## Comparison of Estimates of MR

* SMR is a component of FMR.
  + Studies predict that fish with higher FMR will also have higher SMR.
  + Positive relationship.
* Opposite found in our study.
  + Negative linear relationship.
  + Fishes with high SMR had low FMR?

## Body Mass and Temp

* Between species:
  + Body mass no significant influence on M.
  + Temperature had very slight negative influence on M.
* In conflict with equation 1, and MTE.
  + Maybe other theories too. MTLB? OCLTT?
* Overall parameterisation:
  + Did not account for uncertainty in ETS to oxygen consumption calibration.
    - E.g. Ariza used an ETS/R of 2, while Ikeda used 1.16.
    - Different values, but this uncertainty not worked in.
* Temperature:
  + Studies used to parametrise equation 1 had much greater temp range than estimated.
    - 0.5 – 20.0C compared to -3.4 – 3.9 C (HDPI) in our study.
  + May have overinflated positive relationship with temperature when predicting SMR for fishes from similar temperatures.
* Body mass:
  + More similar range used to parameterise equation 1.
    - 0.026 – 40g compared to 0.5 – 38.7g.
  + Still body mass has no significant influence on M.
* Species captured most variation in M.
* Assuming that body mass and temp do have significant influence on SMR, suggests that growth, reproduction, movement and excretion may have bigger influence on FMR than SMR does.
  + Cannot predict FMR based on SMR.

## Ecological Factors - Movement

* Difficult speculate on growth, reproduction or excretion, but can speculate on movement.
* Different species do different levels of DVM – Watanabe et al. 1999
* KRA known to undertake DVM, as are ELN and GYR.
  + Broad depth distribution – regularly found between 0-1000m.
* No conclusive evidence of DVM for GYN, as with ELC and PRM.
  + Still found down to 1000m, but generally restricted to above 700m (GYN) or above 400m (PRM and ELC).
* Assume from ecology that KRA, ELN and GYR are expending more energy for movement than GYN, PRM and ELC, would explain differences in M that aren’t seen in estimates of FMR.
* Also, some reports that GYN may become benthopelagic in later life.
  + Reduced movement compared to pelagic fishes, so would have lower FMR (Killen 2016).

## Ecological Factors – Life History

* Slight negative relationship with M – artefact due to ecology.
* Species with low mean M (GYN, PRM and ELC) are more common in the northern SS.
  + Temps are warmer.
  + May not complete whole lifecycle in Scotia Sea.
    - Adults migrate in.
  + At the lower end of temperature range 🡪 lower metabolic rate
    - Get refs for this.
* Species with higher mean M (KRA, ELN, GYR) more common in the southern SS, in cooler waters.
  + True Antarctic species.
    - Complete whole lifecycle in Scotia Sea.
  + Able to maintain higher FMR at lower temperatures.

## Within Species

* Body mass and temperature generally not good predictors of M within species.
* Exception is for P. bolini – M increases with log body mass.
  + Opposite of expected according to metabolic theories (MTE) and previous studies.
  + Unclear why this is the case.
  + More research needed on a large sample size.