Round 1

Authors' response to Reviewer 1 comments

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We appreciate your feedback and comments on our manuscript. Following are our responses.

The provided comments are in the standard black font, and our responses to the comments are in blue. The associated changes are in the revised manuscript submitted with this document.

Provided comments

1. The abstract suggests that this paper simply showcases the capability of the model by running a number different of analyses. This approach of just showing what the model can do is reflected throughout the paper. On the other hand, the results presented do have valuable insights that can be of interests to other researchers. A few examples: excluding gravity does not always give more optimistic results, optimal reel in is achieved by balancing the aerodynamic forces with gravity, thin tethers perform better at low wind speed and thick tethers perform at high wind speeds, etc. In my opinion, changing the focus of the paper to highlighting these new insights (noting that they were derived from the new model presented) would make the paper more interesting.
   We understand we might not have highlighted the key insights from our paper along with the modelling framework. The insights derived using the model were only present in the Results section and were summarized in the Conclusions. We have now added text highlighting interesting insights in the Abstract and at the end of the Introduction section as well.

2. In the background section, lines 63-98 could be split into smaller paragraphs. I can see that the authors are describing how this paper improves on previous formulations. Since this cover a wide range of topics (model fidelity, gravity effects, etc.). Splitting them into different paragraphs, with each focusing on how improvements are required could further highlight the value of this paper.
   We have now split the single large paragraph into smaller paragraphs focusing on particular aspects, starting from the required fidelity, the inclusion of gravity, comparison with measurement or higher fidelity simulation data, and followed by our proposed model introduction. Unfortunately, all the discussed papers will have some overlap in their approaches, and hence, a very clear categorisation is a bit difficult. We have also incorporated here the community comment by Maximilian Ranneberg.

3. Lines 132-133 ('the wind vector vw is orthogonal to the kite's tangential motion component'): I don't think Figure 4a shows that vw is orthogonal to the tangential motion.
   We have now added the explanation that the circular trajectory is symmetric around the $\mathbf{X}_\mathrm{w}$ axis and changed the wording from 'situation' to 'instance'. Since the kite is at the top point of its circular trajectory, the tangential motion is out of the plane, i.e. in the e_ϕ direction, which is orthogonal to $\mathbf{v}_\mathrm{w}$. This is true for that instance but indeed cannot be shown in Fig 4(a) since it shows the $\mathbf{X}_\mathrm{w}\mathbf{Z}_\mathrm{w}$ plane.

4. Line 240 ('It states the maximum force it can handle per unit wing area'): repeated use of 'it'.
   Changed the text by combining two sentences to avoid repetition of 'it'.

5. Line 265 (equation 23): this is quite an important equation. Is it feasible to show the derivation immediately below or in the appendix? I guess this is related to doing a simple integration with respect to dl, then relate the l*g*cos(beta) terms to the tether area and mass. I imagine that equations like this will be adopted by many preliminary studies in the future, hence the need to show the working.
   The intermediate derivation steps are now added.

6. Line 307: suggest removing 'the effect of'.
   Done.

7. Line 346 (equation 35): it would be helpful to plot this relationship on a graph.
   Added the plot of the relationship.

8. Please move the figures to the relevant sections in the paper. One example: figs. 14 and 15 should be placed within section 3.1.1.
   We had already placed them in section 3.1.1, but the Overleaf formatting automatically pushes the images into the next section to minimize the white spacing in the paper. In the final formatting phase, we will convey this formatting comment to the journal editors.

9. Please check the y-axis label in figure 17.
   Corrected.

10. Line 487-488: suggest rewriting to 'one without the effect of gravity' (i.e., removing 'including').
    Changed.