## D13C - Initial Plots

### Boxplot

* Most negative d13C (highest MR):
  + E. Antarctica
  + G. braueri
  + K. andersoni
* Least negative d13C (lowest MR):
  + E. carlsbergi
  + G. nicholsi
  + P. bolini
* Action: gather ecological data on these species to investigate differences.

### Log10\_Weight vs. d13C

* Decrease in d13C with weight with E. carlsbergi and G. nicholsi as outliers.
  + Decrease in mass specific metabolic rate with weight (expected).
* Action: perform proper analysis.

### D18O vs. d13C

* Decrease in d13C with increase in d18O. H
  + Higher metabolic rate at lower temperatures (counter-intuative).
* Action: convert d18O into temperature and perform proper analysis.

### D13C with Depth

* Nothing interesting on the metabolic side.
* E. carlsbergi and G. braueri mostly caught shallow (>250m).

## D13C – Sherwood & Rose Comparison

### Species Comparisons

* E. Antarctica – same value as *Chaetodon ulietensis* (Pacific double-saddle butterflyfish, Chaetodontidae).
* G. braueri – same value as *Oncorhynchus nerka* (sockeye salmon, Salmonidae).
* K. andersoni – same value as *Maena maena* (now *Spicara maena,* blotched picarel, Centracanthidae).
* E. carlsbergi – same values as *Clupea pallasii* (Pacific herring, Clupeidae).
* G. nicholsi – same values as *Beryx splendens* (splendid alfonsino, Berycidae) and *Osmerus mordax* (rainbow smelt, Osmeridae).
* P. bolini – between *Centrolophus niger* (rudderfish, Centrolophidae) and *Merluccius merluccius* (European hake, Gadidae).
* Possible action?: run data against known RMR and compare.

### K\_caud vs. d13C

* Plots within the range of Sherwood & Rose fishes.
* G. nicholsi and E. carlsbergi plot within CI from Sherwood & Rose.
* P. bolini, K. andersoni, E. Antarctica all plot below line.
  + Lower d13C than expected given K\_caud.
  + High metabolic rate for activity level.
  + C. maderensis is also below the line.

### D18O vs. d13C

* Higher d18O than Sherwood & Rose fishes.
  + At lower temperatures.
* G. braueri, E. carlsbergi and P. bolini are all plotting within the extrapolated relationship.
* K. andersoni, E. Antarctica and G. braueri all plotting below the line.
  + Lower d13C than expected given d18O.
  + High metabolic rate for temperature.
  + Also seen in C. maderensis.
  + Not metabolic cold adaptation, or it would affect all of them?
* Possible action?: look into metabolic cold adaptation.