Reviewer Report

Strelnikov et al. are appreciated for their careful responses to my comments. Revised manuscript shows the reasonable improvement on methodology and presentation of results but general aspect of science is still in need of improvement especially main objective of this study. Some of my concerns are still needs to be satisfied. This article can be published after this revision if listed (following) questions are sufficiently answered. This manuscript is structured to investigate the small scale structures such as gravity waves and turbulence in neutral, plasma and atomic oxygen densities during WADIS sounding rocket project. This study deals mainly on dynamics but not much attention is paid on chemical processes which also can have control on observed atomic oxygen density fluctuations since its life time may be shorter (below 90 km) in the regions of 63-87 km where most of the observed populations of turbulence measurements are exist. So justifications are need to be made to project that atomic density fluctuations are due to turbulence. I would like to draw the attention on one of my this general question which was already asked but it was not answered sufficiently well in the revised manuscript too.

These are general questions but I can also try to pointout the potential pages and lines where those are need to be improved.

1. Page 2, lines 14-24 and Page 21, lines 18-21: It is stated in introduction that life time of atomic oxygen varies from seconds (50 km) to month (100 km). O-density mainly varies by dynamics of MLT above 90 km due to its long life time. This long life time can allow us to distinguish the generation mechanism of fluctuations. Authors concluded that observed O-density fluctuations are due to turbulence since life time of atomic oxygen is long, this may be true above 90 km but certainly not below 90 km. It is also can be mentioned that generalized conditions can vary from individual cases, those need to be justified with help of temporal variation of life time of atomic oxygen from theoretical model and observations with appropriate references in the height range of 63-87 km where most of the observed populations of turbulence measurements are exist (Fig. 12).

2. Page 7, Fig. 9 and page 12, lines 1-8: Since presented atomic oxygen densities are showing three different profiles (below 87 km in Fig. 9) from three different methods. It is true that those are not common volume observations but difference in magnitude is very large. Whether these differences arise due to chemical reactions or dynamical or methods of measurements are in question, may be supported with appropriate references for presented differences.

3. page 18, Discussion: Provide the profiles of life-time of atomic-oxygen, characteristics time scale of turbulence along with sampling time as a function of height from 60-90 km and then discuss the characteristics time scale of measured turbulence eddy in relation to the life time of atomic oxygen while accounting the time sampling of O-density measurements, to justify that measurements hold information of turbulence in measured atomic-oxygen densities.