

Interactive comment on “Lower tropospheric distributions of O₃ and aerosol over Raoyang, a rural site in the North China Plain” by Rui Wang et al.

Anonymous Referee #2

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This manuscript describes the ozone and particulate matter air quality issues of the North China Plain. The authors then describe the development of an unmanned aerial vehicle (UAV) measurement platform and analyze the results from this measurement platform. The authors did a good job in discussing the impact that the evolution of the planetary boundary layer has on ozone and aerosol concentrations. Generally, the authors described their assumptions well used in the analysis. This manuscript is of interest to the general scientific community because it documents a novel measurement platform and novel measurements in an area that has undergone a recent degradation in its ambient air quality.

General Comments

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This manuscript could benefit from some organization and focusing on key findings. The manuscript would be much more focused if the evaluation of the differences between the flights and the HYSPLIT modeling could be moved to supplementary material and simply referenced in the manuscript and focus the manuscript on the ozone and aerosols in the mixed and residual layers and the comparison to MOZAIC observations and trends.

Specific Comments

Abstract lines 21-22: What methods were used to determine the mixed and residual layers? Simply stating that potential temperature profiles and aerosol number concentration should suffice.

Page 2 Line 19: The atmospheric boundary layer (ABL) acronym used later in the manuscript should be defined here. Additionally, the introduction of the friction layer as equivalent to the ABL complicates the sentence and the term friction layer is not used elsewhere and should be removed.

Page 2 Line 22: The sentence “The ABL with vigorous turbulence is often called the mixed layer (or mixing layer)” is not needed because it is discussed in more detail and clarity on page 3 line 1.

Page 3 line 8: “deserves attention and studies” is redundant. “deserves attention.” Should suffice.

Page 10 line 24: What exactly does “significantly low” mean? Compared to the other profiles? How was significance determined?

Page 13 line 17: While “severer” is technically correct, “more severe” is more commonly used.

Figure 3: The caption does not state what figures (a), (b) or (c) designate. I assume that they are the same as in Figure 1 but this should be explicitly stated.

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