

Atmos. Meas. Tech. Discuss., referee comment RC1  
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## **Comment on amt-2022-158**

Anonymous Referee #1

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Referee comment on "Earth observations from the Moon's surface: dependence on lunar libration" by Nick Gorkavyi et al., Atmos. Meas. Tech. Discuss.,  
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### **Review of "Earth Observations from the Moon surface: dependence on lunar libration"**

The manuscript entitled "Earth Observations from the Moon surface: dependence on lunar libration" provides innovative thoughts and visions on deploying DSCOVER/EPIC-Type camera on the moon for earth monitoring. Indeed, the Moon is a stable and longevous carrier for an Earth-observing sensor. It also exerts influences on precipitation, ice nuclei concentration, hurricanes, etc. For those Moon-related terrestrial phenomena, the lunar platform provides a unique perspective to understand the evolution of the phenomena.

Detailed analysis of the impact of the lunar libration on the visual position of the Earth on the Moon sky is presented, providing suggestions/insights on the possible field of view for the lunar-base earth observing sensors. This manuscript focuses on the impact of lunar libration on the sensor FOV. However, it would be more appealing if a more detailed discussion on the configuration of the potential lunar-base EPIC instruments.

Overall, I recommend the publication of this paper with minor revisions. The following are some minor points when I went through the paper in detail. They are only suggestions for the consideration of the authors when they revise the paper.

Overall, I recommend the publication of this paper with minor revisions. The following are some minor points when I went through the paper in detail. They are only suggestions for the consideration of the authors when they revise the paper.

Line 9, line 293, and line 363, it will be better to have consistent values for the angular diameter of the Earth in the Moon sky.

Line 92, Libration of the Moon. I like the detailed explanation of optical libration provided here. It looks like the physical libration is neglected in the discussion due to its small magnitude compared to the optical libration.

Line 165, what does Figure serve for? I cannot find any discussion in the main text.

Line 285, what is the scientific goal for the slit observation? It will be better to provide some potential applications there to enlighten the reader.

Line 298, does this WFOV camera have the same spectral configuration as the EPIC?

Line 292, is 'wich' a typo?

Line 307, what does Figure 11 serve for? It looks like only the polar regions of the moon are plausible areas for the long-term operation of a lunar sensor. I suggest combining Figures 10 to 12 into one figure and focusing on one period to avoid unnecessary confusion.

Line 342, it will be better to provide the percentage of the loss of the lit area as the decrease of the Earth phase to give readers a better concept of the spatial and temporal observational capability of a moon-base sensor. I guess the Earth phase is one of the disadvantages of the lunar-base sensor. But if there is a dark/nighttime component in the instrument, it will greatly fill the gaps and provide valuable information on the dark side of the Earth just like VIIRS DNBs do.

Line 363, What is the potential scan frequency of the WFOV camera and the hyperspectral sensor? Without this information, it is hard to follow the author's claim 'which will allow each slit to receive at least one scan of the entire Earth's surface in one pass. Please discuss more here if possible.

Although it might be beyond the scope of this paper, it will be better to also shortly discuss/mention the possible limitation of the lunar-base sensor, such as the impact of the lunar environment (lunar dust exosphere, high energy cosmic particle, meteoroid, etc.) to give readers a whole picture of the concept.