Dear editor,

we are grateful for your valuable comments.

Main comment

Previous referee comment on previous version:
Line 441: Providing a theoretical value for ammonium bisulfate would be helpful.

After some literature research, we unfortunately have not found a theoretical value for ammonium bisulfate. We are grateful if the reviewer can provide us with some value. As ammonium bisulfate is little more hygroscopic as ammonium sulfate, we assume that a theoretical value will be little higher. We have added this assumption in the final version of the manuscript.

Editor comment:
Even if there is indeed no kappa directly given in the literature, the authors should be able to derive it based on the underlying equations and corresponding literature values. E.g. using measured growth factors and their equation 4 or using the estimate of the water activity, e.g. (Tang and Munkelwitz, 1994), and the equation set by (Petters and Kreidenweis, 2007) should allow an estimate of the kappa for ammonium bisulfate. The sentence in l. 453 could be replaced accordingly.

We have taken your main comment into account and calculated the κ-values using the Extended AIM Aerosol Thermodynamics Model. The text now reads as follows:

In general, relatively high HGFs were found for the spring campaign assuming ammonium sulfate or ammonium bisulfate being a major compound of the observed aerosol. While κ_{HTDMA} mean values range between 0.54 and 0.60 at RH = 85 % and between 0.46 and 0.51 at RH = 90 % (Table 4), for comparison a theoretical value for ammonium sulfate is calculated as 0.49 at RH = 89.7 % and 0.53 at RH 84.8 % using the Extended AIM Aerosol Thermodynamics Model (Clegg et al., 1998). Calculated values using the same model for ammonium bisulfate are 0.56 at RH = 89.8 % and 0.61 at RH = 84.9 %.

Technical comments

We have also addressed all the technical suggestions you made.

l. 18: Here and at other places in the manuscript, it seems redundant to write 'kappa' and □. Please either write out 'kappa' OR use the Greek Letter □, not both.

This is changed and the Greek Letter is used throughout the whole manuscript.

l. 40: why 'or ability to uptake water'? Isn't this the definition of hygroscopicity and thus should read then, 'i.e. the ability to take up water'?

This is changed now. The new text reads as follows:

"… which is the ability to take up water."

Figures 2 and 3: Correct the spelling of 'precipitation' on the y-axis and legend of panels a.

This is changed now.

l. 356: Please add a reference for ‘EBAS data base’.

A reference is added now:

(https://ebas.nilu.no/)

l. 530: ‘CCN and HTDMA hygroscopity’ sounds rather colloquial. You describe ‘particle hygroscopicity derived based on CCN and HTDMA measurements’ . Please replace the header accordingly by this or similar wording.

The header has been replaced now. The new header reads as follows:

Comparison of particle hygroscopicity derived based on CCN and HTDMA measurements