

Chlorophyll-a Real Time QC

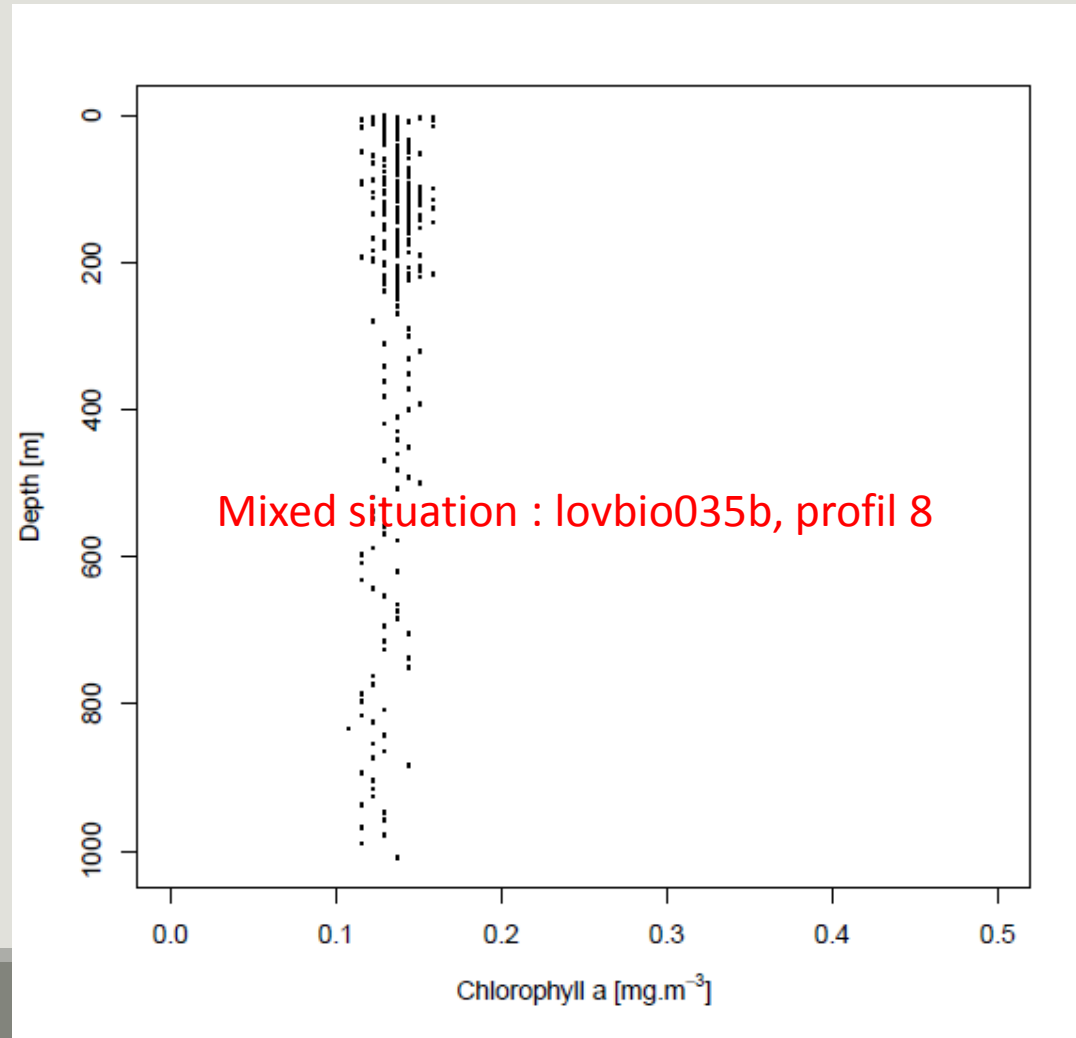
ACTIONS 4,6,7,8

Important points to account for RT-QC

- Value at depth should be zero
- Global Range
- Spikes
- Gradient
- Non-photochemical quenching

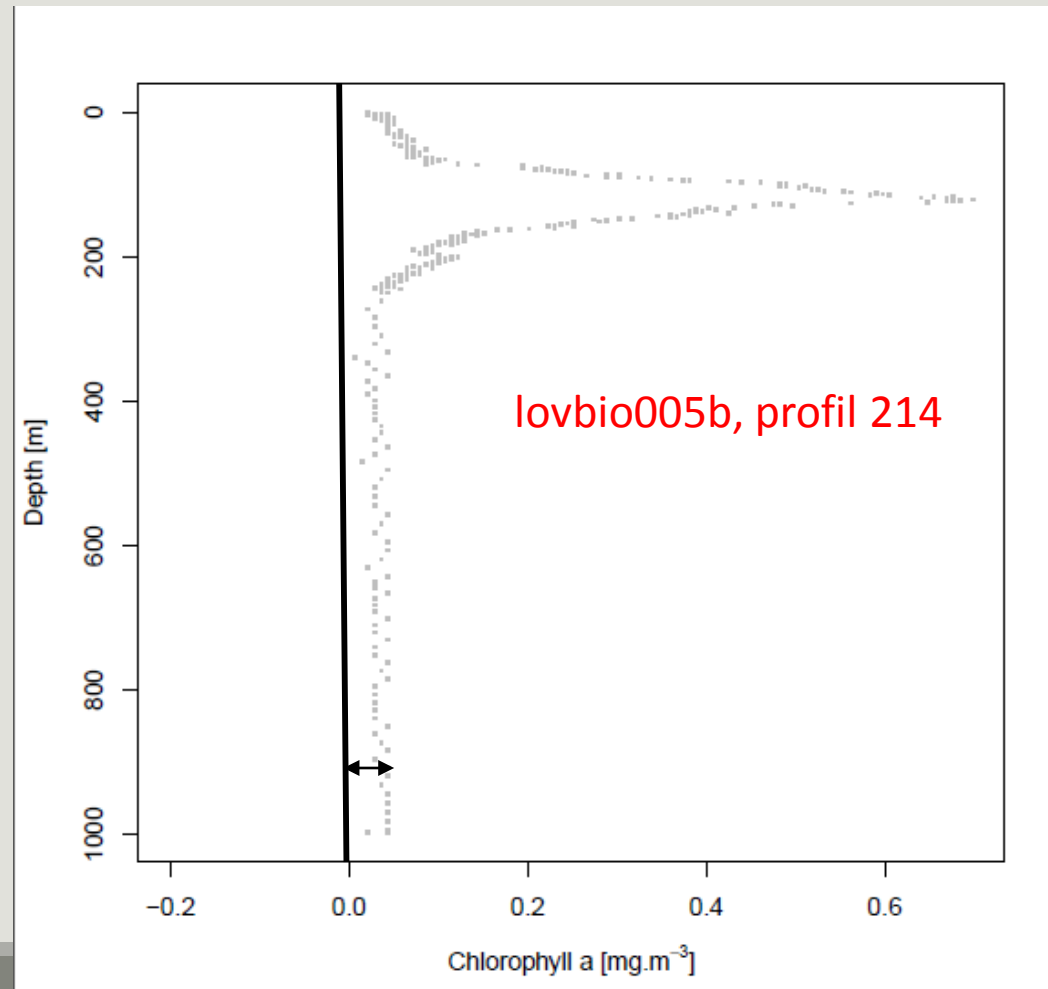
Value at depth

$$\text{CHLA} = (\text{RAW_CHLA} - \text{DARK_CHLA}) * \text{SCALE_CHLA}$$



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Values at depth

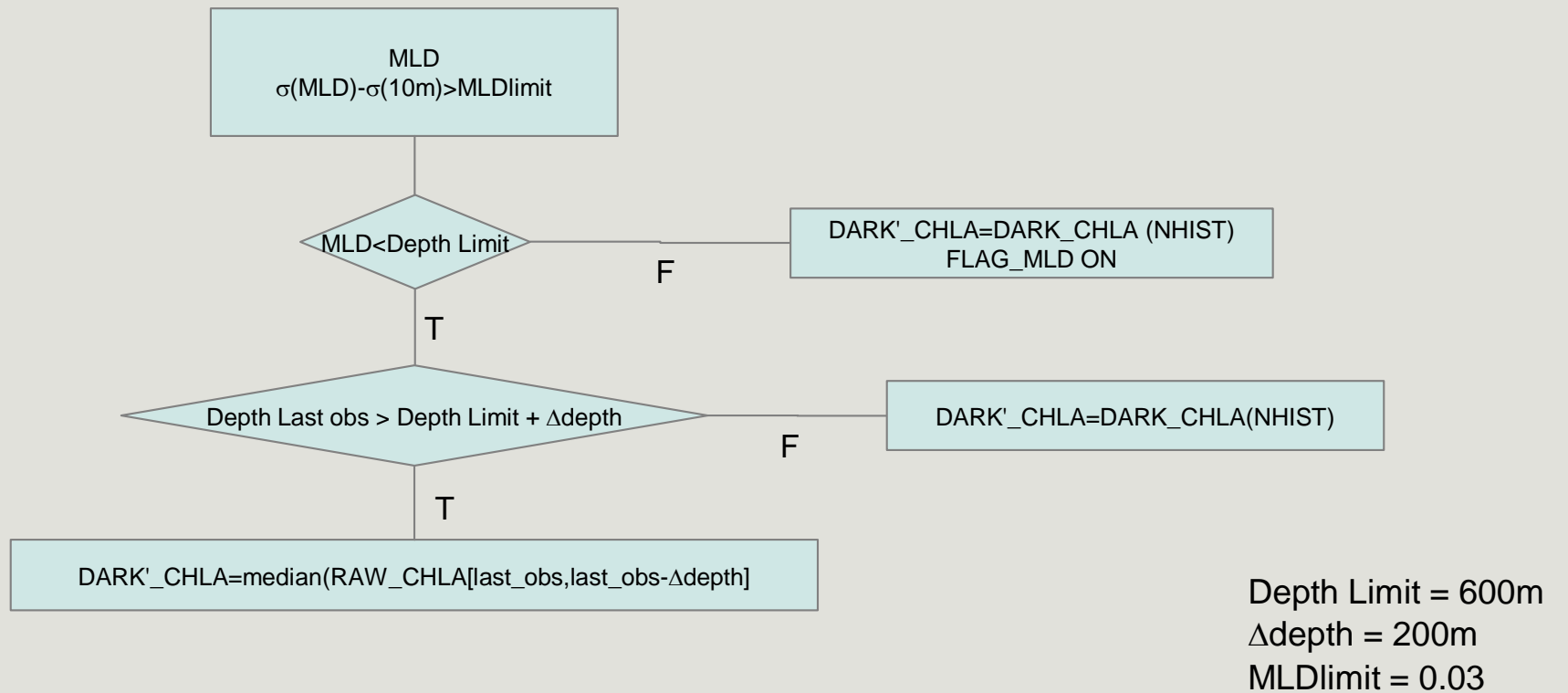
$$\text{CHLA} = (\text{RAW_CHLA} - \text{DARK_CHLA}) * \text{SCALE_CHLA}$$

Calculation of the Mixed Layer Depth (MLD)

- If the MLD is deeper than a Depth Limit
 - => The water column is well mixed
 - => No assumption can be made for the value of the chlorophyll-a at depth
 - => The Dark_chla value is the manufacturer coefficient or the last calibration
- If not
 - if the last Chlorophyll-a observations is deep enough
 - => We can assume that the value at depth is 0
 - if not
 - => No assumption can be made for the value of the chlorophyll-a at small depth
 - => The Dark_chla value is the manufacturer coefficient or the last calibration

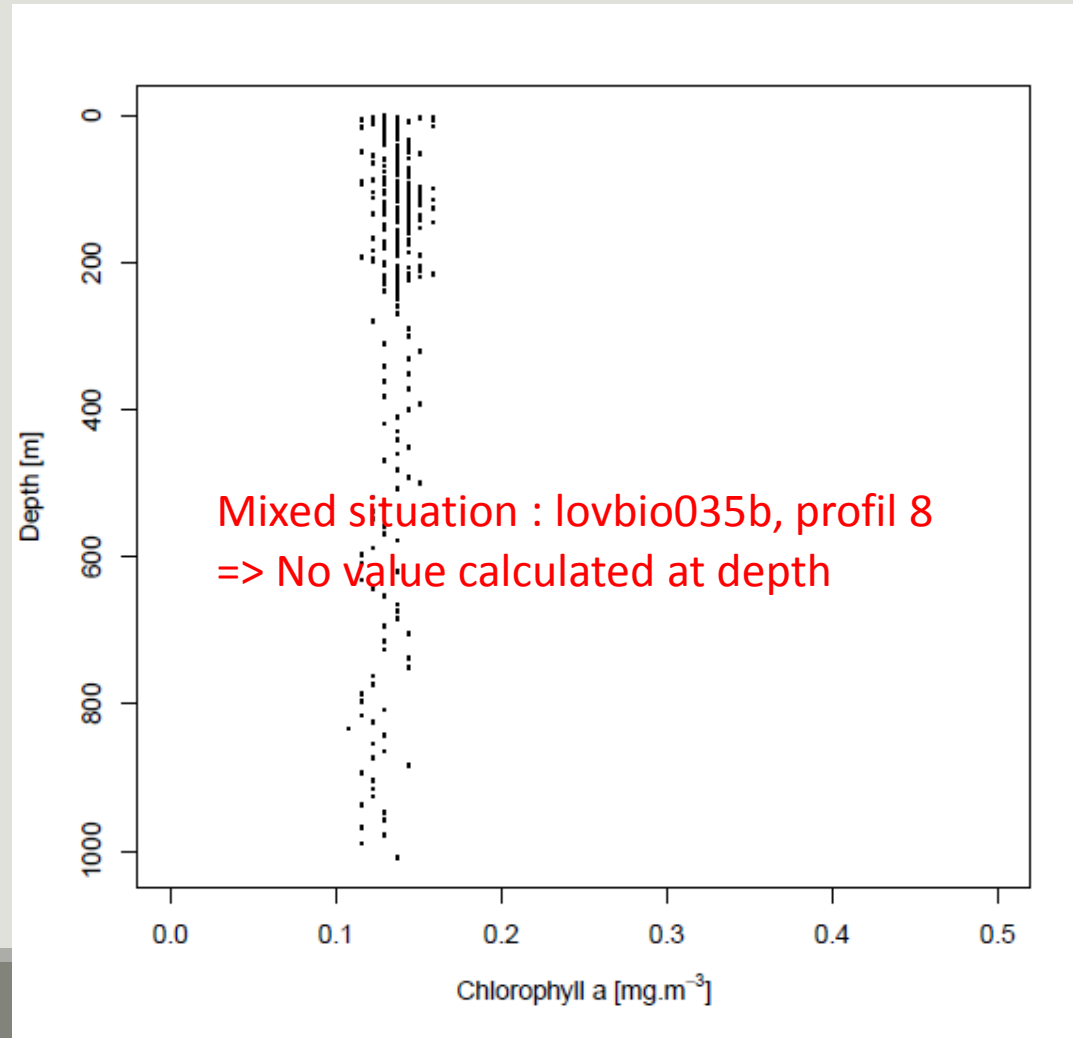
Values at depth

$$\text{CHLA} = (\text{RAW_CHLA} - \text{DARK_CHLA}) * \text{SCALE_CHLA}$$



Value at depth

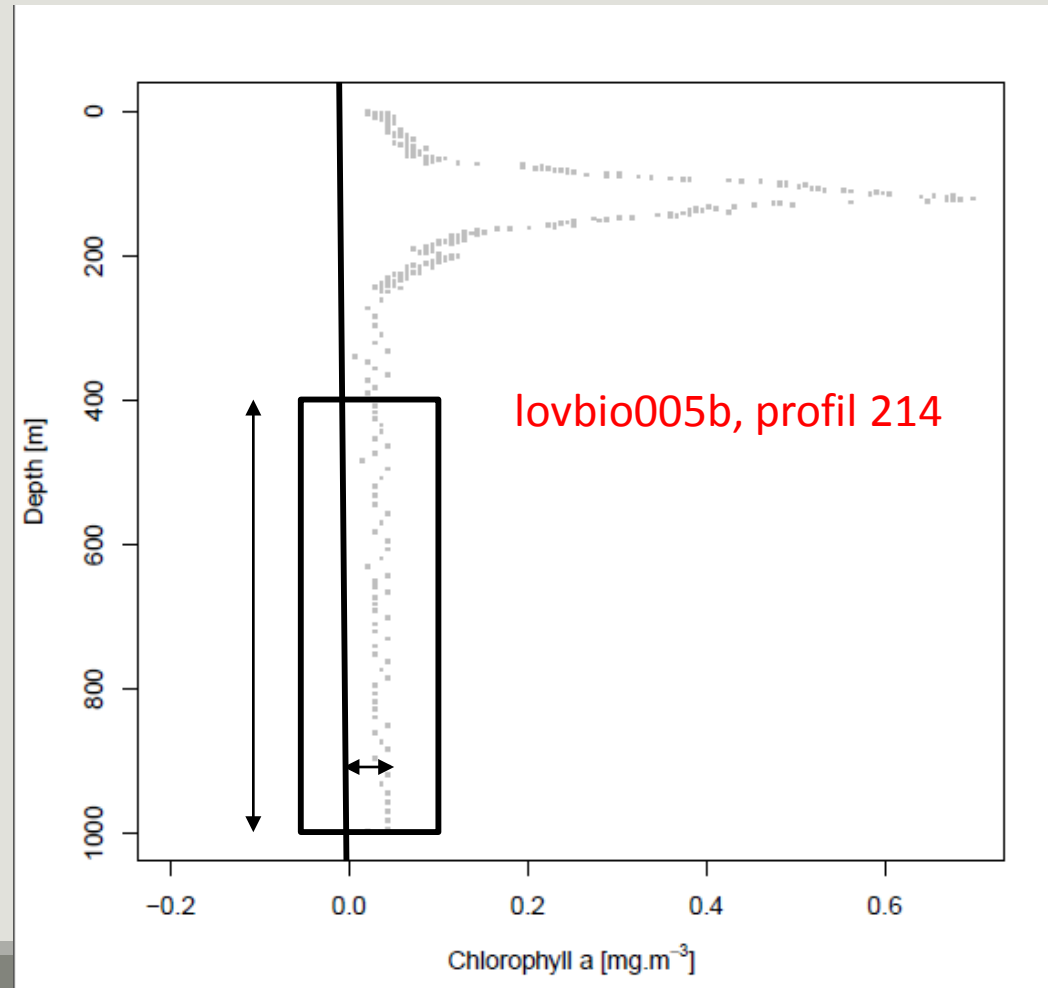
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Value at depth

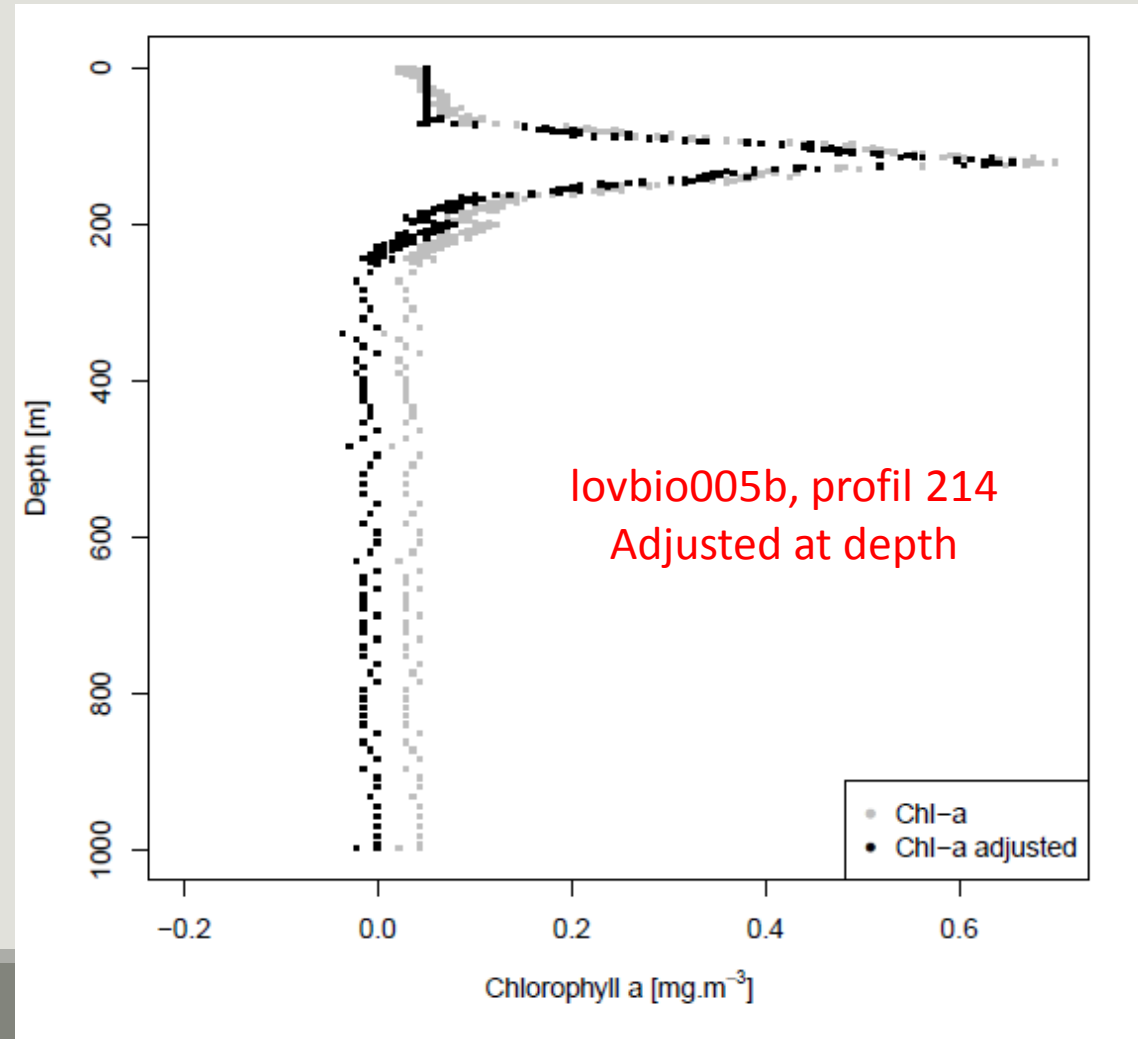
$$\text{CHLA} = (\text{RAW_CHLA} - \text{DARK_CHLA}) * \text{SCALE_CHLA}$$

Estimation of the median
of the value at depth



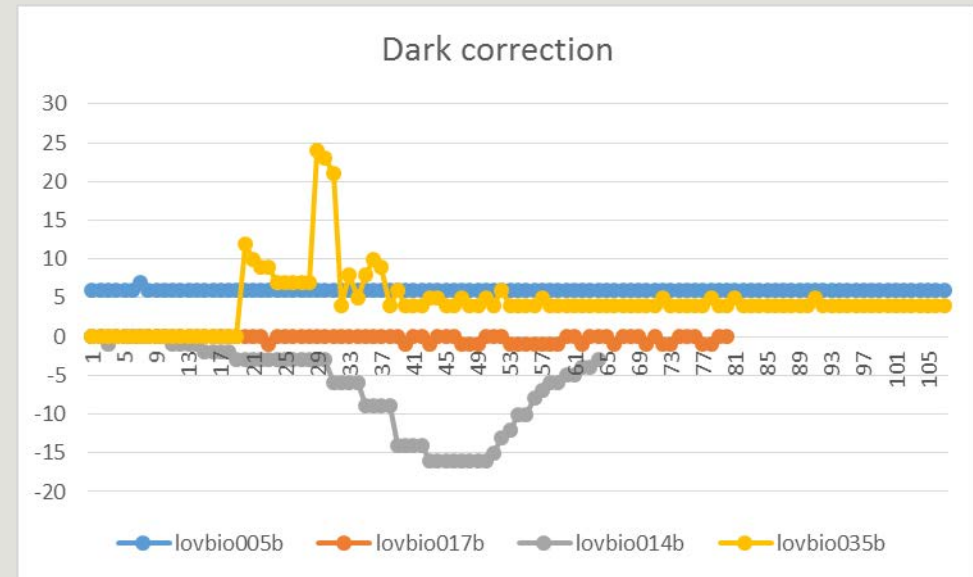
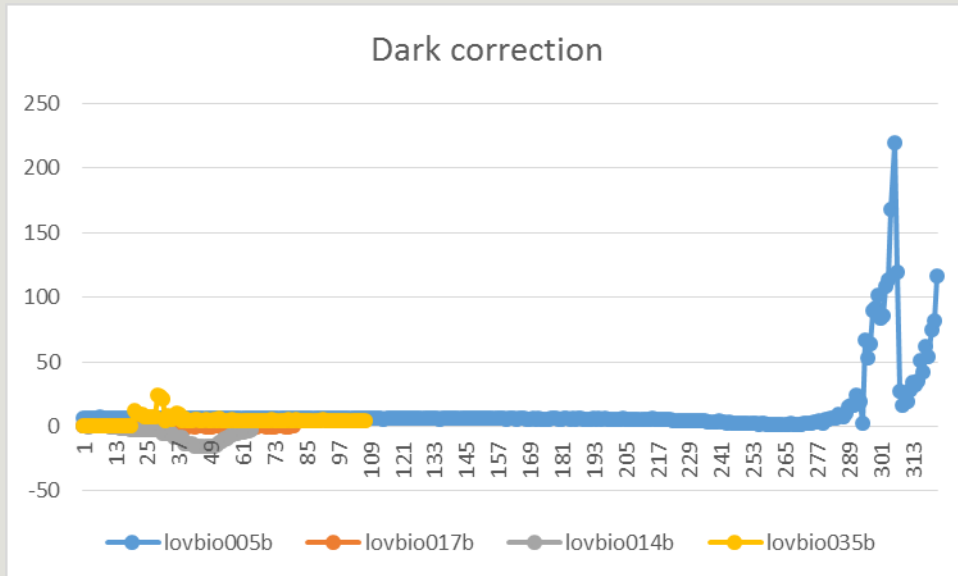
Value at depth

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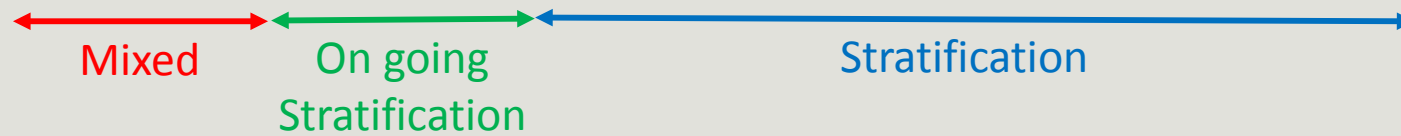
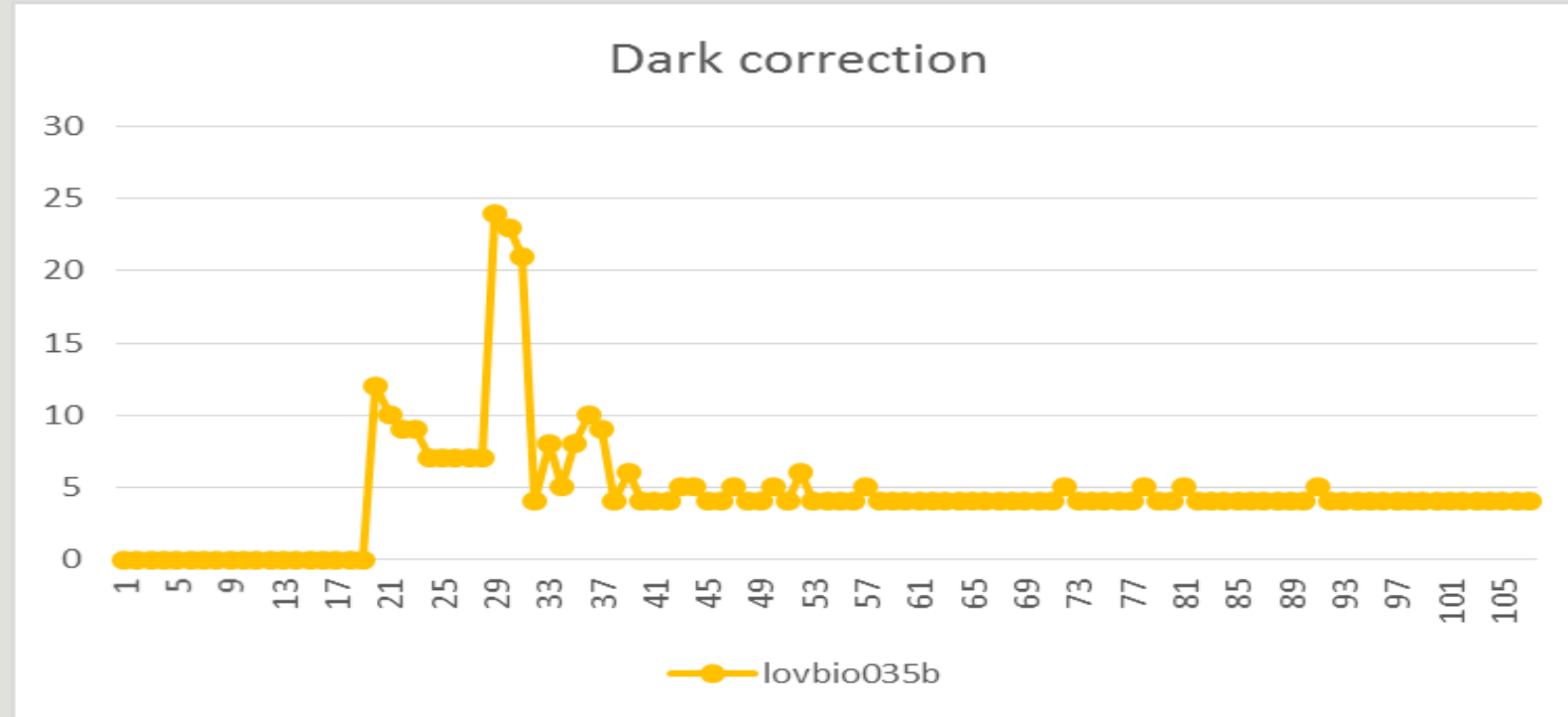
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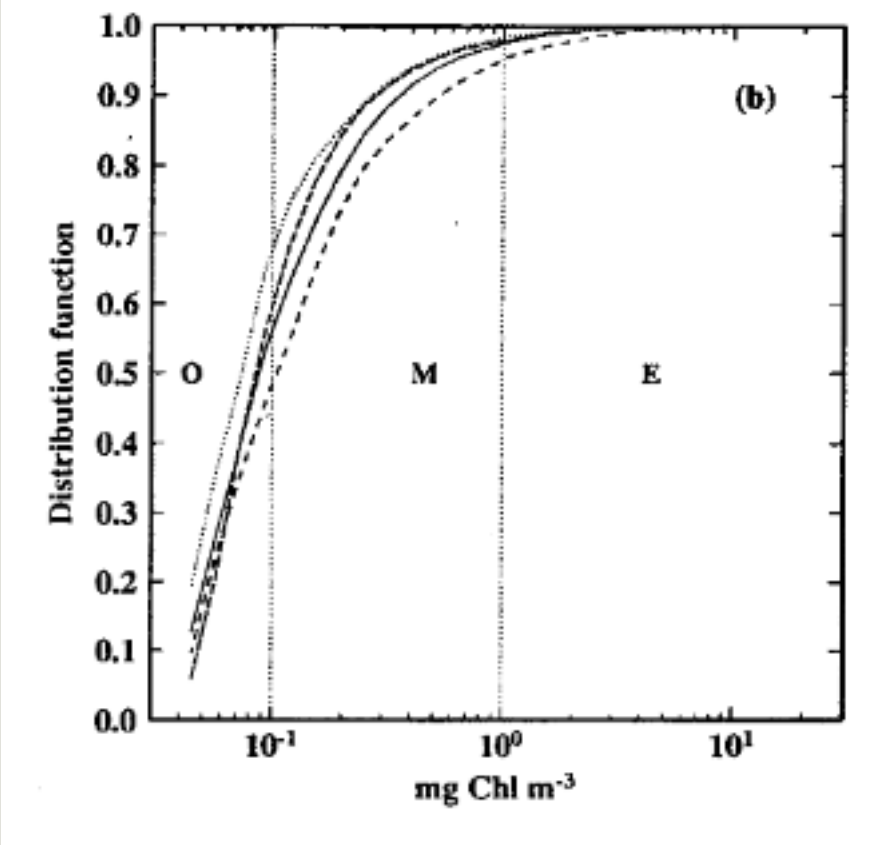
Value at depth

$$\text{CHLA} = (\text{RAW_CHLA} - \text{DARK_CHLA}) * \text{SCALE_CHLA}$$



Global range

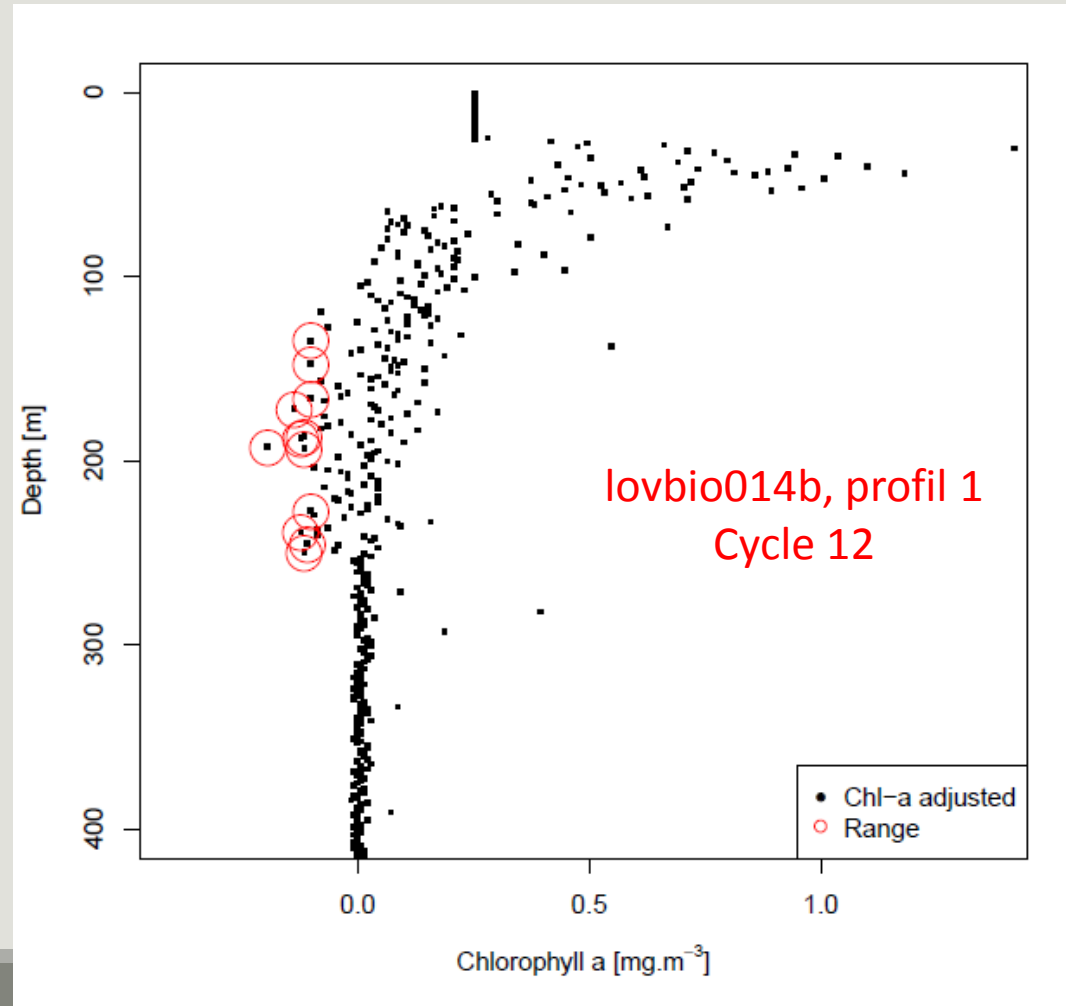
Range Test
-0.1mg/m³ – 50mg/m³



From Antoine, D., André, J.M. and A. Morel, *Global Biogeochemical Cycles* (1996)

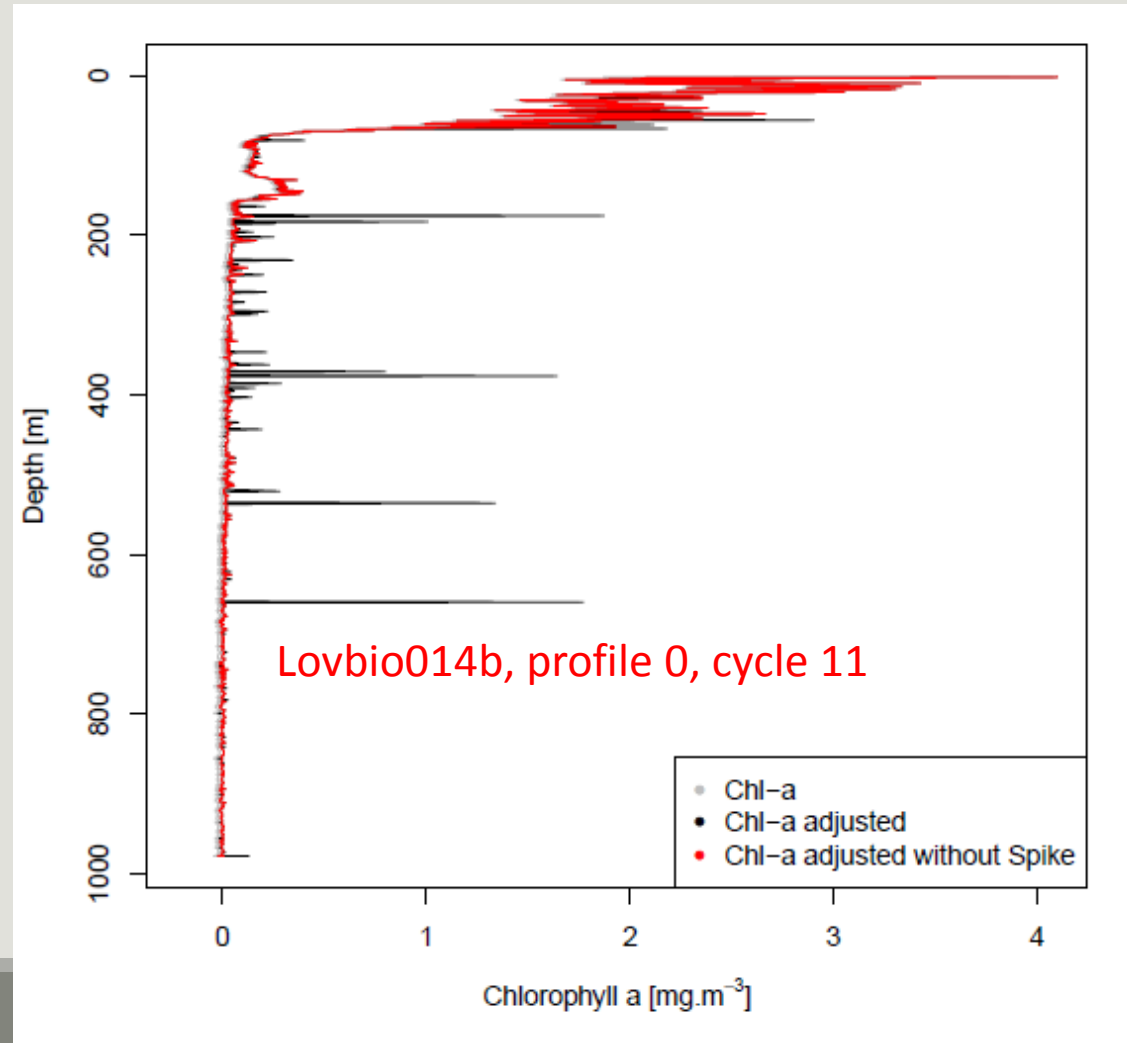
Global range

Range Test
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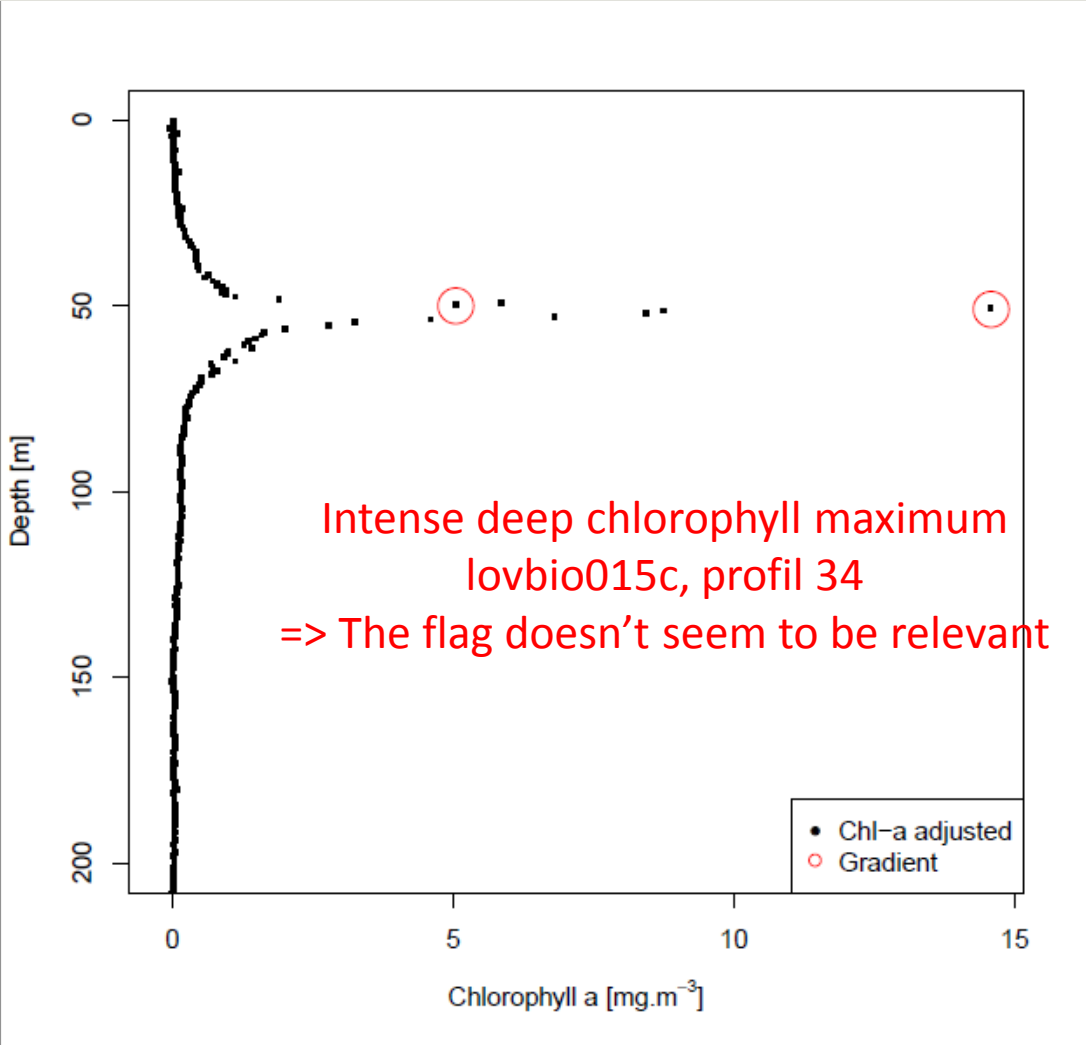
Spike test

Spike Test
Threshold_Value = median(V0,V1,V2,V3,V4) ± 3*MAD (V0,V1,V2,V3,V4)



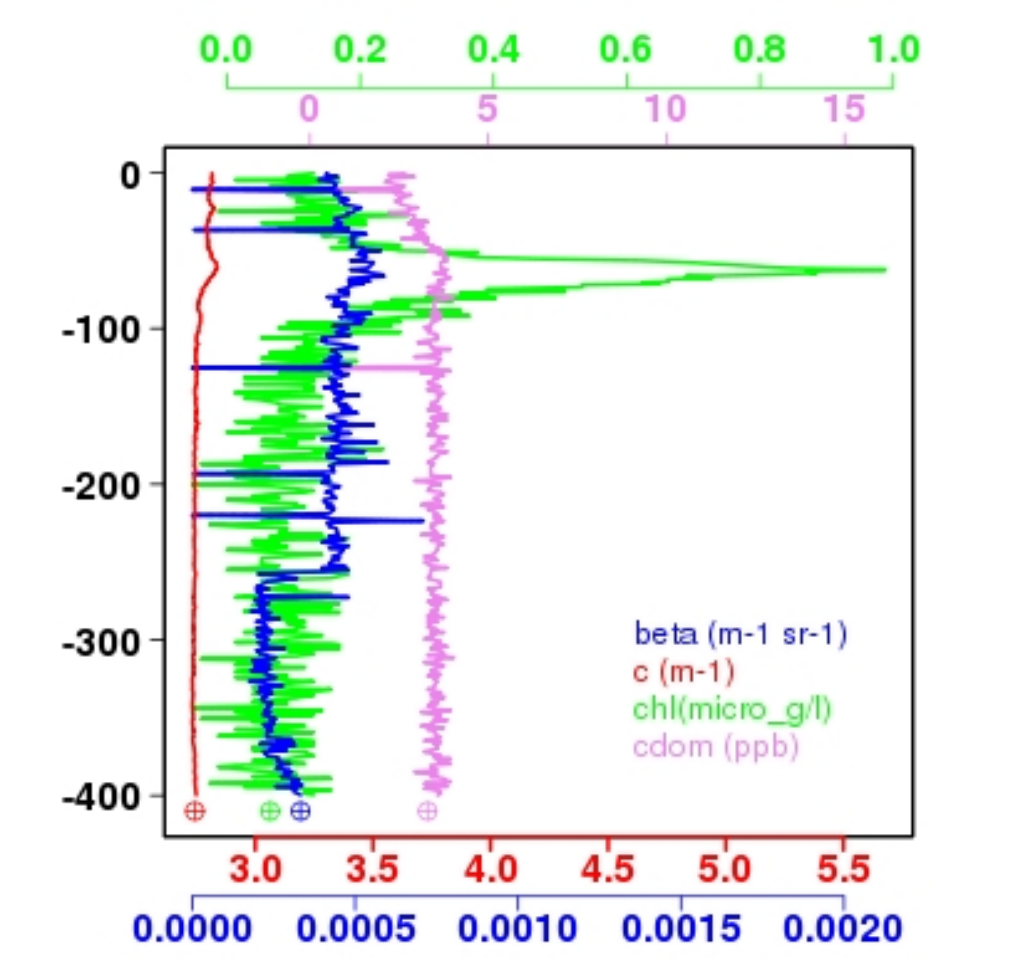
Gradient test

Gradient Test
Test_value= $|V2 - (V3 + V1)/2|$
Threshold=3mg/m³

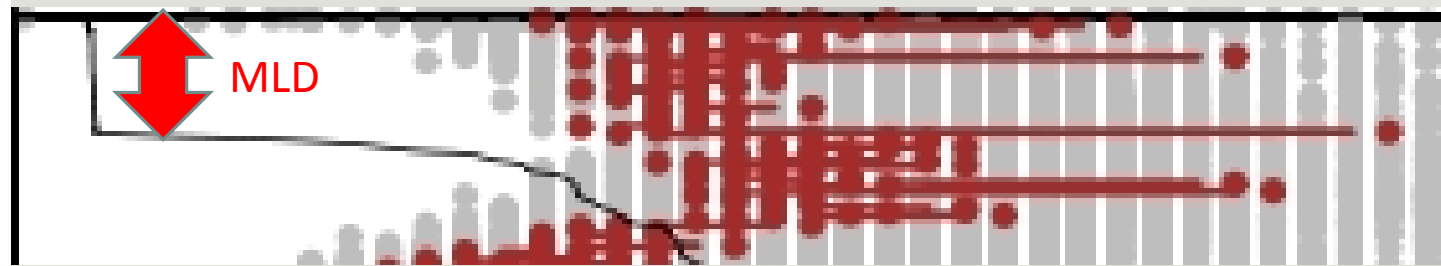
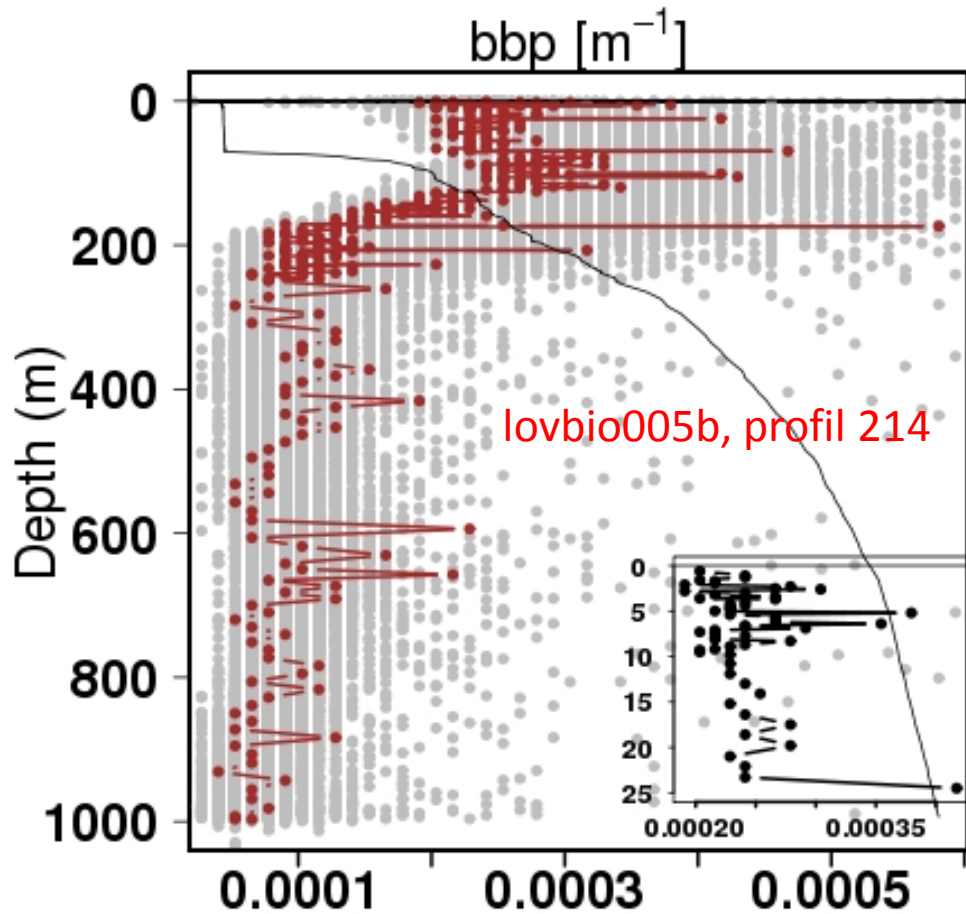


Gradient test

Gradient Test
Test_value= $|V2 - (V3 + V1)/2|$
Threshold=3mg/m³

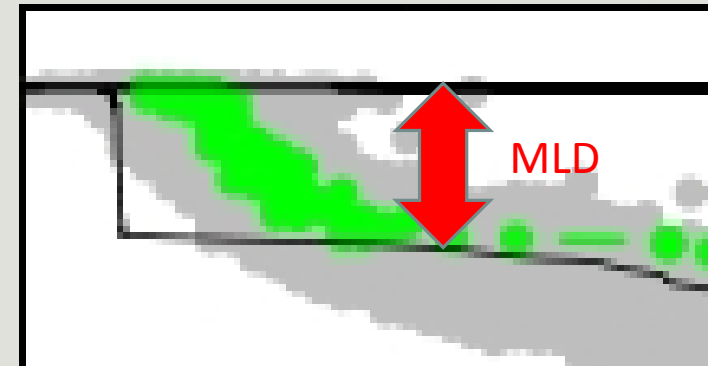
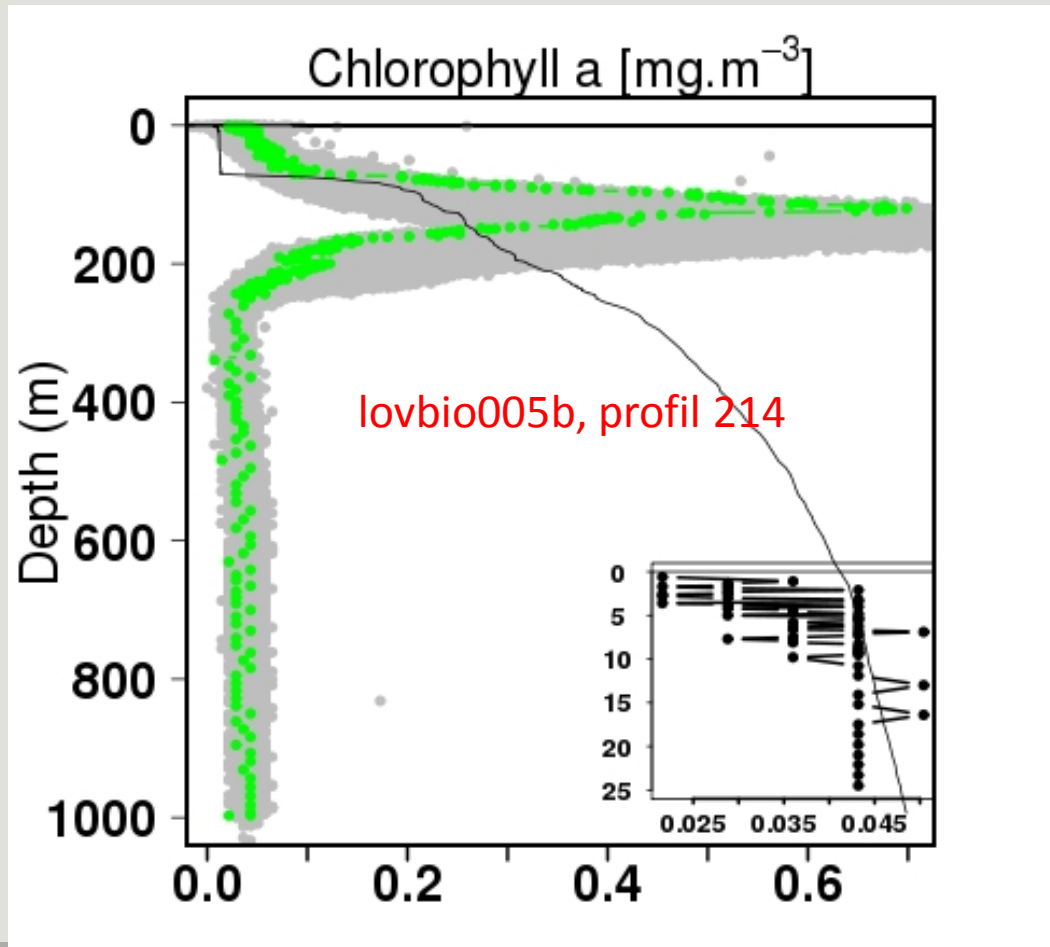


NPQ Correction



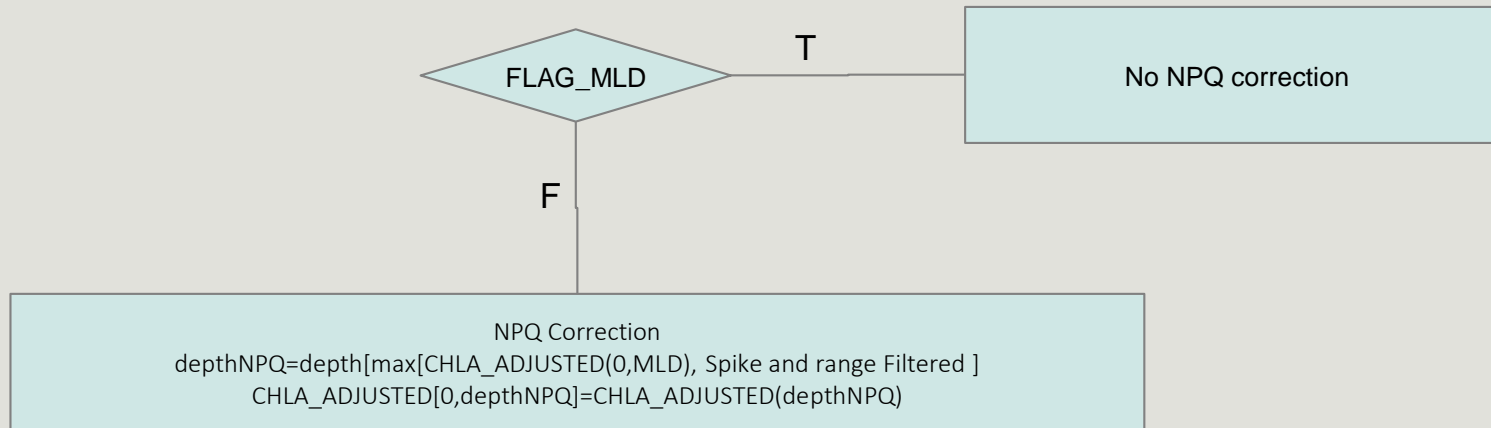
In the Mixed layer, the particle backscattering is homogeneous

NPQ Correction



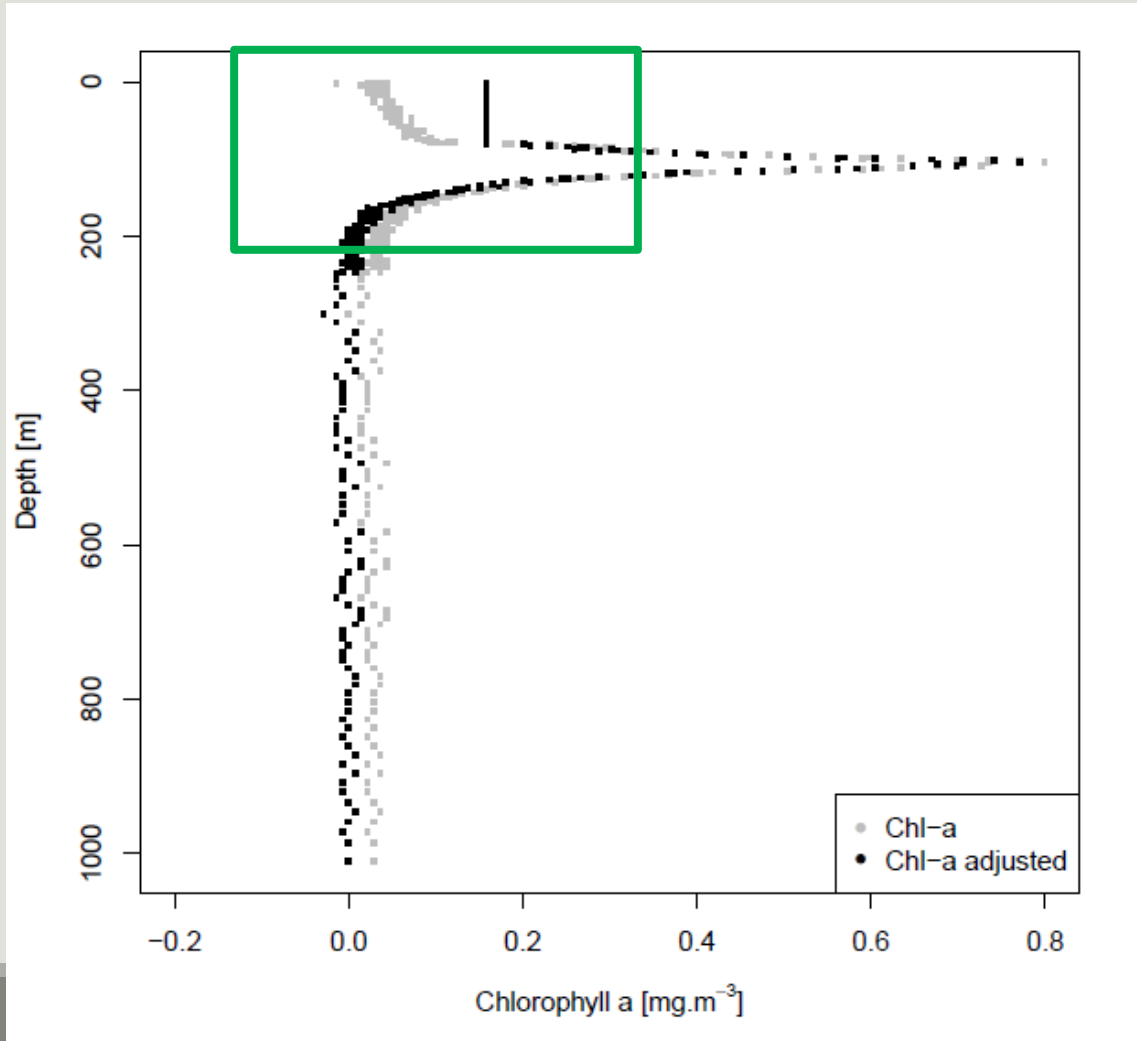
In the Mixed layer, the chlorophyll-a concentration should also be constant.

NPQ Correction

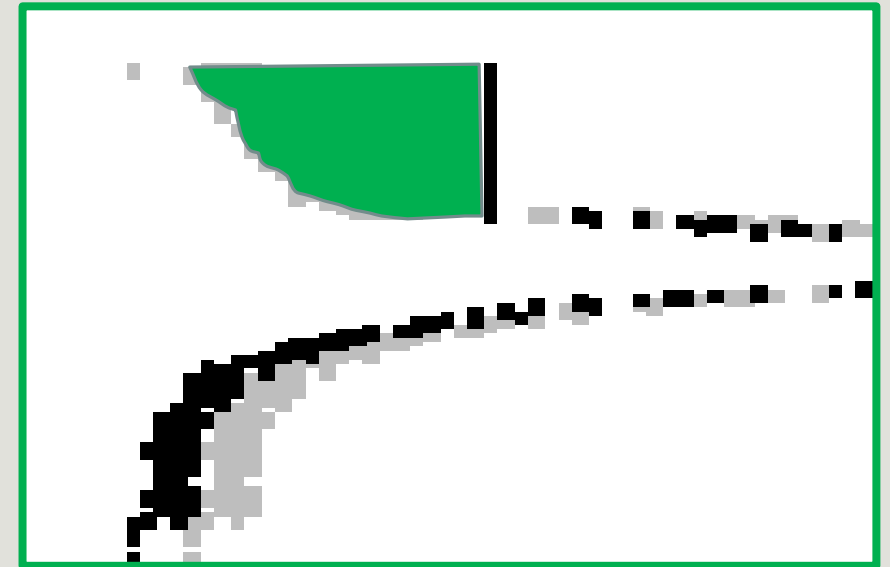


Xing et al., 2011

NPQ Correction



Lovbio005b, profile 230



NPQ Correction

