

This Problem Set is designed to be open book and open notes, but you are expected to work individually to obtain your answers. This will constitute 10 % of your overall grade. You have two weeks to complete this assignment (due 5/8/09 since I am a day late posting this) and submit it to me by email. Please email me concerning any specific questions so as not to use valuable class time on this. Since there are no calculations, please submit your answers as a MS Word document with a file name consistent with the protocol Lastname, Firstname – PS#4.doc.

- 1) Please read the paper (Verdugo et al., Marine Chemistry 92 (2004) 67–85) provided with this Problem Set and discuss the following questions as they relate to class material and other assigned readings (i.e. Libes). Please be brief and to the point.
 - a) What is marine snow?
 - b) What holds it together?
 - c) What is the link between dissolved and particulate organic matter as described in the paper?
 - d) How does the “gel phase” influence what we refer to as the “Organic Carbon Continuum”?
 - e) What influence might gels have on the amount of particulate organic material that reaches the sediment?

- 2) Five classes of geochemical species for metal ions were discussed in class:
 - 1) Inorganic complex or Ion Pair
 - 2) Organic Complex
 - 3) Organometallic species
 - 4) Redox species (i.e. an element that undergoes oxidation or reduction)
 - 5) Colloid bound or particle adsorbed species

For each of these classes give the following:

- a) a specific metal that belongs in that category (i.e. is an example of that class)
- b) a brief, 1 or 2 sentence description of its relevant chemical behavior
- c) what or how the metal reacts (this might be covered in b above)
- d) approximate total concentration of metal (order of magnitude 10^{-6} or 10^{-9} M)
- e) approximate percentage that might take part in the behavior being described.

All the information needed to answer this question is in Millero or was presented in class with the possible exception of e.

Problem #1 is worth 50 points
Problem #2 is worth 50 points