Agreement on the Conservation of Albatrosses and Petrels

Fourth Meeting of the Population and Conservation Status Working Group

Wellington, New Zealand, 7 – 8 September 2017

Derivation of body motion via appropriate smoothing of acceleration data

Emily L. C. Shepard, Rory P. Wilson, Lewis G. Halsey, Flavio Quintana, Agustina Gómez Laich, Adrian C. Gleiss, Nikolai Liebsch, Andrew E. Myers, Brad Norman

SUMMARY

Animal movement, as measured by the overall dynamic body acceleration (ODBA), has recently been shown to correlate well with energy expenditure. However, accelerometers measure a summed acceleration derived from 2 components: static (due to gravity) and dynamic (due to motion). Since only the dynamic component is necessary for the calculation of ODBA, there is a need to establish a robust method for determining dynamic acceleration, currently done by substracting static values from the total acceleration. This study investigated the variability in ODBA arising from deriving static acceleration by smoothing total acceleration over different durations. ODBA was calculated for 3 different modes of locomotion within 1 species (the imperial shag) and for swimming in 4 species of marine vertebrates that varied considerably in body size. ODBA was found to vary significantly with the length of the running mean. Furthermore, the variability of ODBA across running means appeared to be related to the stroke period and hence body size. The results suggest that the running mean should be taken over a minimum period of 3 s for species with a dominant stroke period of up to this value. For species with a dominant stroke period above 3 s, it is suggested that static acceleration be derived over a period of no less than 1 stroke cycle.

This paper has an attachment:

Report Citation: Shepard ELC, Wilson RP, Halsey LG, Quintana F and others (2008) Derivation of body motion via appropriate smoothing of acceleration data. Aquat Biol 4:235-241. https://doi.org/10.3354/ab00104