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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Identifying the sources driving observed $PM_{2.5}$ variability over Halifax, Nova Scotia, during BORTAS-B" *by* M. D. Gibson et al.

Anonymous Referee #1

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General comments: The paper presents the source attribution of observed PM2.5 concentrations over Halifax, Nova Scotia, using PMF receptor model. This study highlights the value of using air mass back trajectories coupled with local wind direction dependence to help identify the sources. The paper has been written well and the introduction, methodology, and results & discussions have been described well. Therefore the paper is considered as a good contribution to Atmospheric Chemistry and Physics.

Specific comments: 1.P4493, line 1: Please specify what kind of variability of total PM2.5 concentrations over Halifax, temporal or spatial variability? 2.P4494, line 16: how samples collected at DGS were considered representative of Halifax? Multiple

sampling sites could be more representative, especially for analyzing spatial variability of PM2.5 over Halifax. 3.P4495-4498: the description of lab analytical methods can be more summarized. Please provide more details on quality assurance of measurements if any has been done, such as precision analysis, black correction, etc. Were there any blank or duplicate samples collected for quality assurance purposes? 4.P4499, line10: please indicate the location of Halifax international airport, such as the direction and distance to the DGS. 5.P4500, line 4-6: please specify the data sources (also resolution) used in HYSPLIT model. Please briefly explain why 2-day back trajectories were considered more appropriate for the analysis? Will there be any changes to the clusters if using a 1-, 3- or 4-day ensemble back trajectories? 6.P4507: please specify the analytical uncertainty of measurements that were used in PMF. 7.P4507: please add a figure or table to show the source profiles for the 6 factors. 8.P4510, line 9-17: this part belongs to methodology, not results. It would be more appropriate to be moved to under section 3 models.

Technical corrections: 1.P4502, line 13: In sentence "...found to have a high signal-to-noise ratio were down-weighted...", high should be changed to low.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 4491, 2013.