

Study Questions for Eppley and Peterson (1979)

What is the difference between primary production, new production, regenerated production, and export production?

Why would we want to know (or quantify) new production in the ocean?

Eppley and Peterson provide estimates of new and total production for various regions of the ocean. Do the patterns “make sense” to you? Which regions are highest/lowest in terms of new and total production?

Thinking about the Falkowski paper, how does new production in the ocean vary on geological time scales? What is limiting in the ocean, and how does this affect total production?

Study Questions for Turk et al. (2001)

Turk et al. say that new production is related to the “biological pump”. What does this mean, and why do we care?

How do Turk et al. estimate new production? Compare the Eppley and Peterson paper to the Turk paper. How many data points did each of them use? What does this tell you about “modern” oceanography?

Turk et al. argue that new production is well described as nitrate uptake (which is the same definition provided by Dugdale and Goering in 1967). Why don't they think iron or silicate limitation are a problem for their method?

Study Questions for Falkowski

What is the “Redfield Ratio”? Is it constant?

The paper states that phytoplankton control the ratio of elements in the ocean—how can phytoplankton change the ratio of the entire ocean? What happens if the ratio is not in Redfield proportions?

What is an Aeolian flux, and why do we care about it?

Phytoplankton with cellulose walls are stated to have more C:P and C:N than phytoplankton with silica walls. Give an example of a type of phytoplankton that uses cellulose and silica, and an example of a phytoplankton group that uses neither one.

Study Questions for Sunda and Huntsman

What is the relationship between growth rate and cell size in phytoplankton?

Are phytoplankton in the Southern Ocean (where the SOIREE experiment was conducted) more likely to be iron or light limited?

Why do small cells do better under low light and iron conditions than large cells?

Based on this paper, do you think there is a “Redfield Ratio” for iron? In other words, could we come up with a constant ratio for C:N:P:Fe?