Review of submission by Blechschmidt et al., " An exemplary case of a bromine explosion event linked to cyclone development in the Arctic".

The paper presents a case study of a bromine explosion event, explored using a variety of supporting datasets and models. I found the paper to be very well written, logically presented and clearly argued. As a results I have only minor corrections to suggest, many merely to improve presentation.

Line 12: "brine-covered"

Line 62: At the time that Rankin et al published their paper, it was thought that frost flowers were a primary source of bromine. Now it seems that they are not, and this should be reflected more clearly at the start of this section. At minimum, put it in the past tense: "According to Rankin et al. (2002), frost flowers **were**…"

Line 86: similarly, "frost flowers and blowing snow in combination **could be** the major…"

Line 89: "satellied-derived"

Line 95: Pratt et al (2013) did indeed find the most production rates of Br2 were from tundra snow, but it's important to emphasise that this snow was close to the coast, and as a result it was saline. i.e. this effect would not be widespread across the tundra with just any snow.

Line 107: "likelihood of" not "likeliness for"

Line 126: "temperature" spelt wrongly

Line 128: include the minus denotion on Br_2Cl, i.e. it should be Br_2Cl^-

Line 138: remover the "with", i.e. to read: also atmospheric mercury…

Line 154: "likelihood" not likeliness

Line 156: "two-digit" wind speeds is not the best way to describe this unless the relevant units are given. Best to give a number, e.g. "and at wind speeds greater than 10 m/s"

Line 239: What is the effect of assuming that all BrO is located and well mixed within the lowermost 400m? i.e. what is the sensitivity to this assumption?

Line 251: "eliminate" is mis-spelled

Line 285 "cloud-free"

Line 323: Tian-Kunze et al is not in the reference list

Line 354: data **were** (not was)

Line 440 to 445: does the comma shape indicate the cold section of the cyclone, and could that be relevant (e.g. through the reaction kinetics you discuss earlier)?

Line 474: and throughout, be careful how you denote longitudes, a *positive* number implies east, a negative number denotes west, but to say that something is -160 degrees East introduces double negatives. Why not just say it's 160W..?

Line 506: spell out gpm

522 and 523: as above, care with how you denote longitude

Line 517: this section discussed figure 5, and the importance of 2 patches of thin sea ice. Within the context of the figure, they don't look very large, given their apparent effect on the atmosphere. Can you say how large they are in km^2? Also, rather than just describe their position, it would help the reader if they were indicated explicitly on Figure 5.

Line 585: following from above, another way to emphasise the role of the thinner sea ice might be to show an equivalent zoom-in of the SMOS data, in a panel next to the MODIS data. (e.g. Fig 6a, and 6b). Also, does the SMOS data give any information on thickness of snow on the sea ice? Was the depth of snow less in the region of the MODIS zoom-in?

Line 643: "origin" is mis-spelled

Line 657: "emission sources **than**…"

Quality (resolution) of Fig 1 needs to be improved