**Activity 4: Ocean Iron Fertilization**

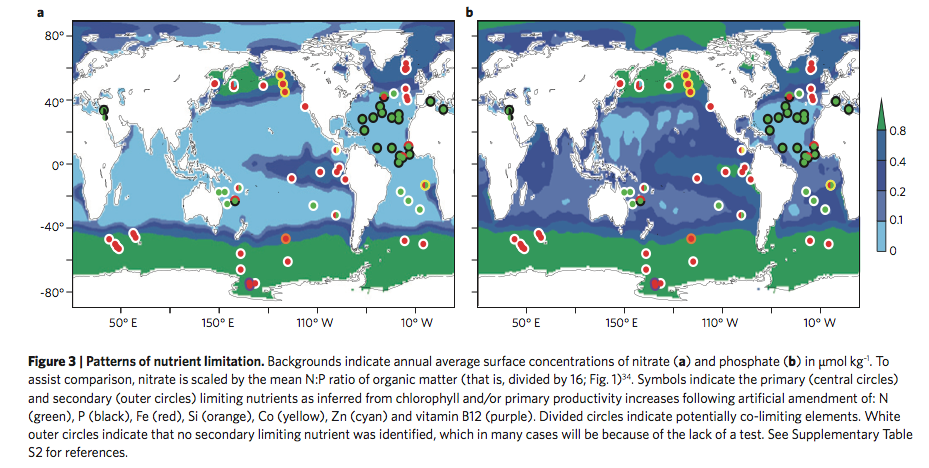
Presentations: Tuesday, June 6 2017 in ESS151

A commercial firm is considering fertilization of regions of the ocean with iron over the next 10 years in order to help slow the rise of atmospheric CO2 concentrations. They have hired us to evaluate the potential benefits and costs of iron fertilization in the following three regions:

1) Subarctic Pacific (group 1)

2) Subtropical North Pacific (group 2)

3) Southern Ocean (group 3)



(Figure from Moore et al., 2013)

In your presentation:

1. Briefly introduce the relevant chemical, physical, and biological features of your region and summarize current thinking on what limits primary production there.

Provide a reasoned and quantitative (where possible) assessment of the:

1. Best chemical form and timing of iron delivery. Justify your choices vs. other alternatives.
2. Potential effectiveness in reducing atmospheric CO2—how much CO2 could be drawn down on the short time scale (1-10 year, during fertilization), and the fate of that CO2 on longer (~100-1000 year) time scales (after fertilization has stopped).

Discuss:

1. Potential geochemical impacts (e.g., altered deep ocean O2 levels, nutrient distributions and nutrient supply, DIC and pCO2 concentrations—think both locally and more broadly).
2. Potential ecological impacts (e.g., altered productivity, species composition, health of fisheries—think both locally and more broadly).
3. Uncertainties
4. Final recommendation

You will have ~15 minutes for your presentation plus ~ 5 minutes for questions and discussion. Please hand in any relevant calculations along with your presentation on June 6th.

Resources:

Helpful references posted on Canvas under ‘Activity 4 Materials’

Moore et al., 2013 Nature Geoscience 6: 701-710

Moore et al., 2004 Global Biogeochemical Cycles 18: GB4028

Boyd et al., 2007 Science 315: 612-617

Martin et al., 1994 Nature 371: 123-129

Smetacek et al., 2012 Nature 487: 313-319

Strong et al., 2009 Oceanography 22: 236-261