

The MS mainly deals with the occurrence frequency, particle growth rate, condensation sink, nucleation strength factor, survival parameter and relationships among them at 3 different locations (rural, urban background and urban roadside sites) in the UK over several years. It contains valuable results and conclusions. Some parts of the MS should be elaborated better (some items are given below as examples), and they can definitely be handled and improved. There is, however, a conceptual weakness of the study related to the lower diameter limit of the SMPS system (of 16.6 nm) which can represent the largest source of inconclusive or ambiguous interpretations for the urban sites.

### **Major comment**

1. New particle formation and growth events are mainly identified, separated from emission sources and classified on the basis of particle number size distributions in the particle diameter range  $<20$  nm (e.g. Kulmala et al., Nat. Protoc., 7, 1651–1667, 2012). The diameter interval available for this in the evaluated work, namely 16.6–20 nm is quite narrow in particular, when you consider the logarithmic scale of the abscissa of size distributions. More importantly, the lower limit is requested to be even smaller (preferably below 10 nm or at 3 nm) for studies in urban atmospheric environments, where huge emission peaks can temporary dominate the smallest size ranges as well (Nieminen et al., Atmos. Chem. Phys., 18, 14737–14756, 2018). This property (16.6 nm lower limit) of the measuring system and its consequences for the data treatment, results and conclusions at the urban sites should definitely be discussed in detail, explained and resolved before any further opinion could be formed or decision can be made.

### **Some minor comments**

1. Lines 21, 69, etc.: it is advised not to start a sentence with abbreviation.
2. Line 61: consider writing primary particles or emission sources instead of primary emissions.
3. Lines 106–109: it is unusual to attribute particles with a diameter between 1.3 and 3 nm to road traffic emissions, and, therefore, this should be discussed and explained in more detail.
4. Lines 149–151 or Table 1: supply more detailed data coverage, e.g. for each year or season of years.
5. Lines 198–203: it is requested that the diameter of particles under consideration is specified as the growth rate changes with diameter.

6. Lines 262, 263, Table 2: revisit your rounding off strategy.
7. Lines 462–463: remove; it is a repetition from lines 235–239.
8. Fig. 2: it is unclear from the figure or related text which time interval was considered here.

A number of NPF events of 90 at Harwell in summer (JJA, 92 days) should be clarified to avoid any misunderstanding.