- Date: 13-Dec-2016, By: MF/MLML; rev: 13Dec2016
- What: Predicted Exposure Time for BS02
- Input:Ir/Radiance for Es/Ed & Lu via MOBY260 (uW/cm^2/sr/nm)Ir/Radiance for FEL & OL425 cal lamps (uW/cm^2/sr/nm)Approximate Es/Ed & Lu Responses for BS02 in MOBY261 (ADU/pix/sec)/(uW/...)
- <u>Output:</u> Predicted Net Signal (ADU/pix/sec) = BS Response * Ir/Radiance Predicted Exposure Time (sec) = 50,000 (ADU/pix) / Pred. Net Sig. (ADU/pix/sec)



Figure 1. Expected Ir/Radiance levels: in-water & cal-lamp

<u>From: Stephanie Flora flora@mlml.calstate.edu</u> Date: 13-Dec-2016 00:47 To: feinholz@mlml.calstate.edu</u> Mike, This is currently my best shot at a resps. We only have ~3 good MOBY data sets. Also the Es and Ed data are taken at a VERY short integration times. Besides the light variable with the short int times I think there is a int time calibration issue. For the Lu resps I used the Lu data with the longer int times (mostly over 1 sec some around 1.5 s). The responses are VERY variable. The delta times from the BS02 data and the MOBY data vary from a few minutes to ~25 minutes. Good luck! Steph (Attached: plt_inwater_comp_rsp.txt 229KB)



Figure 2. Approximate BS02 System Responses

Multiplying BS02 Es/Ed System Response (Fig.2 bot) by Expected in-water Irradiance levels (Fig.1) gives Predicted Net Signal (ADU/pix/sec), shown in **Figure 3**, below. Dividing an approximate maximum 50k (ADU/pix) Net Signal by Predicted Net Signal gives

Predicted Exposure Time: Es at 0.28 sec, EdTop at 0.49 sec, EdMid at 0.33 sec, EdBot at 1.1 sec

...which seems to agree with Stephanie's email, above, stating: "Es and Ed data are taken at a VERY short integration times"



Figure 3. Predicted Net Signal for in-water Irradiance

Multiplying BS02 Lu System Response (Fig.2 top) by Expected in-water Radiance levels (Fig.1) gives Predicted Net Signal (ADU/pix/sec), shown in **Figure 4**, below. Dividing an approximate maximum 50k (ADU/pix) Net Signal by Predicted Net Signal gives

Predicted Exposure Time: LuTop at 3.9 sec, LuMid at 2.7 sec, LuBot at 4.0 sec

...which is somewhat longer than what Stephanie's email states:

"For the Lu resps I used the Lu data with the longer int times (mostly over 1 sec some around 1.5 s)"



Figure 4. Predicted Net Signal for in-water Radiance

Similarly, the product BS02 Es/Ed Response and FEL Irradiance gives Predicted Signal, **Fig.5**, and the quotient max 50k (ADU/pix) Net Signal and Predicted Net Signal gives:

Predicted Exposure Time: Es at 2.2 sec, EdTop at 2.7 sec, EdMid at 1.6 sec, EdBot at 2.4 sec

I.E. for Irradiance Calibration scans



Figure 5. Predicted Net Signal for FEL Irradiance cal lamp

Lastly, the product of BS02 Lu Response and OL425 Radiance gives Predicted Signal, **Fig.6**, and the quotient max 50k (ADU/pix) Net Signal and Predicted Net Signal gives:

Predicted Exposure Time: LuTop at 3.9 sec, LuMid at 0.86 sec, LuBot at 1.0 sec

 \dots which is biased by the probably unrealistic Lu response turn-up above ~690 nm in Fig.2 (top) \dots so, for Fig.6 Predicted Signal less than 690 nm:

Predicted Exposure Time: LuTop at 10.5 sec, LuMid at 6.7 sec, LuBot at 9.6 sec

I.E. for Radiance Calibration scans



Figure 6. Predicted Net Signal for OL425 Radiance cal lamp