SUPPLEMENTARY MATERIAL: Calculation of equivalent air speed (V_{eq})

Airspeed of each bird tracking was normalized by flight altitude to produce equivalent air speed (V_{eq}), following the method of Pennycuick (1989) according to

$$V_{eq} = V_a * \sqrt{\frac{\rho_T}{\rho_0}} \, ,$$

(1)

where V_a is the true airspeed, ρ_T is the actual air density at the current flight altitude and ρ_0 is the standard air density at sea level, 1.226 kg/m^3. Actual air density (ρ_T) was estimated as

$$\rho_T = \rho_0 * \left(\frac{P_T}{P_0}\right),$$

(2)

assuming a temperature of 15° C, where P_T is the pressure at the flight altitude and P_0 is the standard atmospheric pressure, 1013.25 hPa. The pressure at the flight altitude (P_T) was estimated as

$$P_T = P_0 \left(1 - \left[\frac{0.0065 * h}{273 + T}\right]\right)^{4.256},$$

(3)

where h is the flight altitude of the bird and T is the temperature (here assumed to be 15° C; Pennycuick 1989).

References

Pennycuick, C. J. 1989 *Bird flight performance – A practical calculation manual*. Oxford University Press, Oxford, UK.