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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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Thank you for your interest in our work and your critical review.

Your first question on the force fraction of force transmitted via back bridle lines to front bridle lines is a very justified one since the pressure point of kites generally does not stay in one position for different power settings. Since there was no data available for the kite model we used and our setup with KCU and kite flown on a single main tether was not equipped to measure it we could not track the actual force fraction during the flight. The attached graph from Jan Hummel's PhD thesis 'Automatic measurement and characterization of the dynamic properties of tethered flexible wings' (TU Berlin 2017)

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shows the force fraction f over ϵ_{rel} ('relativer Powerweg' is equivalent to u_p). Although we can see a trend to higher values of f for higher power settings u_p we decided for a constant value of $f = 0.33$ because the relation or magnitude of this trend for our kite remains unknown. Further was the relation only measured for a four line kite in static flight whereas we used a kite with a single main tether and flew crosswind maneuvers.

Regarding the smoothing, we did not try different methods so we cannot compare to other filtering techniques. Initially we only used a smoothing period of $0.3s$ to eliminate noise of the sensors but this left us with the problem that the mentioned high frequent oscillations of the kite where inertia plays an important role would render the assumption of a force equilibrium inapplicable.

With your third comment you are of course right. Due to higher loading or different flow conditions also flight speed and angle of attack do have an effect on the shape of the kite. We write 'a change in angle of attack affects the aerodynamic coefficients by changing the flow field' but we do not claim that it does not affect the shape of the kite. In case of a change in angle of attack we primarily change the flow field which affects the shape of the kite whereas if we change the power setting it is in terms of logic 'the other way round'. But of course we have to always consider that both flow field and shape of the kite are strongly coupled and we can never change one without affecting the other.

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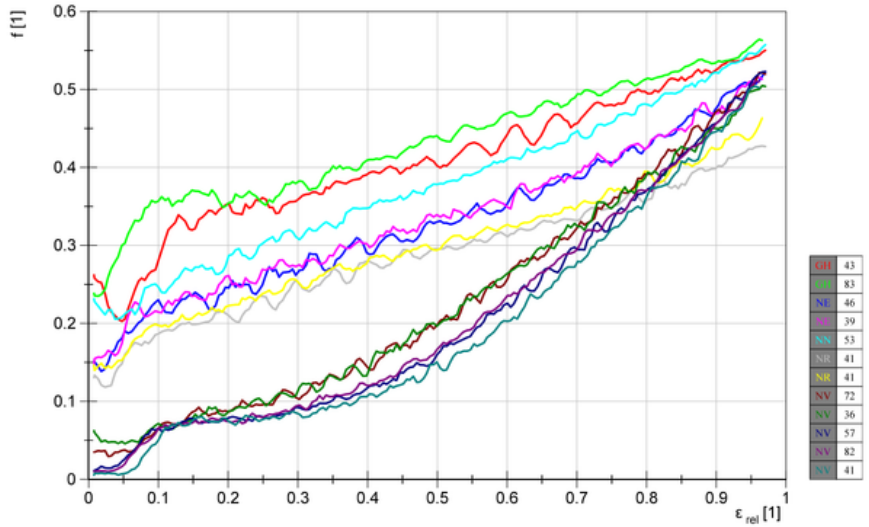

Fig. 1. Force fraction between back lines and front lines over power setting for different kites ['Automatic measurement and characterization of the dynamic properties of tethered flexible wings' ,Jan Hummel]