Summary

The authors present novel offshore LLJ research off the coast of California in regions relevant to wind energy. This research includes not only observational LLJ characterization, but also various model comparisons. Overall, observations capture LLJ events occurring only a few percent over the observational campaign but note that the vertical extent of these observations will undercount LLJ events. The models tend to underestimate the number of LLJ events but overestimate the duration. Models do a good job of capturing the hourly timing, but struggle on a seasonal basis. Other LLJ characteristics have positive/negative biases depending on the location and model used.

Overall, I believe this research to be a great addition to the offshore wind energy literature, and I recommend this article to be *accepted with minor revisions*, which are listed below.

Major comments

- I feel the paper ends abruptly and that no proper conclusion is given. It would be beneficial for the paper to include, at the very least, future directions this research could/should go to help offshore low-level jet characterization.

Minor comments

- Line 45: It is stated that the California coastal LLJ is well-studied, yet only two references are included. The first reference, Parish 2000, is repeatedly mentioned and referenced from this point on. To the authors knowledge, are these the only two studies to investigate LLJs along the California coast? If so, I would recommend rewording this sentence to tamper down the claim that the California coastal LLJ is well-studied.
- Lines 88-89: Do the phrases “in 1100 m of water” and “in 625 m of water” refer to the depth of the ocean floor to the sea-level surface? This reads weird to me.
- Section 2.1: What is the temporal resolution of the lidars and ultrasonic anemometers, and was any temporal averaging done? I understand the specifics are in Severy et al. (2021) and Krishnamurthy et al. (2023), but I feel at the very least basic temporal resolution of these instruments should be discussed.
- Section 2.2: What is the advantage of using the TOGA COARE algorithm, compared, say, to alternative algorithms? I feel a little more discussion is warranted here.
- Section 2.4: While I am aware that quantifying LLJs are an unsettled topic of discussion in our field, I would be remiss not to request Debnath et al. (2021) to be included in this section. While Debnath et al. (2021) leverages Kalverla et al. (2019)’s work, the Debnath paper has been used extensively in LLJ discussions in the U.S.
- Lines 163-164: I appreciate the mention of the limitation of the observations in capturing the true extent of LLJ events.

- Figure 2b: It is interesting that the longest LLJ occurrence at Morro Bay occurs at the end of the period. I assume this is by chance, no?
- Line 242: When it is said that the data are resampled at the top of the hour, does this mean that only top of the hour observations are taken, or some mathematical operation is done (hourly average)?
- Figure 11: Neat way to visually compare LLJ core height differences!
- Lines 352-353: Is that duration time correct? 10:00 to 14:10 UTC is not 14.2 hours. Am I missing something here?
- Line 513: The paper for this reference has been officially published and should be updated accordingly.

References

(Debnath et al., 2021)

Debnath, M., Doubrawa, P., Optis, M., Hawbecker, P., and Bodini, N.: Extreme wind shear events in US offshore wind energy areas and the role of induced stratification, Wind Energy Science, 6, 1043–1059, https://doi.org/10.5194/wes-6-1043-2021, 2021.