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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characterizations and source analysis of atmospheric inorganic ions at a national background site in the northeastern Qinghai-Tibet Plateau: insights into the influence of anthropogenic emissions on a high-altitude area of China" *by* Bin Han et al.

Anonymous Referee #2

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The manuscript covers an important topic and key area relevant to the background level air pollution in China. It gave an overall view of ion characterizations with PM2.5 at a remote site of the QTP. However, I have some concerns on this submission. About PMF model, I think source apportionment of PM2.5 should be based on the full dataset of chemical compositions of particles, including ions, carbons and elements. However, in this study, only ions data was included, while carbons and elements were not analyzed. This might not be in line with the principle of source apportionment. Another concern is

that the authors included gases pollutants data in the model, but they are not chemical compositions of PM. The authors discussed a lot the secondary formation of sulfate and nitrate; however, part of sulfate was thought to be emitted directly by salt lake in PMF result. The secondary formation and direct emission of sulfate seem to exist simultaneously, but the authors failed to explicit them in their analysis. I suggested the author delete the section of PMF to avoid contradiction between different sections of manuscript, or give more detailed explanation on them. High relationship between SO42- and Na+ was found in this study, however, detailed discussion should be done in section 3.4. This is also important for the source analysis of sulfate.

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