Reply to Ref #1

I thank the referee for his valuable comments to improve my manuscript.
Will first correct a mistake. 1) Ref. conclude: data used in not open to all, is not correct. Sources for these data – where they are published, are listed in manuscript. Can also be copied at National Archie, is Oslo, where the Gjøa data are stored. At Royal Sciety, London or Scott's Musum for Discovery data.
2) Ref. may not be familiar with 'polar cap disturbances >80^{o} mag. lat,, the mag. K-index in this region is nor correlate with Kp. Cf. e.g. papers – 40 yrs ago by Dr. T.N. Davies, Fairbanks, Geophys. Inst. Her polar rain & photo-electrons more important than sw.

3) I will not delete the lines 36-39 of the abstract, but rewrite as: The main aim of the paper is to establish a relation between a few types of polar cap auroras and geomagnetic signatures , solar UV& X activity.

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2. I cannot see why my manuscript is poorly organized. Can you name deficiencies? The other referee liked it.
3. I will include a sentence with information about the solar cycle, but I don't think important. ' All data are collected during solar cycle 14. The sunspot number varied from 36 to 48, but 120 years ago the values may be uncertain.
4. I agree that Fig. 1 is not so easy to read in all details, but its purpose is just to show the locations of our two observations are located at the opposite end of the same field line – and therefore share the same MLT. Equal important. The 2 stations are separated in local solar time by 6.5 hours; i.e. you can distinguish between variation due to solar wind and variation due to solar UV & X radiations & photoelectrons. The author feels the fig is unique. You know where to fine a beather Fig?
5. I think the lines 101-103 clarify the local times in terms of UT which is helpful and repeated in Table 1. The stations GH and CA are unique, because they have same MLT, but different local time by 6.5 hrs. Fig. 1 is unique – the 2 stations are at opposite end of same field line.
6. Details of the re-calculation. Have used the data center advice in Tokyo. http://wdc.kugi.kyoto-u.ac.jp/index.html (WDC for Geomagnetism, Kyoto (kyoto-u.ac.jp)
7. Could you include the magnetic latitude of the two stations? GH = 78^{o} N and CA = 78.7^{o} S.
8. I will include the station name in line 117. Answere: general def of mag time, Greenwitch already mentioned.Don't understand why
9. Could you include a date in line 197? Done
10. Could you give the requested details in Fig. 4? Based on the auroral rep in logbook and Amundsen's description in diary – I tried to reproduce this event by drawing - my sketch and explained how in fig. text. Nb. The auroral ring – the oval, was never reported more than 30 degrees over southern horizon.
11. Could you clarify this in line 222? Done
12. Answere: Redrawn the CA magnetogram to show more clearly the detailed variations in the H-comp. Fig also referred to in Ch. 6. The purpose of Fig. 5 is to show the geomagnetic conditions on 4. & 5. Nov. 1903.
13. line 254: Why do you know that the color was, deeply reddish"? . As mentioned in logbook, auroral color listed 7 times in addition to what written in the dairies.
14. line 279: Could you clarify this? Answere: The observations show.
15.Table 2: Could you clarify this? Amnswere: copied the original from Graaud, 1932. From detailed checking diaries, I found 16 more events, which have been included in the months when they were obserced.

16.line 317: Can you give a source of the statement 1903 was special with the strongest..“ 31 October 1903 the strongest magnetic that century (cf. Egeland and Deehr, 21014).
I will not delete the sentence 317-318 about the Halloween storm. Perhaps we observe a 100 yrs period. A 100 yrs pereiod in auroral data also reported by Sam Silverman. It is interesting

17. about streamer: Both in data from GH & CA streamers are used many times.
18. I cannot delete sections 6.1 - 6.3 which are my main findings. (Will not. As written in Abstract and other places. This is the main findings in this study)
19: Could you follow the referee and delete lines 530-535? No, cf. Aans:were to point 18.
20. The data are open.
21.I would recommend to delete the last sentence of the manuscript 555-557. No, That is what Fig 12 showa.
22. I am uncertain about Fig. 6. A very interested figure, detailed explained in the 2 references listed in the figure .text
23. Magnetic time is included in the Fig. 9. Answere: To illustrate not correlatied with MLT as observed in th oval
24. Could you comment on the last remark of the referee? If some wish to work further with Gjøahavn data, they will find some valuable info through this reference.