

## ***Interactive comment on “Size-distributions of n-hydrocarbons, PAHs and hopanes and their sources in the urban, mountain and marine atmospheres over East Asia” by G. Wang et al.***

**Anonymous Referee #1**

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### **General comments**

This paper reports particulate-phase concentrations of n-alkanes, PAHs, and hopanes from three sites in China and Japan. Total concentrations and size-resolved ones are presented for different seasons and disparate environments: urban, mountain, and marine. The paper is clearly written, and the results are clearly presented. The analysis is interesting and informative. An exploration of diagnostic ratios within each major category of organic compound helps draw a contrast between influential sources at the different sites. The paper also contrasts GMDs and size distributions at each site and

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concludes that differences are due to coagulation and repartitioning of species during long-range transport. However, it overlooks the possible role of water content in influencing size distributions. The downwind marine environment is likely more humid, and oxidation of the organic compounds—both those analyzed within this work and others not analyzed here—during transport may have increased the particles' hygroscopicity. Because such data from East Asia are relatively newer and because the region's sources are different, I would like to see a discussion of how these results compare with similar measurements in Europe and North America. The large influence of coal in East Asia is likely to produce interesting contrasts. A few minor revisions, suggested below, will help strengthen the paper.

### **Specific comments**

1. (Title) The title reads “n-hydrocarbons” but really the paper only analyzes n-alkanes, so the title could be more specific.
2. (p. 13864, line 22) Since this section emphasizes differences in C23-C27 versus C31, it would be useful to know what are the major sources of smaller versus larger n-alkanes, or at least how n-alkane speciation profiles differ between major sources. Such information might add further insight to identifying the dominant sources at each location. The paper later analyzes the carbon preference index, but this addresses the ratio of odd to even n-alkanes and not the broader speciation.
3. (p. 13870, lines 7-8) As mentioned in the general comments above, a simple analysis of GMDs does not rule out the possibility for increased water content of particles in the marine atmosphere. The argument for enhanced repartitioning of organics to explain larger GMDs would be strengthened if it examined changes in the ratios of individual species at different sites relative to their vapor pressures.

### **Technical corrections**

4. (p. 13863, line 20) Define BSTFA.

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5. (p. 13864, line 15) “Air pollution” is always singular, not plural.

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