Group 1 Questions

Block 1 - Drivers

1. Primary Production is typically influenced by deterministic (e.g. temperature, irradiance) and stochastic drivers (e.g. nutrients, turbidity).

a. How would you compare the importance between the two sets of drivers for each system (marine, inland, terrestrial)?

b. The effect of climate change on stochastic drivers might be more difficult to assess. What is the best way to address future changes in stochastic drivers for our understanding of primary production?

2. It is known that, in terrestrial environments, the increase in CO2 could lead to an increase in the GPP, by increasing the carboxylation rate. Can we expect an increase of PP in aquatic systems like wetlands etc. with increasing CO2? What about positive feedback in increasing the CO2 and PP?

3. Usually PP is not limited by a single factor, but by a combination of drivers such as light and nutrients availability. In this sense, some events in time and space when/where both resources are available in abundance (e.g. mixing after thermal stratification, estuary) would enhance rates of biogeochemical processes and ultimately primary productivity. This is what is behind the ecological concept called "Hot-spot hot-moment". QUESTION: What are major "Hot-spots hot-moments" for primary production in terrestrial, marine and inland systems? How climate changes could affect the frequency and intensity of such events in these systems?

4. Scales: Studies are often limited by temporal and spatial scales, e.g. studies tend to be biased towards periods and places that are easier to sample or in sites where the sensors can be deployed safely avoiding loss and damage. These limitations in turn, affect our capacity to transfer knowledge from microscales/ short-time scales to whole ecosystems and in the last instance across terrestrial-freshwater-marine systems. Regarding that, how do scales matter in our capacity to understand the effects of climate change on aquatic/terrestrial productivity?

5. The difference in the scale and complexity of primary producers have made scientists turn to models to assess primary production. Where is the main knowledge gap on assessing and projecting primary production in the anthropocene, as climate change continues to alter our ecosystems: is it the lack of empirical data or do models have to be refocused and "get it right"?

6. What mechanisms should be parameterized and included in the models? What spatial and temporal resolutions are needed for each system?