

Interactive comment on “Analysis of the formation of fog and haze in North China Plain (NCP)” by J. Quan et al.

J. Quan et al.

zqxxm_cn@sina.com

Received and published: 26 July 2011

We thank the reviewer for the careful reading of the manuscript and the helpful comments. The reviewer's comments are accordingly addressed in the revised manuscript. We think that the paper is significantly improved following the reviewer's suggestions.

General comments: This paper investigated the long-term trends of fog and haze over NCP region and compared their decadal variations between urban and rural sites. In addition, the impact of aerosol loading on the typical fog occurrence, as well as the role of fog droplets and aerosol hygroscopic process on visibility degradation have been discussed in detail by in-suite measurements including meteorological and microphysical parameters. These works are very necessary for investigating the increasing low visibility events in China, especially in large cities, which are experiencing the rapid social

C6917

and economic developments. This study is based on solid data and sound research approaches. The impact of aerosol loading on fog occurrence and visibility deterioration is clearly demonstrated. In my opinion, this paper is acceptable for publication with minor revisions as detailed in the following specific comments.

Specific comments: 1)Page 11914, line 1, the author had best describe the visibility data applied in the trend analysis of fog and haze in more detail, Are those data from instruments or observer? what's the frequency?

The visibility data is from observer, it is observed at 8:00 am.

2)Page 11914, the criterion of visibility and RH used to determine haze and fog is different from the haze observation standard issued by CMA in 2010 (QX/T113-2010). So the author should highlight the criterion in this paper, such as what's kind of the visibility and RH data used in haze and fog determination, hourly or daily?

The data of visibility and RH are from the history observations at weather stations of China Meteorological Bureau. The data include observations at 2:00 am, 8:00 am, 14:00 pm and 20:00 pm (local time). In this study the observations at 8:00 am were selected since 8:00 am is the rush hour when fogs appear. The criterion of haze and fog occurrences set in this work is based on the criterion of WMO, UKMO and method suggested by Vautard et al. (2009) and Wu (2006), together with the particular situation in China. For example, fog and mist are not easily distinguished in China due to the heavily polluted aerosol condition. The visibility and RH data used in this study is observation at 8:00 am. We add a table on the criterions of WMO etc. and supply above description at revised manuscript.

3) Page 11915-11916, the author mentioned that the OHAZ days at the rural sites were lower than that at the urban sites, which was attributed to aerosol loading result from economical developments. What's the difference of OFOG days between urban and rural sites?

C6918

The OFOG days at rural sites were similar to the evolution at the urban sites. These results might be caused by that except the aerosol concentration, the climate condition is also an important factor that influence the OFOG days (as shown at Fig.4). We rewrite the second sentence in Page 11916 as follow: “.....the OFOG days are strongly dependent upon the OHAZ days (Condition-1). When the OHAZ days exceeded the crucial value, the OFOG days were not sensitive to the OHAZ days (Condition-2). The occurrence of haze and fog was influenced by weather conditions, such as static stable weather condition and abundant vapors (for fog).”

4) Page 11928, in fig. 1, the illustration is not consistent with the symbols in the figure and the descriptions in page 11913.

Yes ,we changed it.

5) Page 11915, during the 4 periods of OHAZ variation described in fig.3, if the impact of sand storm which has important role on visibility has been considered?

No, it was not considered.

6) Page 11929, in fig.2, the y-axis should be“days/year”, while not “haze day/year”.

Yes ,we changed it.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 11911, 2011.