Review of Observation of the Lunar Tide in the Middle Atmosphere by the Aura Microwave Limb Sounder

Summary of work

This paper presents the first identification of the lunar tide in geopotential height observations of the middle atmosphere from Aura/MLS. The lunar tide is identified as a clear semimonthly variation in Aura/MLS observations between 2004 and 2021. A comparison with model results from Geller (1970) as well as temperature observations from TIMED/SABER is also discussed. The paper further examines the vertical, seasonal and latitudinal structure of the lunar tide. The results show that the lunar tide signal is stronger in January than in July and peaks near the equator.

Summary of review

This paper presents a significant new observational result, namely the identification of the lunar tide in satellite geopotential height observations of the middle atmosphere. My major comments regarding the explanation of the semimonthly signature in Aura/MLS, the use of the daily averaging procedure, the comparison with Geller (1970), and the interpretation of the high-latitude winter signal have been satisfactorily addressed. The revised manuscript now gives a clearer explanation of the sampling and aliasing framework, includes an explanation of the tidal mode notation, better justifies the daily averaging, and discusses the comparison with previous work more carefully. The authors have also addressed the remaining comments, including the requested clarifications and corrections to the manuscript. I believe this is a useful contribution to the study of atmospheric lunar tides and I am happy to recommend it for publication in its present form.