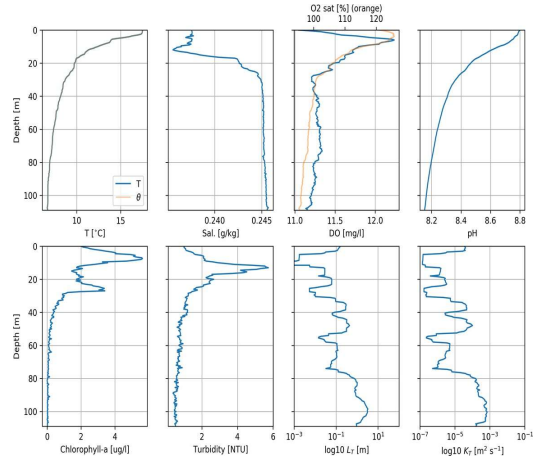
CTD Profile - 14 June 2019

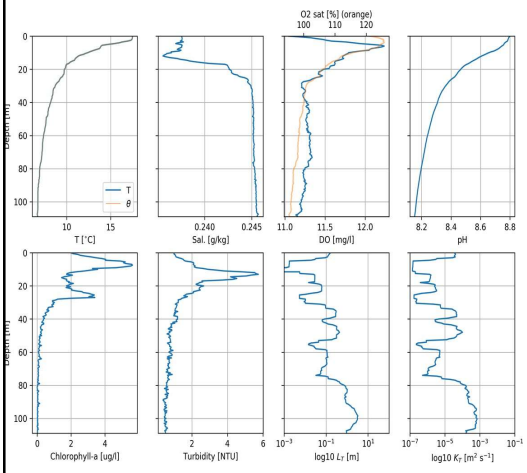


1. How deep would you expect primary production (PP) to take place before this CTD profile was taken? Which variables support your answer?
2. In which depth is most of the algal biomass contributing to the located PP?
3. What may cause the turbidity peak at ~15 m depth?

   What can be the reason that the CHL-a and the turbidity profiles have not the same shape? Formulate a hypothesis about what phenomena shape the two profiles.

1

CTD Profile - 14 June 2019



4. Why is pH decreasing with depth?

5.How thin was the convective mixed surface layer the previous night? Why is this mixed layer in June so much thinner than in the profile in later autumn?

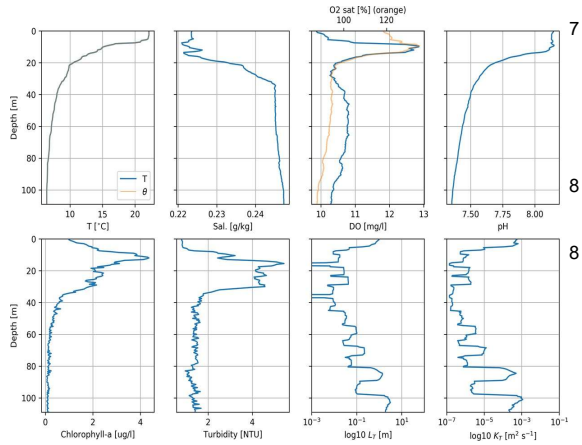
6. Why is the salinity lower in the SBL compared to the deep-water? There is a local small minimum in about 15 m depth – why?

2

CTD Profile - 14 June 2019

3

CTD Profile – 9 July 2019



7 (i) The top 4 m of the salinity profile is completely homogenous - Why?

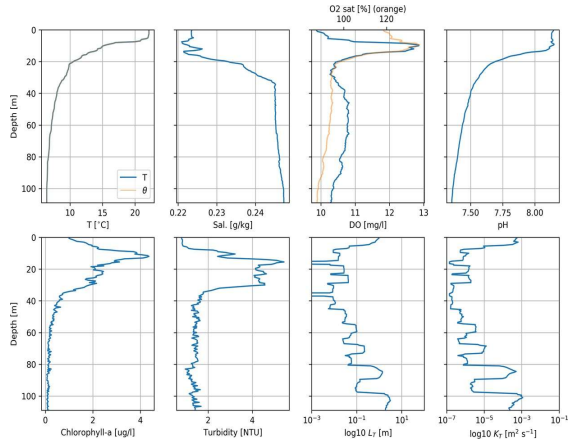
7 (ii) The salinity profile gives you indication on the depth range within which the Rhône River is re-stratifying into the water column – how deep has the Rhône River intruded into the water column during spring and early summer 2019?

8 (i) In which depth are most of the algae contributing to the PP?

8 (ii) In 20 to 28 m depth, CHL-a levels are also enhanced – what is your hypothesis for this second peak in the CHL-a profile?

4

CTD Profile – 9 July 2019



9 (i) Why is the oxygen concentration more than 100% of saturation? How is this physically possible?

ii) Formulate mathematically what determines this concentration at the surface.

5

CTD Profile – 9 July 2019

10 (i) Check the water flow and temperature of the Rhône River at for the few days before the CTD profile was casted and formulate a hypothesis for the turbidity profile?

10 (ii) What are typical particle concentrations in July in the River Rhône?

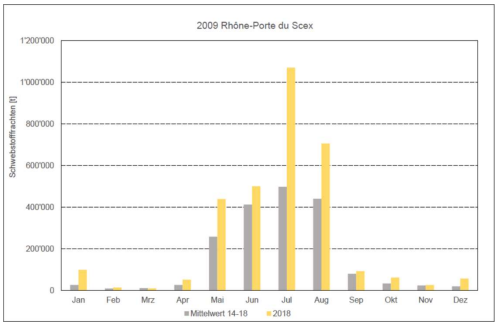
°C

Juli/Juillet Luglio
10.8
10.6
10.2
9.7
10.0
10.0
10.0
9.6
9.6
9.9

Average 380 m^3/s

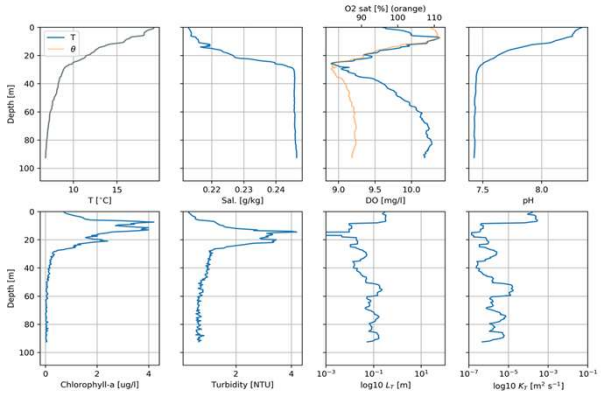
m^3/s

Juli/Juillet Luglio	
527	
616	+
582	
507	
440	
429	
408	
423	
393	
370	



6

CTD Profile – 9 September 2019



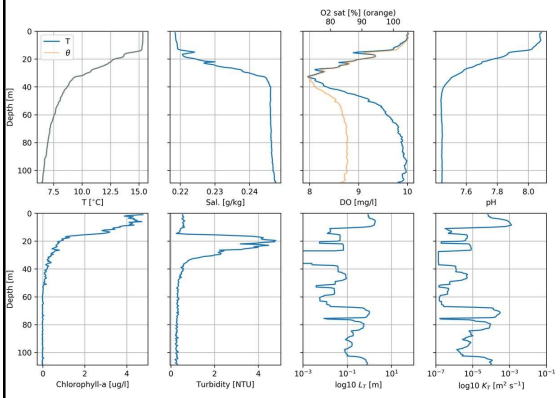
11. Compare the oxygen profiles from June and July 2019 and this one from September 2019 and explain the temporal changes of oxygen concentration of the maxima and minima.

12. Why has the turbidity profile a weaker signature (i.e., thinner peak) than in July 2019?

13. What is your ecologically-based hypothesis for the three peaks in the CHL-a profile?

7

CTD Profile – October 2019



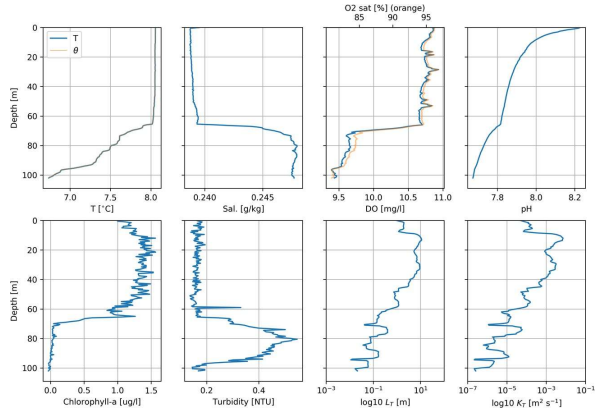
14 (i) What is the difference in the CHL-a profile from October 2019 compared to the profiles from summer? (ii) What is the ecological explanation?

15. Why is the oxygen concentration end of October closer to 100%?

16. At what exact depth is the upper edge of the Rhône River intrusion? (ii) Are the oxygen profile and the salinity profile consistent with your answer - why?

8

CTD Profile – 17 January 2020



17 Why is the Turbidity level in January 2020 so much lower than during summer?

18 Why is the oxygen concentration in the surface layer almost homogeneous and lower than 100%?

9