

QC FRAMEWORK

RTQC

Dark
correction

Dark = median of deep FChla
profile (profile by profile)



NPQ
correction

Xing12



Slope
correction

Roesler17 = 0.5

DMQC

Option 1: Minimum for each profile

Option 2: On-Float Dark

Option 3: Median of all minima

Option 1: Xing18

Option 2: Josh's method

Option 1: Onboard-based correction

Option 2: Satellite-based correction

Option 3: Irradiance-based correction

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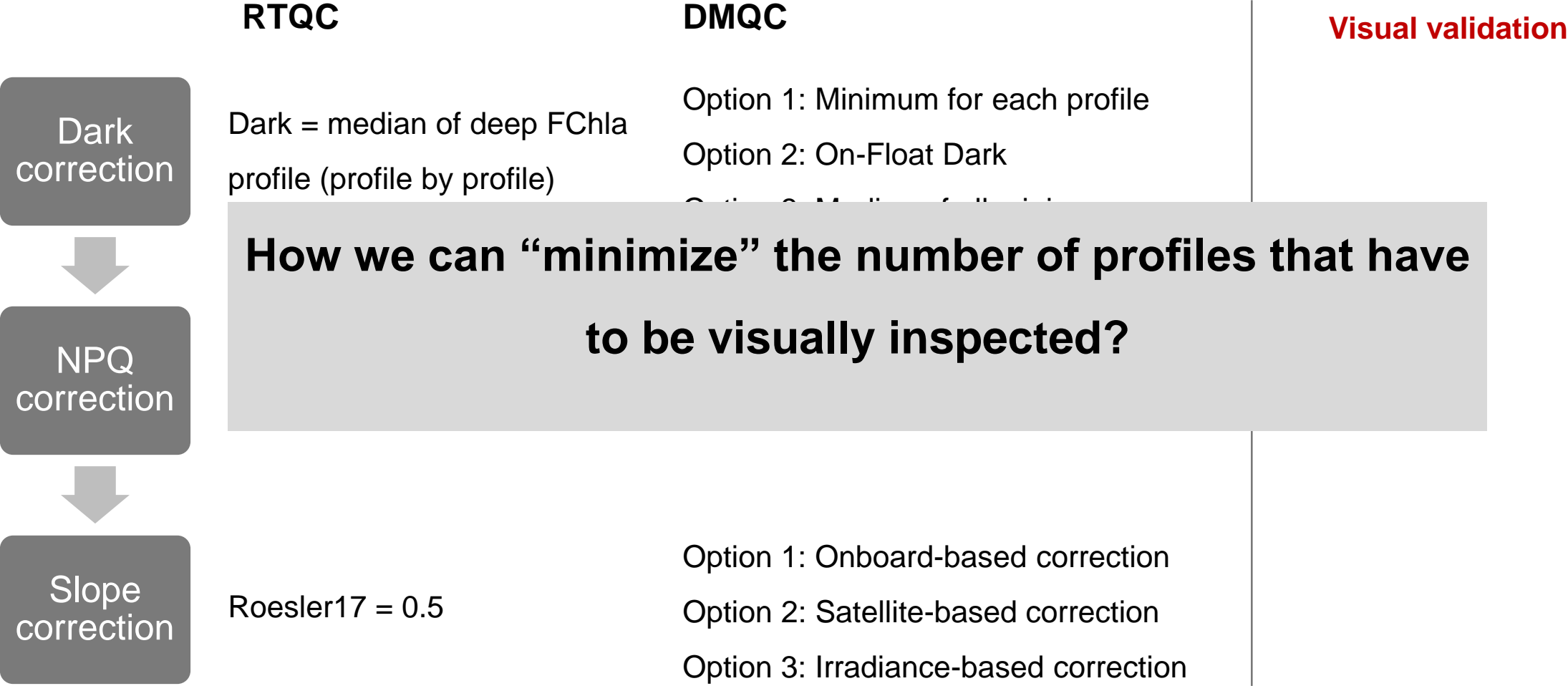
Option 1: Onboard-based correction

Option 2: Satellite-based correction

Option 3: Irradiance-based correction

Visual validation

QC FRAMEWORK



How we can “minimize” the number of profiles that have to be visually inspected?

No reference data base exists for CHL

BGC-Argo “authorized” Chlorophyll-a is obtained by fluorescence

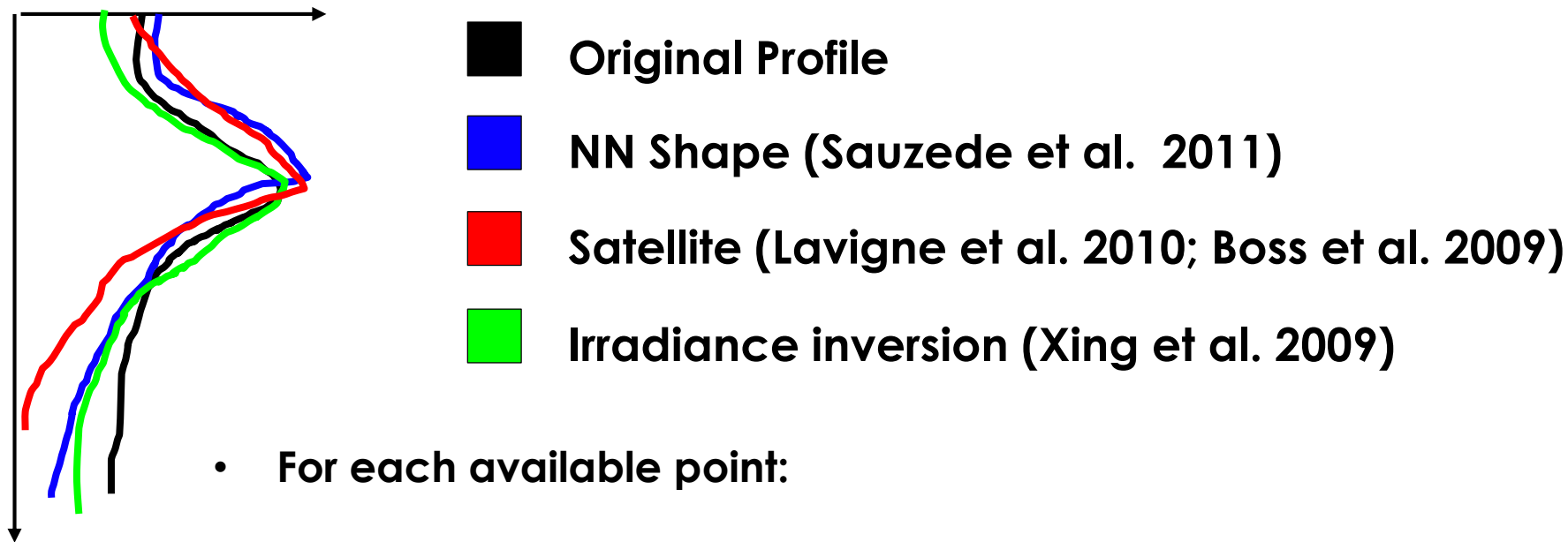
Very high spatio-temporal variability (i.e. 10^3 range)

Data from “Reference” method (i.e. HPLC) are rare and costly

However, “alternative” methods exist to generate (semi-) independent Chl-a profiles

These “Alternative” methods could be used to verify if the processing is correct and then reduce the number of profiles to visually inspect.

No climatology -> “alternative” profiles



$$\underline{\Delta = Original - Chl_{method}}$$

- For each profile:

$$\underline{Ratio_{method} = \% \text{ of point where } \Delta \text{ is } < 0.05 \text{ mg/m}^3}$$

Where *method* is NN Shape, Satellite, Irradiance inversion

No climatology -> “alternative” profiles



- For each available point:

$$\underline{\Delta = Original - Chl_{method}}$$

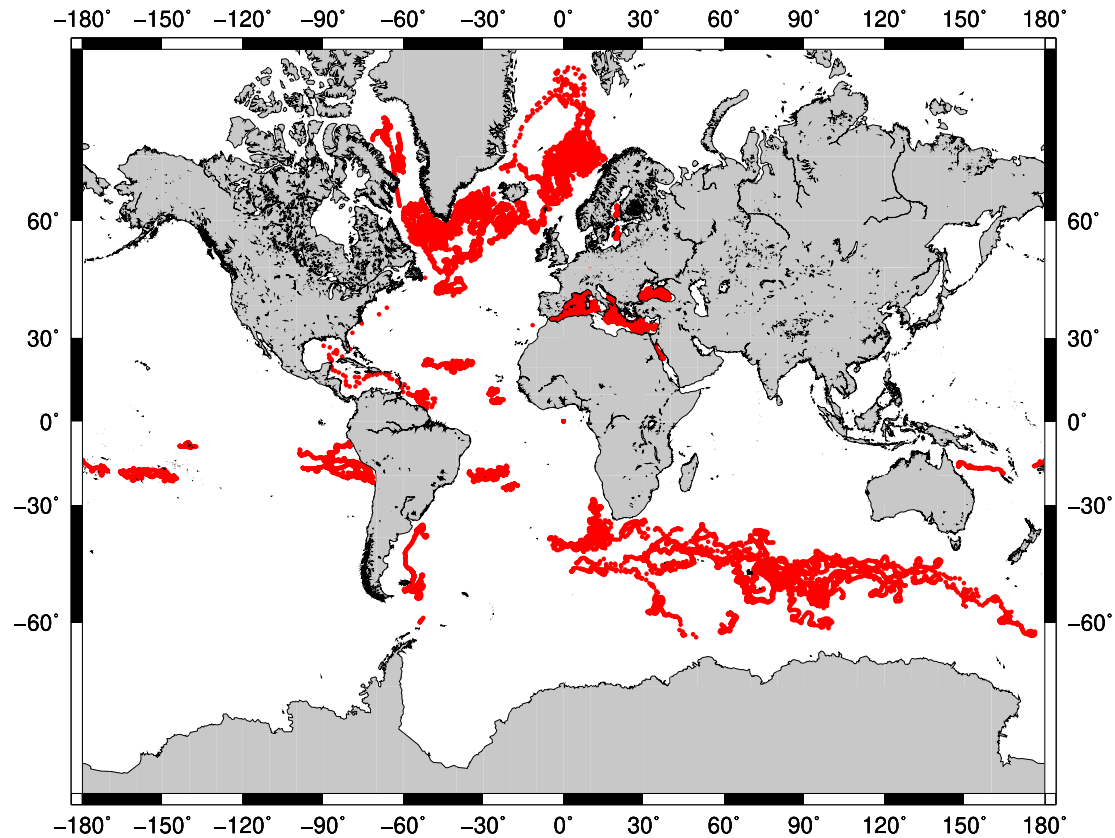
“It is better to compute normalized Delta” (Boss, pers. Com. 2019)

- For each profile:

$$\underline{Ratio_{method} = \% \text{ of point where } \Delta \text{ is } < 0.05 \text{ mg/m}^3}$$

Where *method* is NN Shape, Satellite, Irradiance inversion

Data Base Test



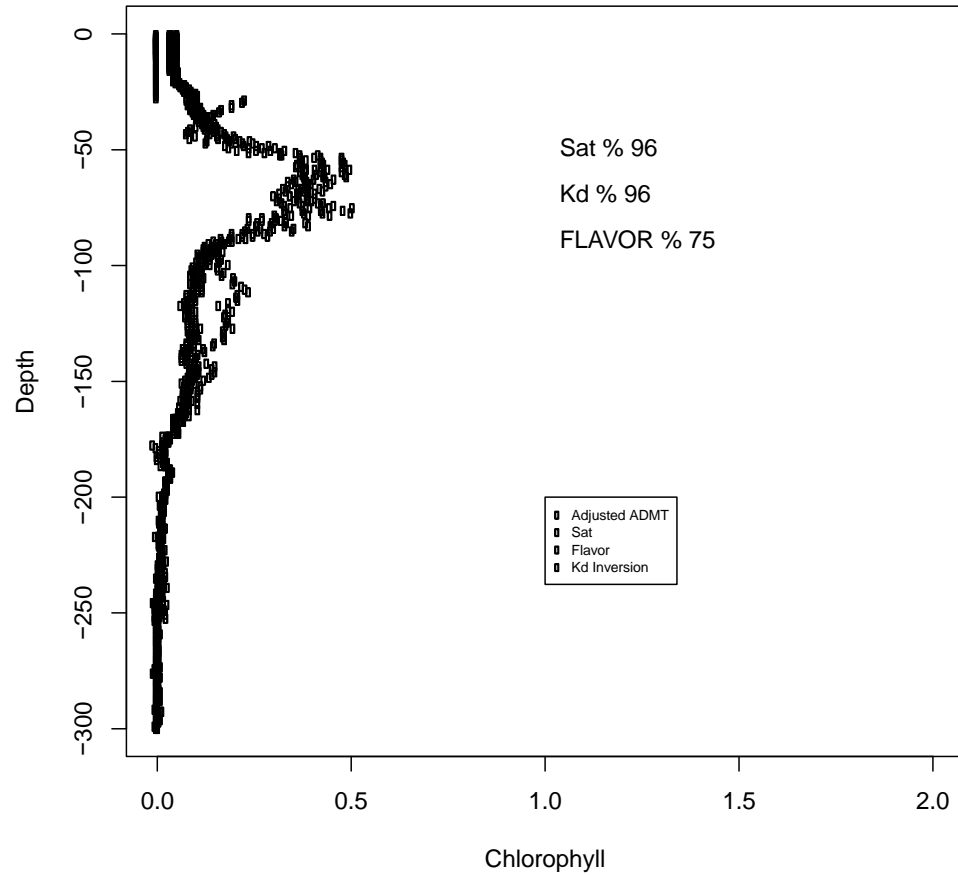
182 Floats

31428 Profiles

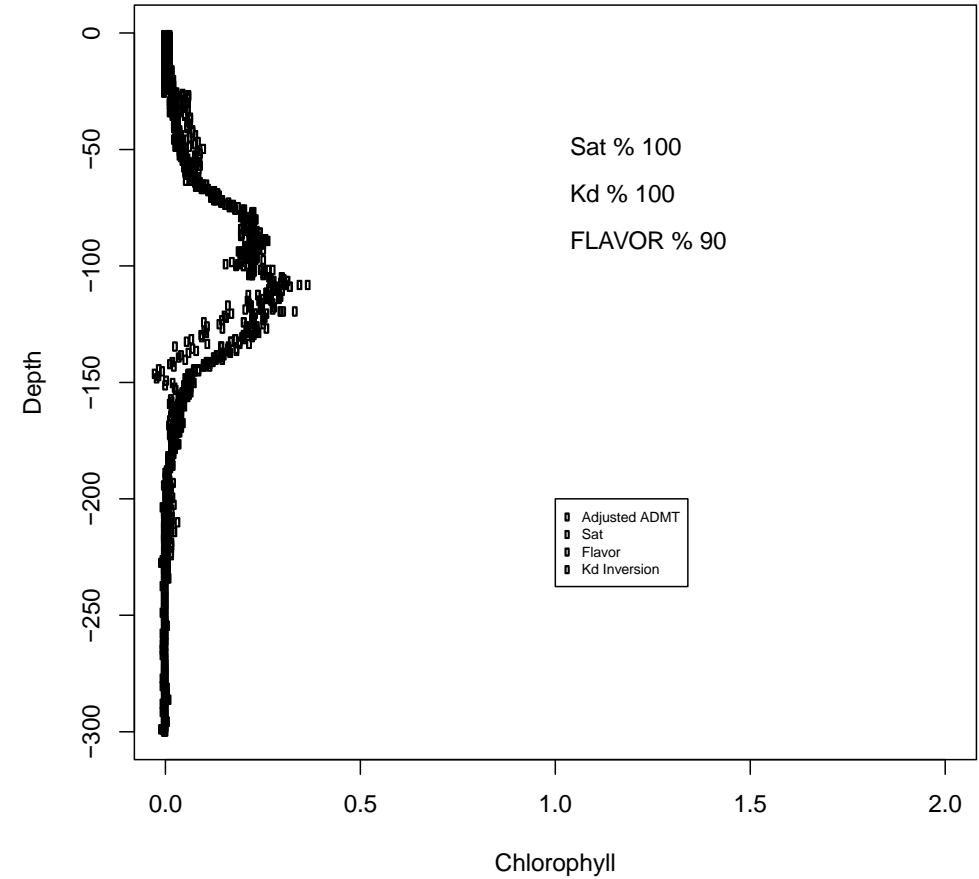
9184428 Points

Some Example

BD6901764_126



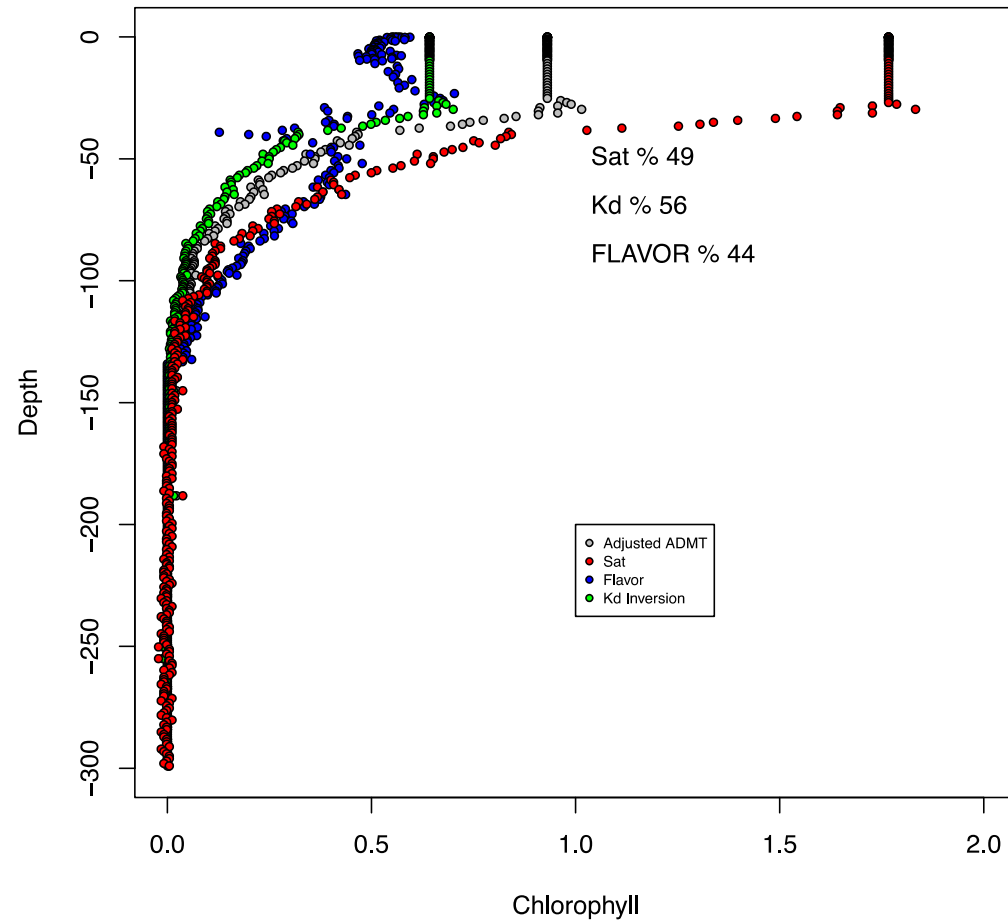
BD6901765_145



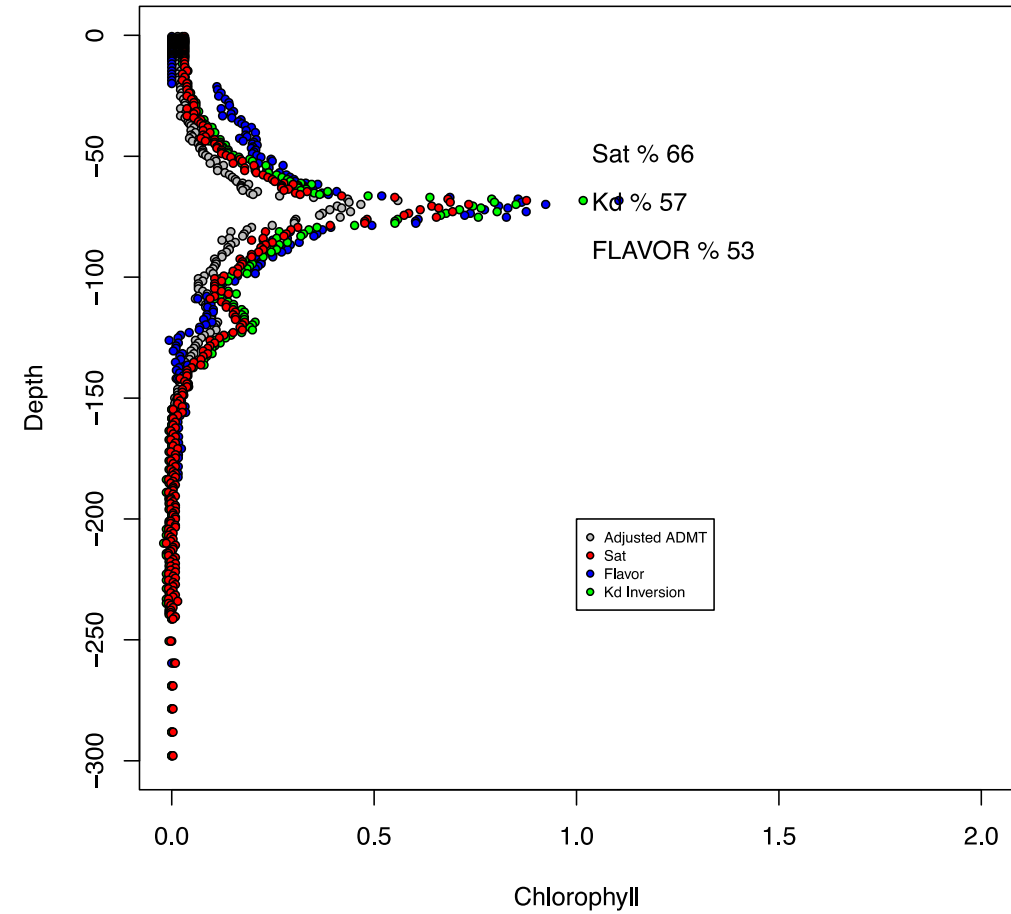
NB: % indicate the % of points of the profile where Delta is < 0.05

Some Example

BR6901493_187.nc

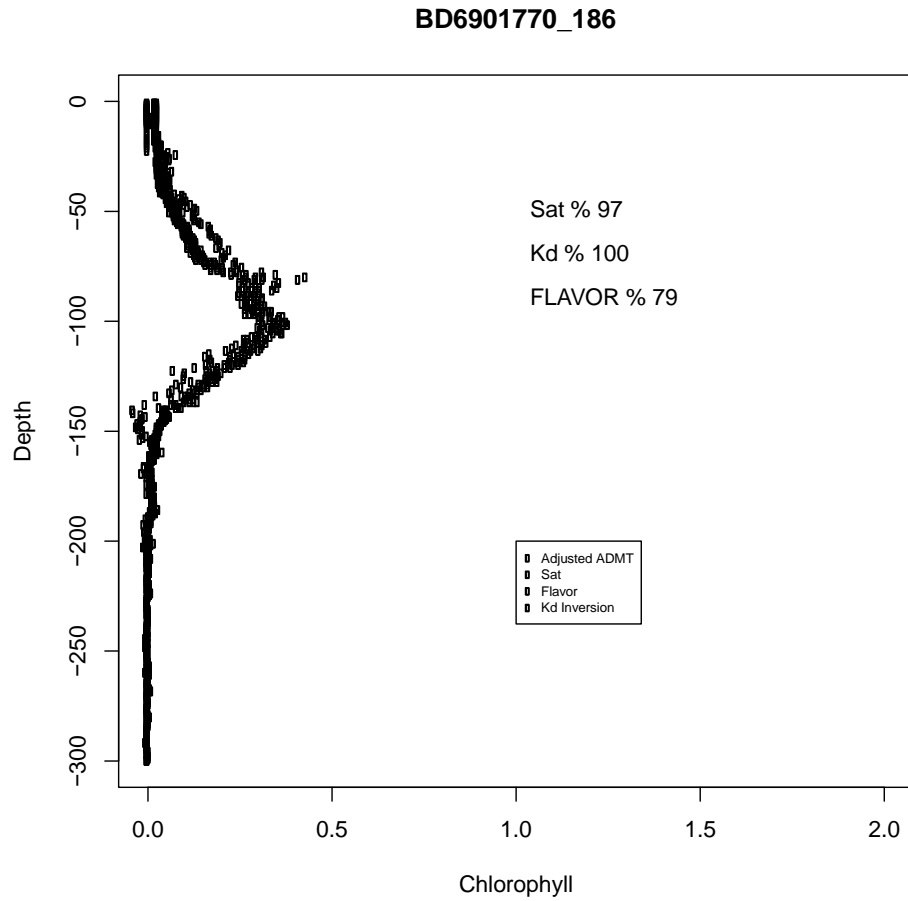


BD6901649_004.nc



NB: % indicate the % of points of the profile where Delta is < 0.05

Some Example



NB: % indicate the % of points of the profile where Delta is < 0.05

Stats

	# Profiles where methods apply	#profiles with ($ \Delta < 0.05$) > 90%	
		#	%
All Methods	12586	185	1.4
<i>Sat</i> AND <i>NN</i>	16535	889	6
<i>Sat</i> AND <i>Irr. Inv.</i>	12838	2296	18
<i>Irr. Inv.</i> AND <i>NN</i>	22174	301	1.3

Conclusions

The selected "Alternative" methods have several limitations:

- Sat: dependent of matchups quality and quantity
- Irr Inv: dependent of Irradiance data
- NN algorithm training

Other methods could be implemented.

The combination of the different "alternative" methods could partially "fill the gap" of the missing reference data base.

With the adapted metrics (which have to be defined) the number of profiles that should be visually checked could be relevantly reduced.