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Interactive comment on "Aerodynamic characterization of a soft kite by in situ flow measurement" *by* Johannes Oehler and Roland Schmehl

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1) Remarks p13 Back line force Measurement.

We have not measured the force ratio within this study about in situ aerodynamic measurement of a kite used for pumping cycle operation in an AWES. We have, however, measured this ratio in a separate study about a similar but smaller kite flown by a human pilot on the beach. The corresponding MSc thesis is reference and can be accessed here: van Reijen, M.: The turning of kites, Master's thesis, Delft University of Technology, http://resolver.tudelft.nl/uuid:5836c754-68d3-477a-be32-8e1878f85eac, 2018. The measured force ratio is plot-

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Discussion paper

ted in Figure 6.8 and ranges from 0.75 down to 0.45 (see Fig. 1 in this response). This seems to correspond well to the finding of Behrel (2017), who uses the same kite design (LEI tube kite). We will include more of this information in the revised manuscript. λ_1 is an estimated value, while λ_2 is a solution of the force equilibrium. We did not include the relatively simple and straightforward algorithm to not expand the already extensive manuscript much further. We are not explicitly accounting for the variation of the projected surface of the kite but instead use the constant value of the CAD geometry as reference value.

2) General Remarks: Do you have access to Kite modelling data, and more precisely on the lift and drag coefficient obtained? Can you compare it with the measured data?

The objective of the present study was to experimentally determine the aerodynamic characteristics of the kite, during flight operation in pumping cycles. In our opinion, such aerodynamic data of high quality is one of the most critical input data for kite models. Including also a model in the present study, and describing this to the required level of detail, would have been out of scope of this already quite extensive study.

3) Is it feasible in the future to measure the wind velocity with a 3 directions ultrasonic sensor in order to have more precise data? We have assessed this technology but concluded that presently, the simple Pitot tube with two orthogonal flow vanes is the most robust setup. Next to the sensors themselves, the key challenge is to find a relatively stable reference frame, because the KCU is quite dynamic and the wing is deforming. In our opinion, the plane spanned by the two power lines is the best location to attach a sensor.

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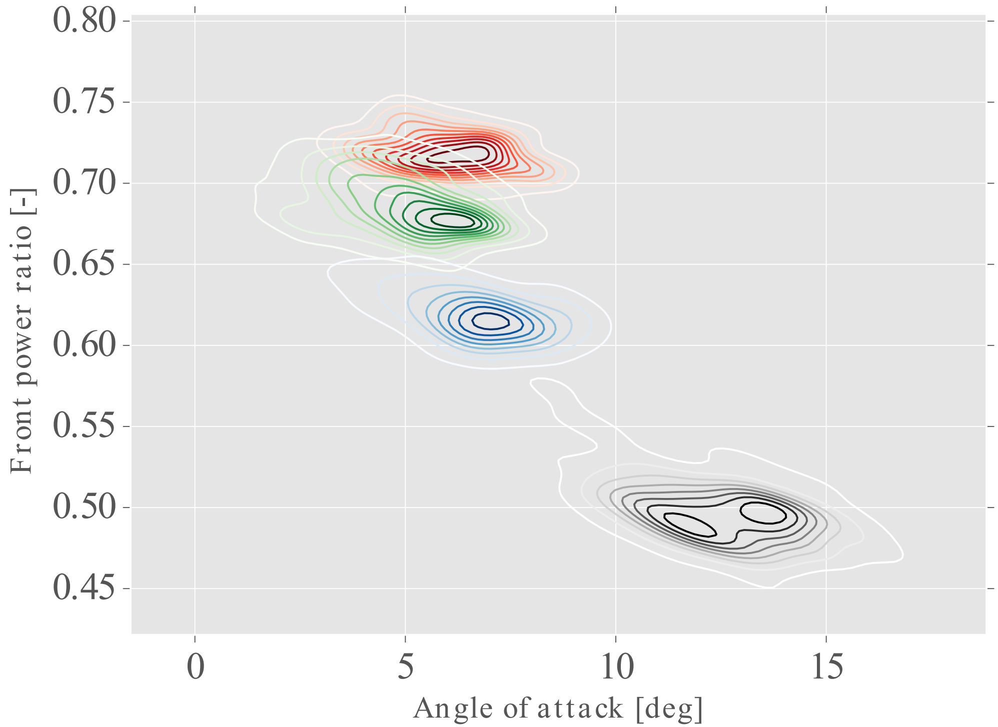

Fig. 1. Power ratio between power and steering lines, from low to high power setting: red, green, blue, black. During the powering up there is a shift in the force distribution over the kite. The steering lin