**Notes on metabolism fits for 2016-11-07 folder**

Metabolism results for each lake are based on parameters set below. These parameter sets produced the best metabolism fits for each lake, we can discuss whether we should be consistent across lakes (use same parameters) or seek the best fitting models. I also played around with fitting over multiple days and this did not produce good results for most lakes, however, improved some lake days – I decided to just stick to fitting over 1 day since it only improved a couple of days for one lake (Crampton). – Jake

Options:

1. OE (observation error fits initial DO) vs PE ( process error sets initial DO to observed initial DO)
2. Logged indicates that GPP and R parameters are constrained realistic (positive for GPP, negative for R)
3. Guesses sets the initial guesses supplied to the optim() function in R
4. Sunrise = T indicates that the metabolism model is fit from sunrise to sunrise for a given day rather than from midnight to midnight.

**Column descriptions in ‘lake\_metabEst.txt’ files:**

year: year

doy: day of year

GPP: gross primary production; units: mg O2 L-1 day-1

R: respiration; units: mg O2 L-1 day-1

NEP: net ecosystem production; units: mg O2 L-1 day-1

GPP\_SD: bootstrapped standard deviation for GPP; units: mg O2 L-1 day-1

R\_SD: bootstrapped standard deviation for R; units: mg O2 L-1 day-1

gppCoeff\_SD: bootstrapped standard deviation for GPP coefficient; units: mg O2 L-1day-1(µmol m-2 sec-1)-1

rCoeff\_SD: bootstrapped standard deviation for R coefficient; units: mg O2 L-1day-1(°C)-1

doInit\_SD: bootstrapped standard deviation for initial DO; units: mg L-1

nll.nll: negative log likelihood

converge.converge: did the model converge or not; 0 = yes, 1=no

**Acton –** ‘OE’, logged, guesses = (1e-3,1e-3) for gpp and r, sunrise = T

**Acton\_2010** – ‘OE’, logged, guesses = (1e-2, 1e-2) for gpp and r, sunrise = T

**Crampton** – Observation error, logged parameters, guesses = (1e-5, 1e-4) for gpp and r. Simulating over multiple days produced more realistic estimates of metabolism (less near zero estimates); however, the fits to the data (do.obs) were worse. Fitting from sunrise to sunrise produced better fits than midnight to midnight.

**EastLong** – ‘OE’, logged, guesses = (1e-3,1e-3) for gpp and r, sunrise = T

**Feeagh** – ‘OE’, logged, guesses = (1e-5, 1e-5) for gpp and r, sunrise = T

**Harp** – ‘PE’, logged, guesses = (1e-3, 1e-3) for gpp and r, sunrise = T

**Langtern 2013** – ‘PE’, logged, guesses = (1e-4, 1e-4) for gpp and r, sunrise = T

**Langtern 2014** – ‘PE’, logged, guesses = (1e-3, 1e-3) for gpp and r, sunrise = T

**Lillinonah** – ‘OE’, logged, guesses = (1e-3,1e-3) for gpp and r, sunrise = T

**Lillsjoliden** – ‘PE’, logged, guesses = (1e-4,1e-4) for gpp and r, sunrise = T

**Mangstrettjarn** – ‘OE’, logged, guesses = (1e-3,1e-3) for gpp and r, sunrise = T

**Mendota** – ‘PE’, logged, guesses = (1e-2, 1e-2) for gpp and r, sunrise = T

**Morris** – ‘OE’, logged, guesses = (1e-3,1e-3) for gpp and r, sunrise = T

**Nastjarn** – ‘OE’, logged, guesses = (1e-3,1e-3) for gpp and r, sunrise = T

**Ovre** – ‘OE’, logged, guesses = (1e-3,1e-3) for gpp and r, sunrise = T

**Struptjarn** – ‘OE’, logged, guesses = (1e-3,1e-3) for gpp and r, sunrise = T

**Trout** – ‘OE’, logged, guesses = (1e-5, 1e-5) for gpp and r, sunrise = F

**Vorstjarv** – ‘OE’, logged, guesses = (1e-3,1e-3) for gpp and r, sunrise = T