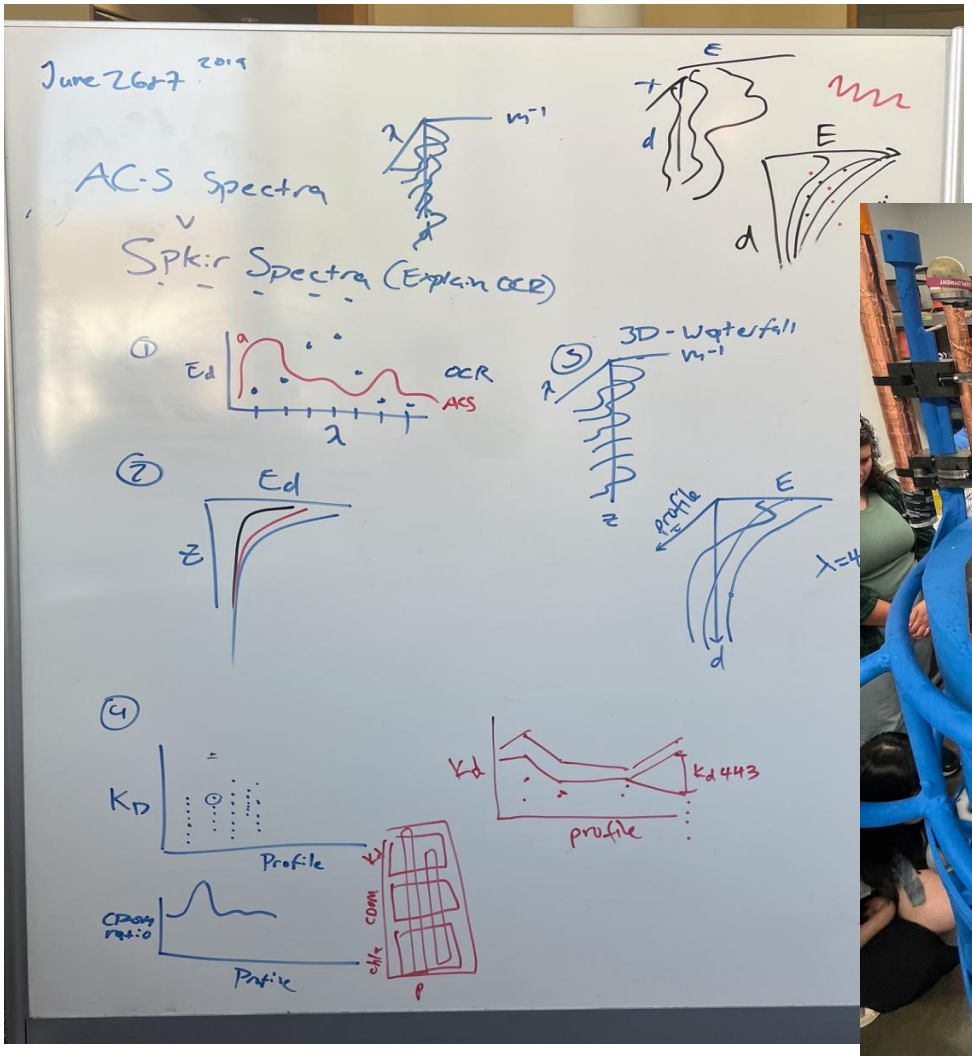
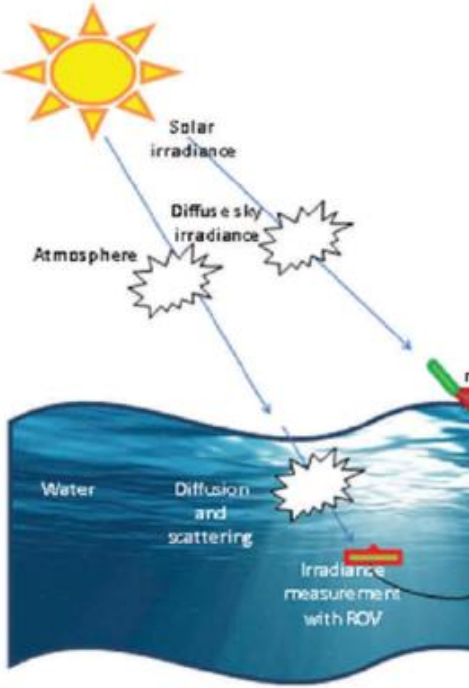
AOPs & IOPs: the search for optical closure

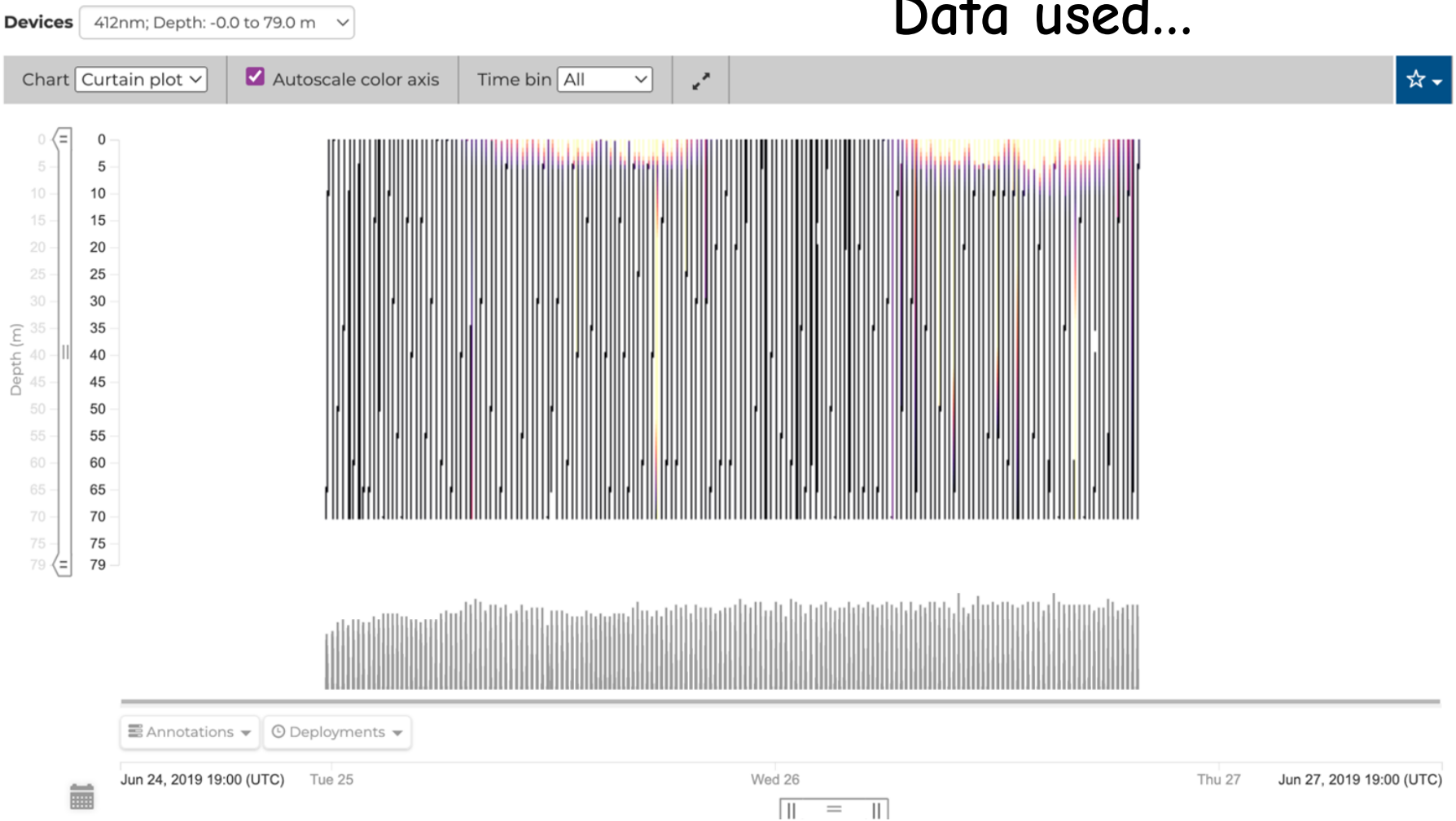
Turner Alexander

Spectral Irradiance



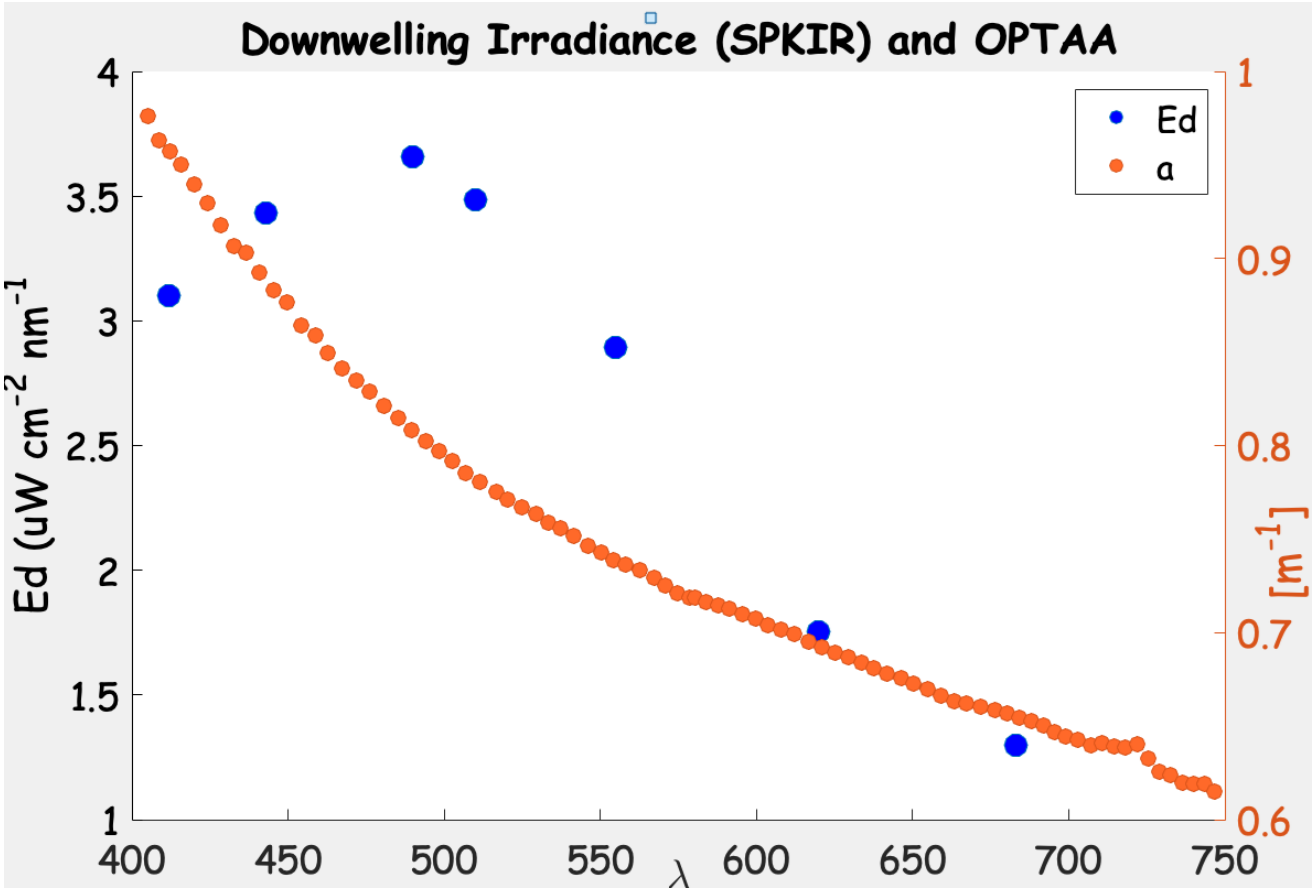


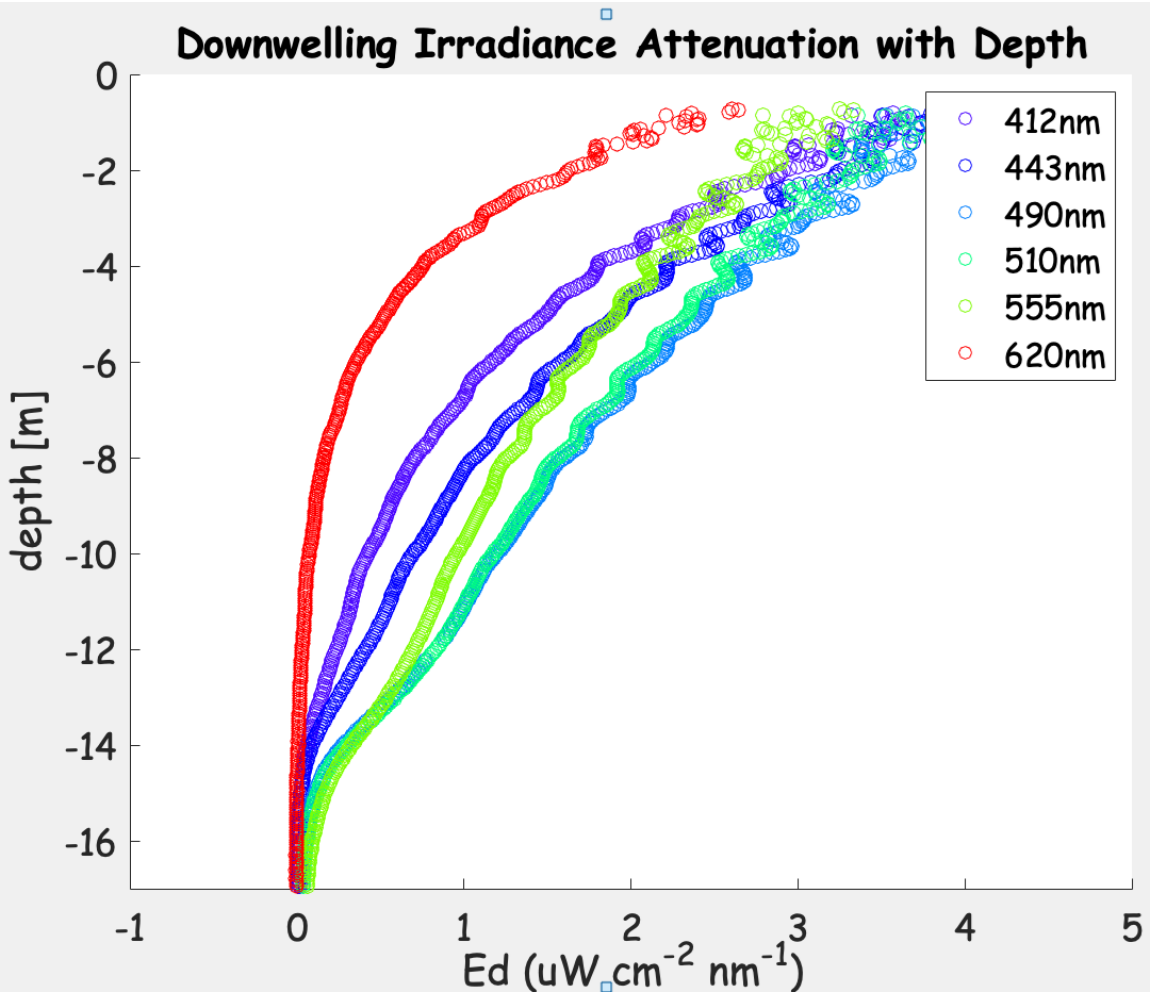
Data used...


Devices
412nm; Depth: -0.0 to 79.0 m
Chart
Curtain plot
Autoscale color axis
Time bin
All
Depth (m)
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
79
Annotations
Deployments
Jun 24, 2019 19:00 (UTC)
Tue 25
Wed 26
Thu 27
Jun 27, 2019 19:00 (UTC)

What does SPKIR data look like?

Seven wavelengths (opposed to OPTAA 80)



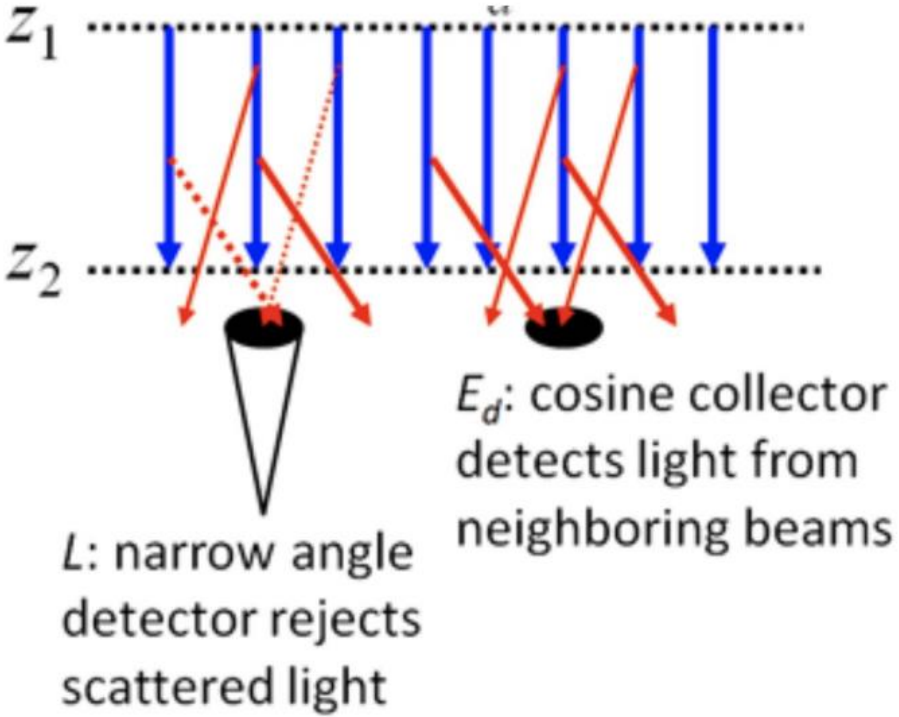


Red attenuates the fastest from absorption by pure water (683)

Near UV at 412 the next fastest to attenuate, likely from CDOM

All spectra attenuated at ~17m

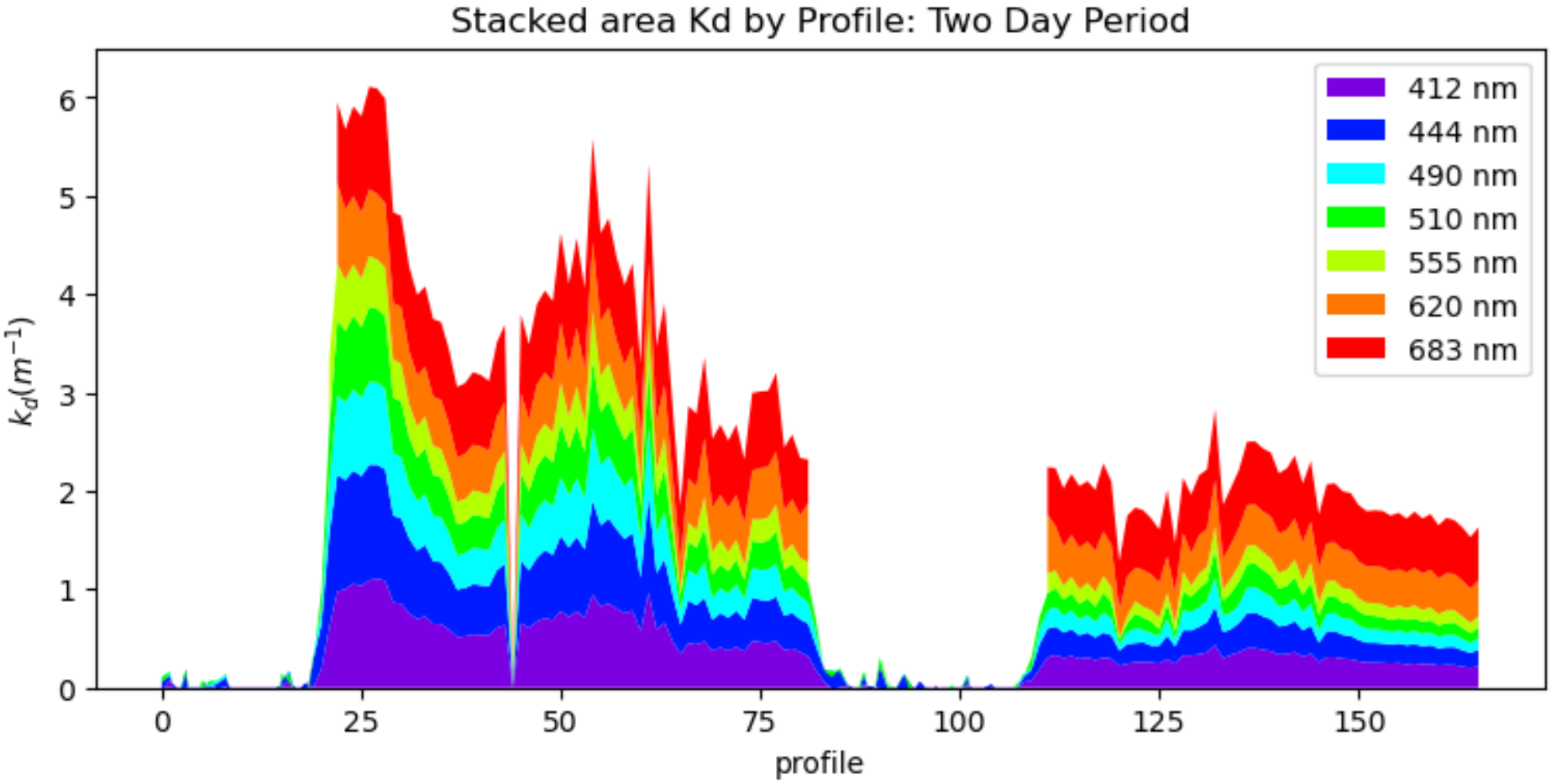
What is the diffuse attenuation coefficient k_d?

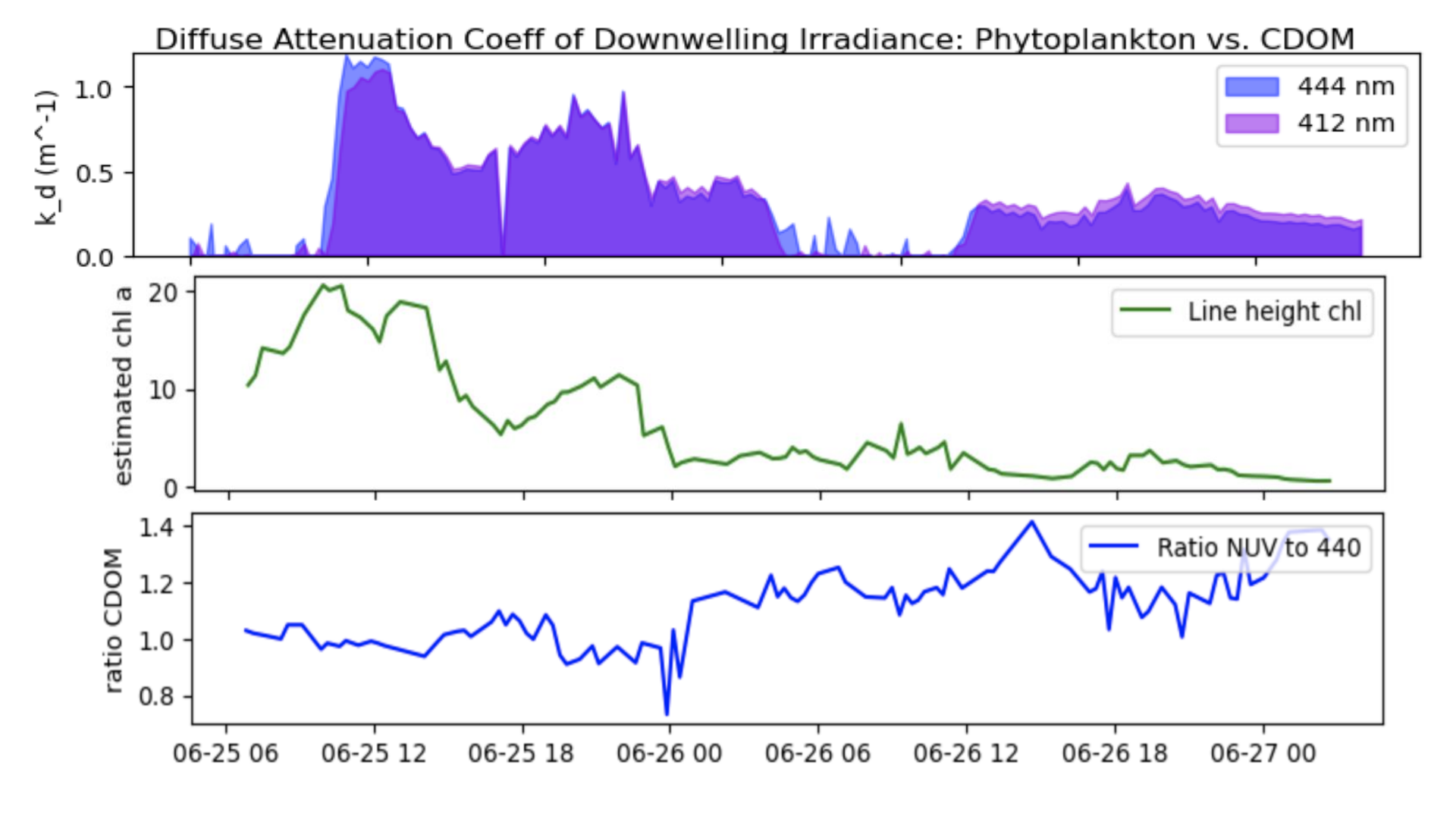


Not a collimated light source

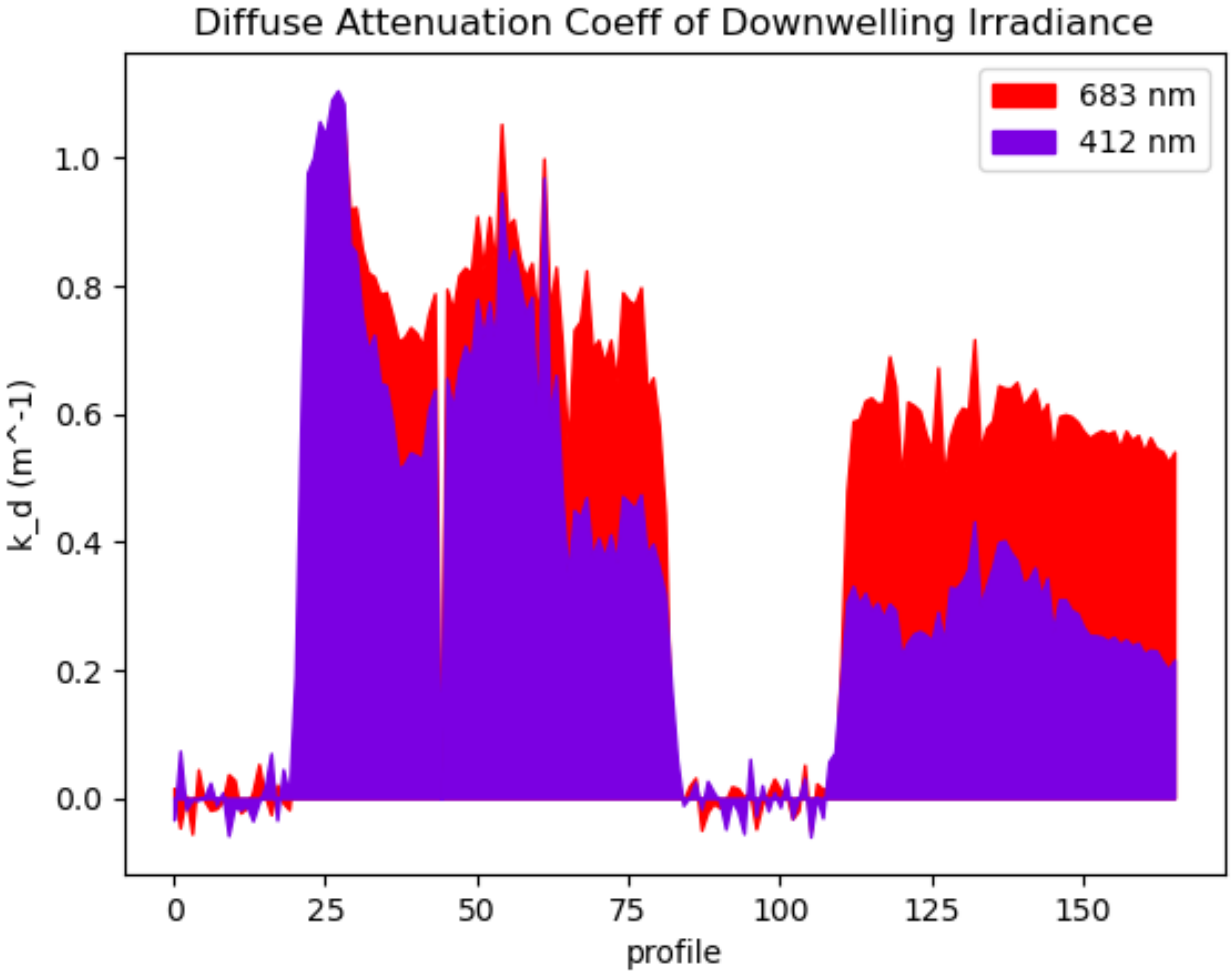
Not a radiance detector

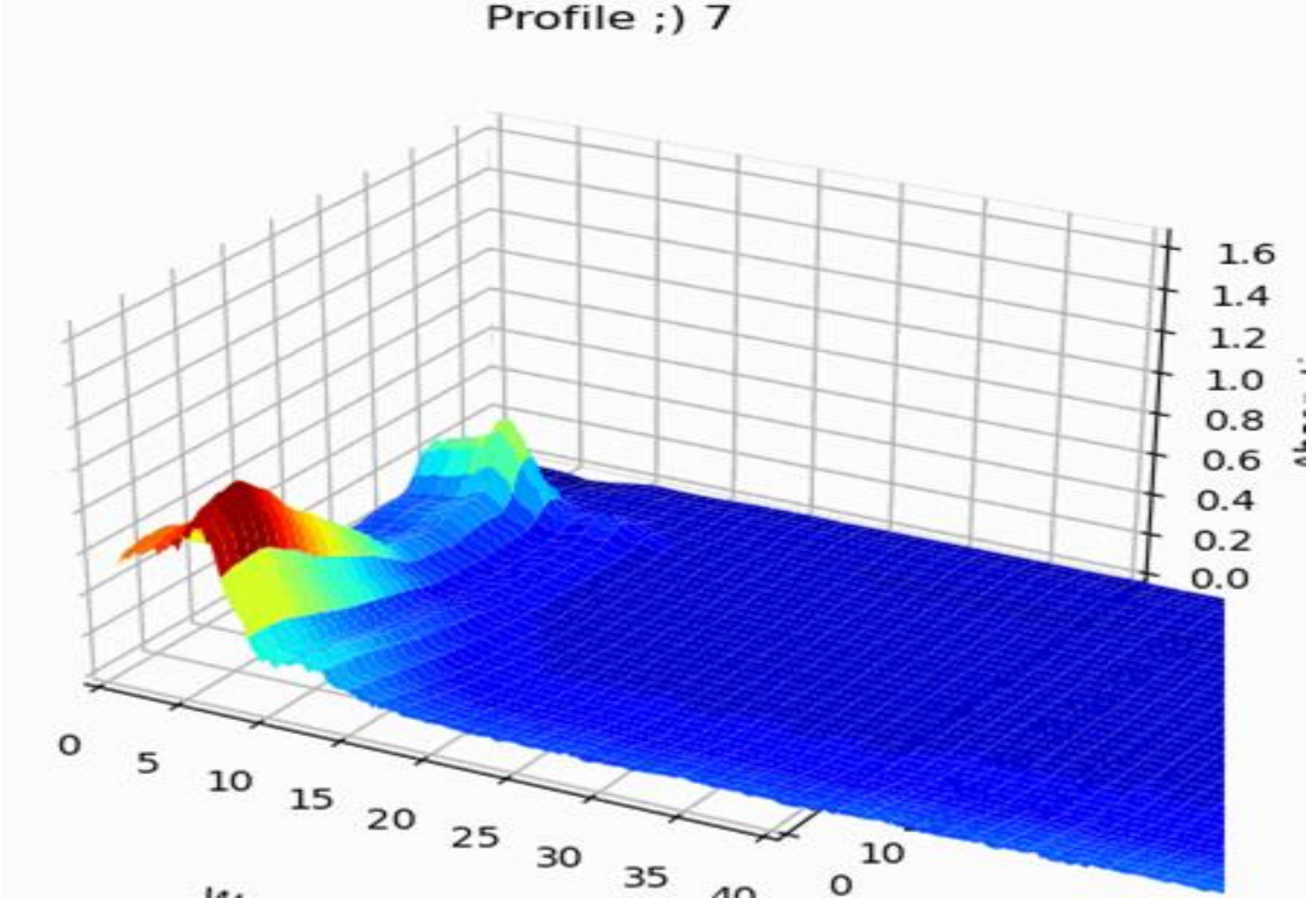
Cosine response


Stacked area Kd by Profile: Two Day Period
412 nm
444 nm
490 nm
510 nm
555 nm
620 nm
683 nm
$k_d(m^{-1})$
0
1
2
3
4
5
6
0
25
50
75
100
125
150
profile


Diffuse Attenuation Coeff of Downwelling Irradiance: Phytoplankton vs. CDOM
k_d (m^-1)
1.0
0.5
0.0
444 nm
412 nm
estimated chl a
20
10
0
Line height chl
ratio CDOM
1.4
1.2
1.0
0.8
Ratio NUV to 440
06-25 06
06-25 12
06-25 18
06-26 00
06-26 06
06-26 12
06-26 18
06-27 00

Results -


Diffuse Attenuation Coeff of Downwelling Irradiance
683 nm
412 nm
k_d (m^-1)
1.0
0.8
0.6
0.4
0.2
0.0
0
25
50
75
100
125
150
profile


Profile ;) 7
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
5
10
15
20
25
30
35
40
0
10

Key learnings from the course -

- using Jupyter Hub & python!!
- OOI Data Explorer
- reading-in and comparing data from multiple instruments
- biology:
  - scattering, absorption, beam attenuation
  - diffuse attenuation coefficients, K functions
- Challenges with mooring operations (and ways to overcome them !)
- How to navigate NSF funding opportunities

would have been cool to learn more about:

- ERDDAP: cool website and URL generating function