes without adequate physical arguments as to the explanation of the anomaly signatures found.
Also there is an apparent misunderstanding of the RO profiles co-location approach used in the paper, which employs a core dataset of about 1300 RO profiles co-located with volcanic clouds and some complementary RO profile datasets from outside such clouds and outside eruption and post-eruption periods for reference purposes.
We thank the commentator for the effort of providing this input and think the following explanation of relevant key aspects of our approach—along with the associated improvements that we will include in the revised paper based on this short comment, an editor comment on Figure 3, and two referee comments—can clarify and alleviate the concerns:

The present paper is an exploratory feasibility study where we introduce a "novel technique *including* GPS radio occultation for detecting and monitoring volcanic clouds." *including* means, as already the abstract points out, that complementary ash and SO_2 data from radiometric measurements (AIRS, OMI) provide the location information to obtain the subset of those RO profiles only that are co-located with volcanic clouds. We can then use this core dataset (of about 1300 RO profiles) to learn about potential anomalous signatures from such clouds in the vertical thermal structure of the UTLS. This approach alleviates the concern that this co-located core ensemble may mix in RO profiles from outside such clouds. As a reference for these core results, several figures show the results in the context of complementary datasets taken intentionally from outside clouds and other time periods, in order to put the anomaly signature results from the core ensemble into context. For example, Figure 3 is of this sort, the explanation of which will also be further improved in the revised paper based on an editor comment.
Note also that we explain the characteristics of the input data and methods in Sections 3 and 4; we will also further improve there in the revised paper, related to making the definition of the geographic areas and collocation criteria for some of the datasets more clear.

On concerns with the anomaly technique and physical explanation. Technically we compute the anomaly profiles against collocated profiles extracted from a longterm reference RO climatology, i.e., we do it here the same way as for the Biondi et al. predecessor papers on convective cloud systems. We emphasize that this methodological approach (that we also briefly summarize again in the paper) is in no way dependent in its validity and viability on any physical arguments as to what causes some anomalous signature found—so that there is no basic concern for applying it, beyond its original Biondi et al use, also towards volcanic clouds. That is, irrespective of whether certain causative mechanisms induce warming (such as e.g. associated with absorption and local radiative heating by SO_2 clouds) or cooling (such as e.g. associated with the top of moist adiabatic convective updrafts), or any other anomalous signature, the anomaly technique will just help to isolate empirically whether there is some systematic deviation against normal climatological behavior for given datasets (e.g. cloud-effected vs outside-cloud).
Having found clear basic evidence for anomalous signatures associated with volcanic clouds, the physical interpretation is a separate matter, which we do in this initial paper intentionally only within a relatively modest tone and scope; more detailed future work will refine.
We finally note that we will improve some of the wording at a few places also related to this anomaly technique: in particular where the current wording "cloud top detection technique" is too sloppy we better refer to the technique more generally, i.e., beyond the specific aspect that anomaly profiles can be and are used to estimate cloud tops as one of the diagnostics.