

Xu et al. measured size-resolved aerosol hygroscopicity and chemical composition using online techniques at a coastal site (Mace Head) for almost three months in winter, and carried out hygroscopicity-chemistry closure analysis. They found that hygroscopicity showed different diurnal patterns for continental and marine air masses, in general the measured growth factors at 90% RH agreed well with those predicted from aerosol chemical composition. Marine aerosols play a vital role in the climate system, and online and simultaneous measurements of their hygroscopicity and chemical composition are rather limited. Therefore, the results presented are scientifically significant, and the work has been well conducted. I would recommend it for final publication after the following comments (most of which are minor) are addressed.

Scientific comments:

Line 37: A recent review paper (Tang et al., A review of experimental techniques for aerosol hygroscopicity studies, *Atmos. Chem. Phys.*, 19, 12631-12686, 2019) summarized what aerosol hygroscopicity is and why it matters, and the authors may consider including it in the revised manuscript.

Line 41-57: More detailed and more insightful discussion on previous work should be provided here. The current manuscript does not convince me in terms of its novelty when compared to previous studies.

Line 41-54: In addition, it is not clear to me why previous AMS measurement could not measure sea salt but the work presented could do so. More details should be given here as well as in Section 2.2.2.

Line 133-134: A recent study (Tang et al., Impacts of methanesulfonate on the cloud condensation nucleation activity of sea salt aerosol, *Atmos. Environ.*, 201, 13-17, 2019.) measured CCN activity of methanesulfonates, and the kappa value of sodium methanesulfonate was determined to be 0.46, giving a GF of 1.72 at 90% RH. This experimental work supports the GF used in this manuscript and should be cited.

Line 240-244: please explain why different size dependence was observed for marine and continental air masses.

Figures 5 and 7: The two figures are a little confusing. I assume “C” means “continental” and “M” means “Marine”? More details should be provided in these two figures and figure

captions. In general I feel that abbreviations have been overused in this manuscript, reducing its readability, and I would suggest that the authors significantly reduce the usage of abbreviations in the revised manuscript.