

The relationship between respiration rates and ETS activity in fishes in relation to swimming activity

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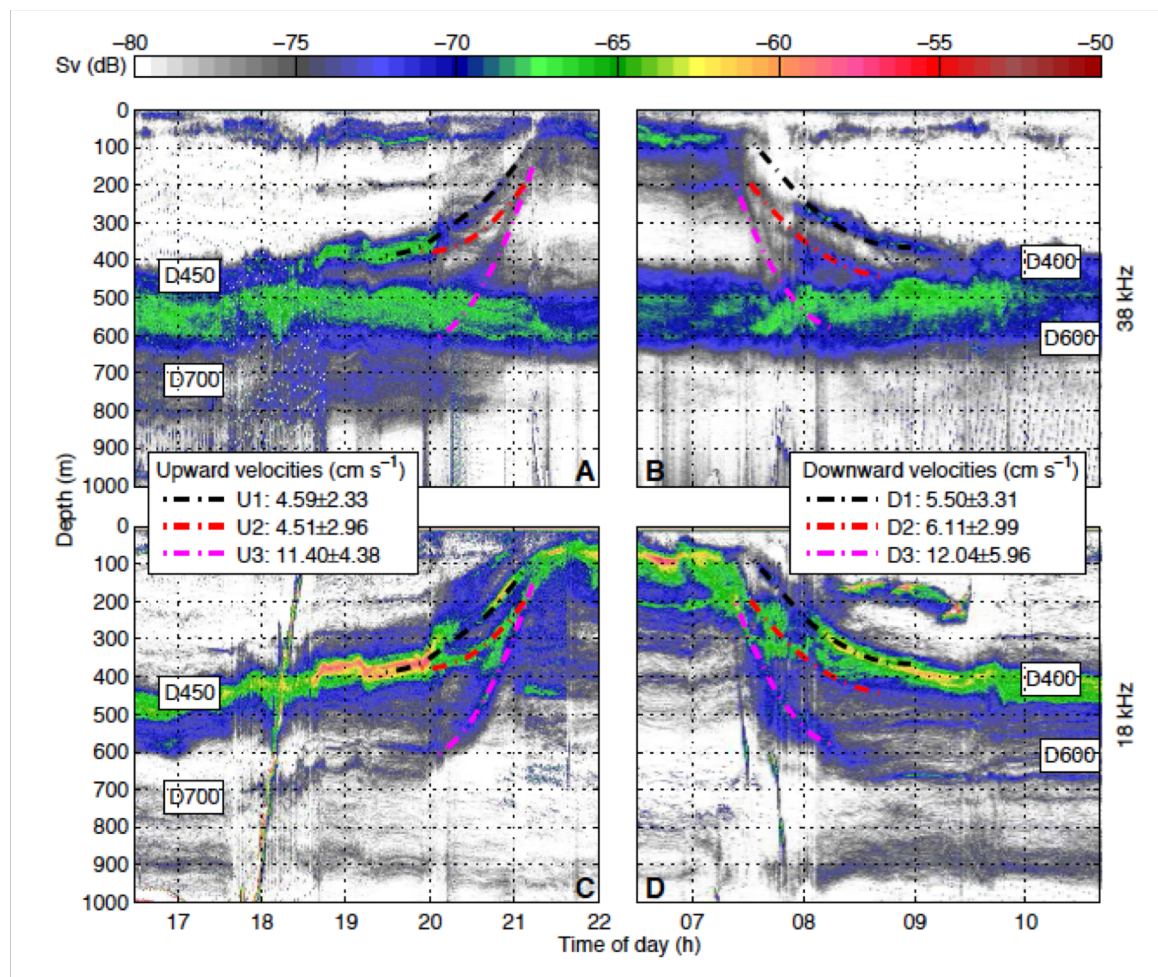
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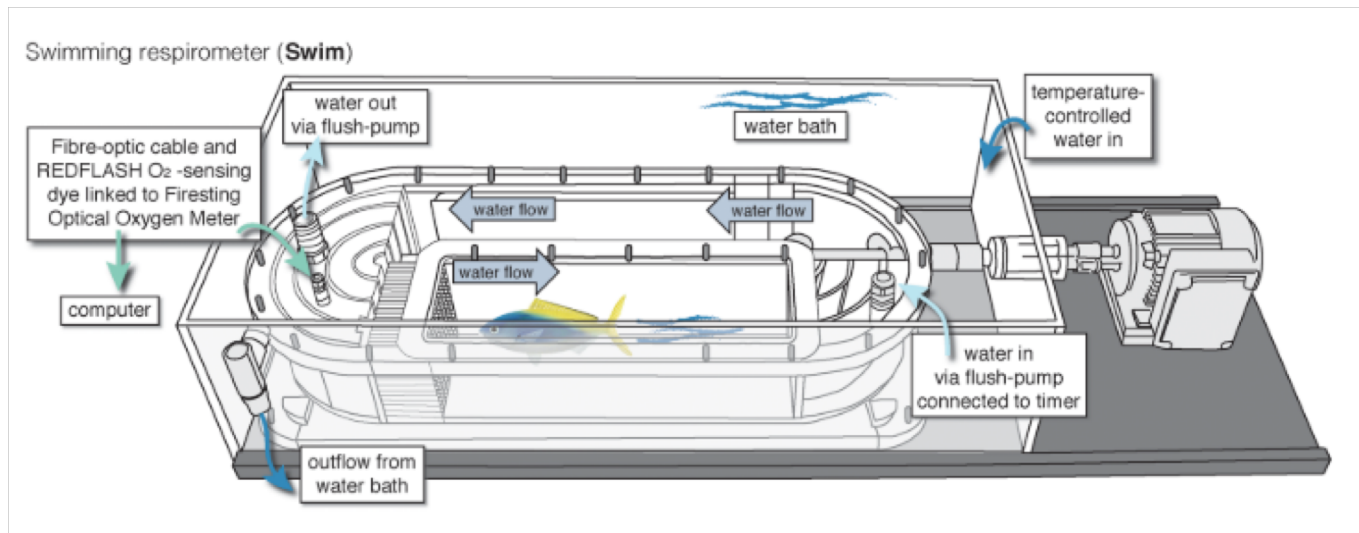
Fish respiration

- Respiration in the deep-sea is difficult to measure
- Electron transfer system (ETS) activity is used as a proxy
- Mesopelagic fishes perform important diel vertical migrations
- Respiration at different swimming capacities
- Respiration/ETS ratio at different swimming activities



Ariza *et al.* (2016)

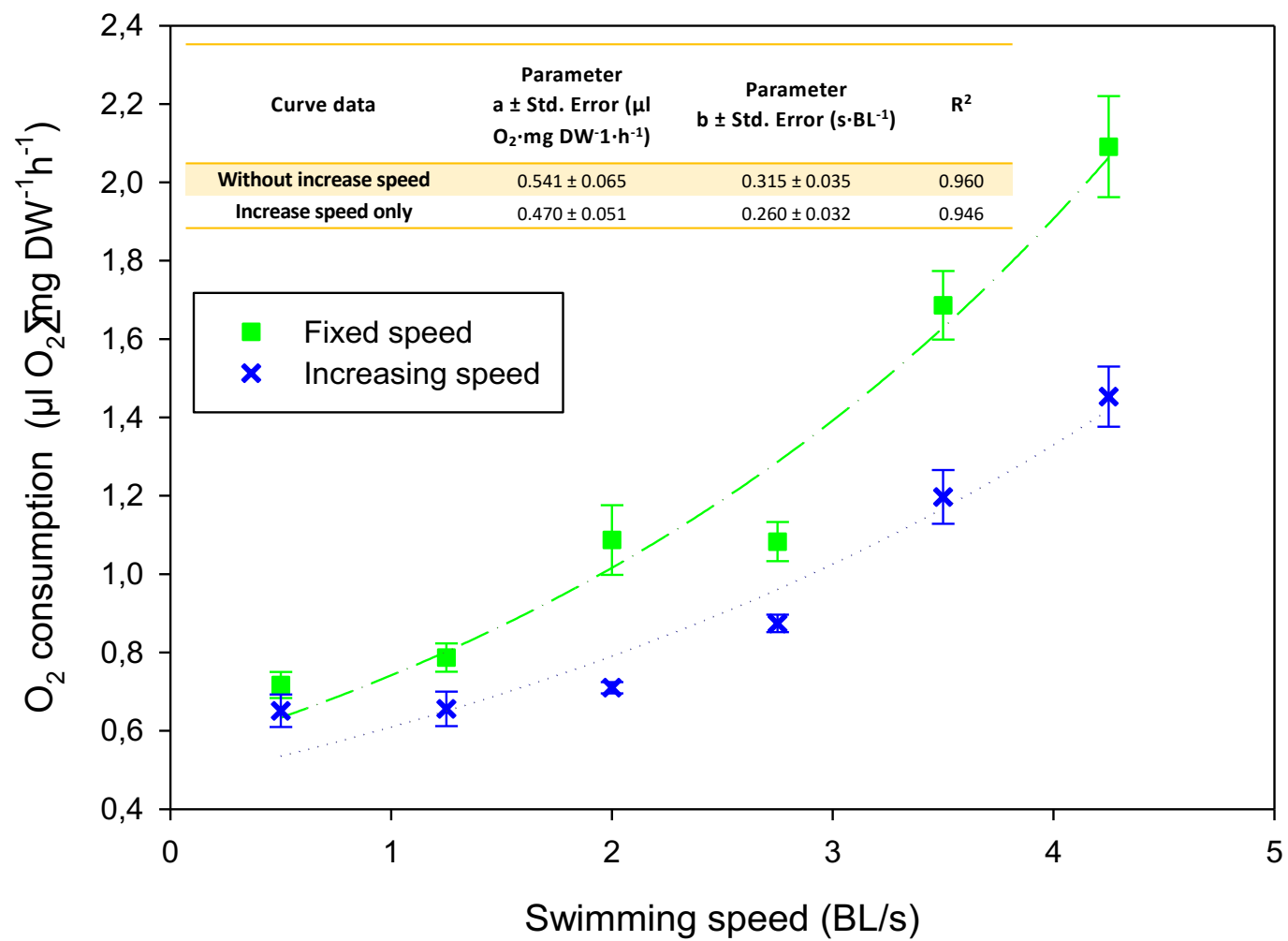
Intermittent flux swimming tunnel respirometer

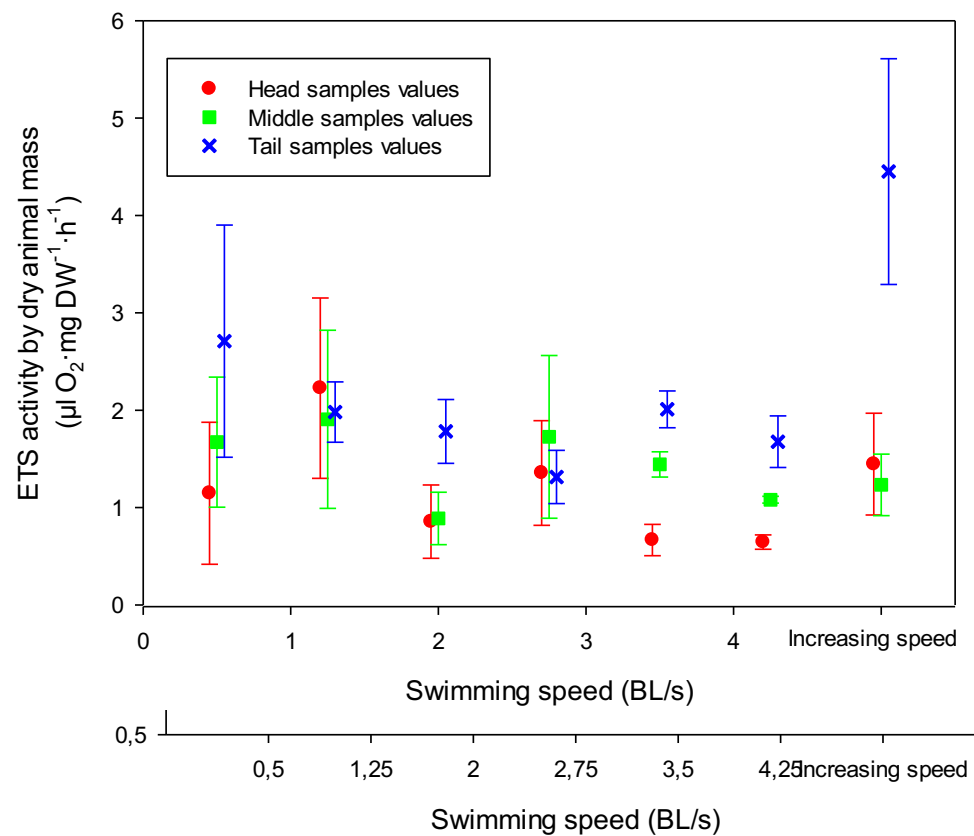
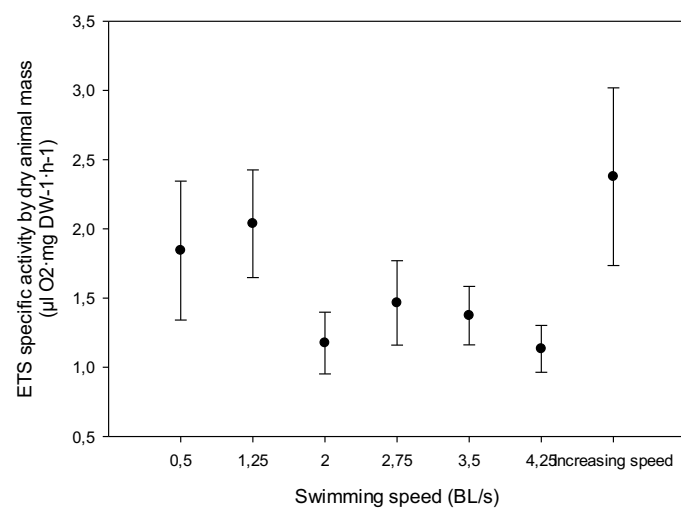
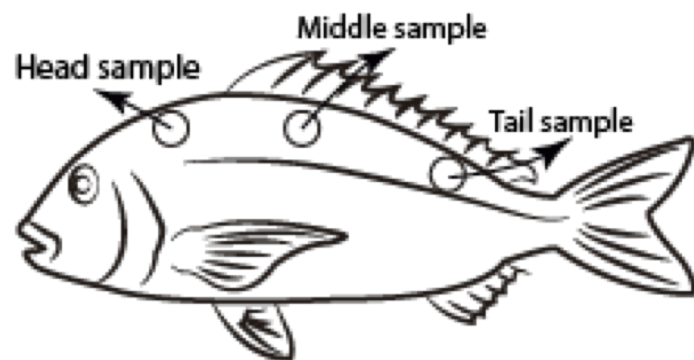


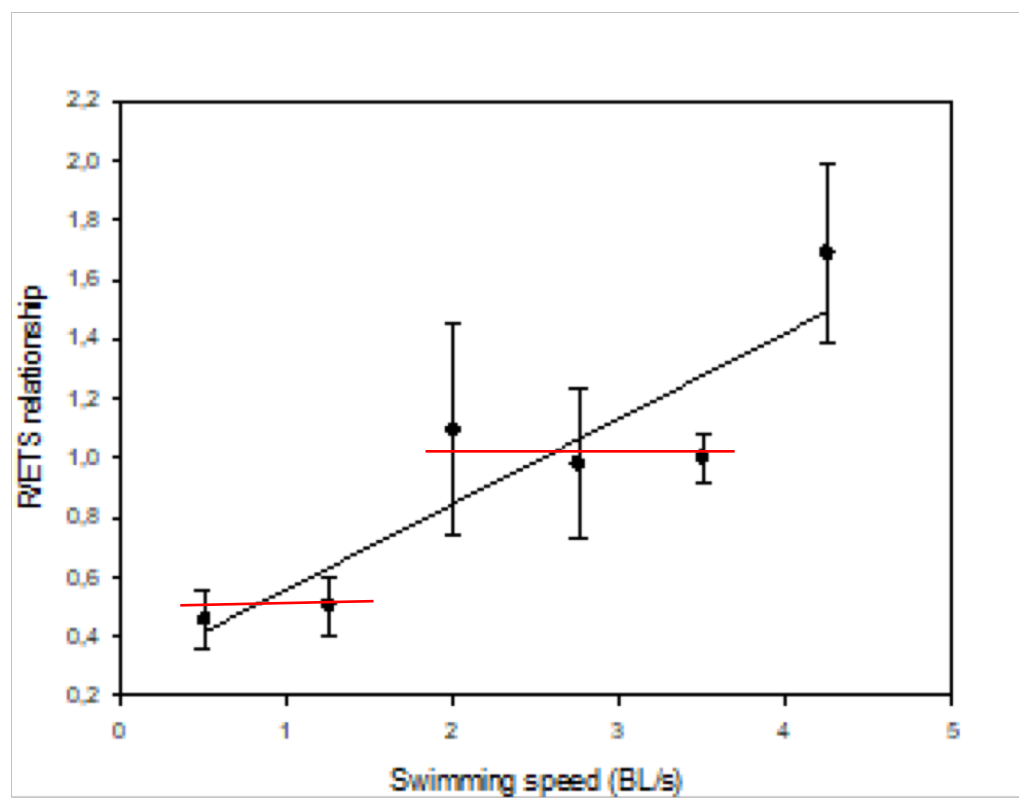
(Rummer et al., 2016)

M&Ms

- 21 gilthead sea bream (47.1 ± 9.8 g) .
- Fasted for 24 hours.
- Acclimation time 5 hours at $0.5 \text{ BL}\cdot\text{s}^{-1}$.
- Fixed speed experiments: one fish for each speed at 0.5, 1.25, 2, 2.75, 3.5, and $4.25 \text{ BL}\cdot\text{s}^{-1}$. Eight flush-wait-measurement cycles for each speed. Three replicates for each speed (18 fishes).
- Increasing speed: same fish for all speed measurements (3 replicates) 5 flush-wait-measurement cycles for each speed (30 cycles/fish)







R/ETS relationship:

- Varied between 0.4 and 1.5
- Similar to those determined for zooplankton (Hernández-León and Gómez, 1996).

Diel vertical migration swimming speed is 2 BL/s (Davison et al., 2013).

- Fish contribution to active transport of carbon as a function of energy expenditure in swimming
- Maximal R/ETS relationship during migration is 0.9
- Minimal R/ETS relationship during migration is 0.4

Next

- To find an appropriated test fish.
- To keep mesopelagic fish individuals alive for real O₂ consumption rates measurements.
- Unknown contribution of buoyancy ability to reduce energy expenditure by swimming.

Thanks