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Interactive comment on "Night-time oxidation of surfactants at the air–water interface: effects of chain length, head group and saturation" *by* Federica Sebastiani et al.

Anonymous Referee #2

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Major The authors give the relevance of the manuscript towards insight into organic coated aerosol (first sentence in the abstract). However, the experimental data is not taken from aerosol but from a flat surface, which could have a link to the marine boundary layer. This is significant given the known deviation of aerosols from the behaviour expected from a flat surface, that is more pronounced as the droplet size decreases and surface curvature increases. I would expect there to be a significant effect due to change in surface tension that would alter the kinetics between aerosol and flat surfaces that makes a flat surface an unsuitable experimental model for aerosol. Although the authors do note on page 21 that they are currently looking at aerosol proxies, none of this data appears to be included in the manuscript. The experimental system has

been previously outlined in Sebastiani, RSC Adv (2015), and is highly relevant to this manuscript. But even so, there does need to be more in-depth discussion of the experimental techniques used here particularly where these form the basis for drawing conclusion or inference. As the manuscript stands very little detail is given on the experimental setup and measurement, and crucially the conditions that measurements are taken under. Has the effect of NO3 flow rate on oxidation been considered? From page 4 there seems to be a range used, but details are not given with each measurement. On page 5 the authors mention the laser alignment window, which seems to be for a 632.8 nm Helium Neon laser mentioned in Sebastiani, RSC Adv (2015). Is this experimental setup appropriate for this measurement given the intention to measure night-time oxidation? There needs to be further discussion to establish the conditions that the samples were kept under, e.g. was a dark room used to prepare samples, or an indication is needed that this has been considered. Further discussion on the potential products that could form should be included. Without compositional information the assumptions made during the oxidation process and kinetic analysis are not convincing. Have the authors assumed that the products will not undergo further oxidation or degradation?

Minor Figure 4 appears before table 1, but look to be discussed in a different order in the text. Acronyms such as BAM should be written in full. Symbols used in equations should be explained for clarity in the text, e.g. in section 2.1.3; lambda and theta. Page 13: The variable parameters on line 13 should have "is", an equals sign, "varied between", or something appropriate between symbol and values.