

## ***Interactive comment on “Wintertime aerosol dominated by solid fuel burning emissions across Ireland: insight into the spatial and chemical variation of submicron aerosol” by Chunshui Lin et al.***

**Anonymous Referee #2**

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The study of Lin et al. analyses the PM1 spatial and chemical variation in Ireland using ACSM and AE33 measurements. PM1 spatial variation is very important since a lot of sources are specific to different locations across Europe and are insufficient characterized. Chemical Online measurements offer the opportunity to assess with high accuracy the time evolution of atmospheric aerosol chemical composition. The paper is well-written, making extensive use of the available literature and the results are visualized in an appropriate way. New information is presented in the study related to the main PM1 sources in Ireland during wintertime.

C1

As general remark I recommend that Mace Head measurements and discussion to be treated separately in another study since no data are available in the same time period and BC is assumed to be the constant between 2013 and 2016 wintertime, without a scientific evidence.

Line 15-20 (pp1) Why average concentration for PM 1 in Dublin is comparable with average in Birr ? (the value for Dublin is almost double than Birr).

Line 25-30 (pp3-4) For ACSM should be included all calibration coefficients determined during the campaign measurements, for all sites. Line5-10 (pp 4) Is the CE 1 applied after comparison with SMPS for all sites during the same weather conditions? Did you used SMPS volume concentration? What size range was used for SMPS set-up?

Indeed, the CE did not affect the relative contribution of nonrefractory PM1, but if BC is included in PM1, the relative contribution of BC is dramatically modified, my suggestion is to argue more why CE 1 was chosen.

Chapter 3 (pp 5-6) Is not clear what are the final a values chosen and the correlation values with BC tracers for final solutions. Please clarify these.

Fig. 5 insufficient explained e.g. the altitude of air masses, number of days used for the model

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