NOTES ON THE WEEKLY ASSIGNMENTS

Problem/discussion sets: To help you prepare for the second week's modeling seminars, the instructors will hand out *problem/discussion sets* containing specific questions and/or problems to be discussed in class. Individual students will be assigned to lead discussion of particular problems/issues. While rereading the papers for the second week's seminar, you should think about, work on, and write out answers to these questions—and come up with other questions of your own. Come prepared to discuss your answers and questions in class.

Things to think about: To get you started formulating your own questions, we offer the following as an overwhelming number of suggestions for the kinds of things you might consider while rereading the papers for the second week's modeling-issues seminar.

- What is the purpose of the model/paper? Why did the authors choose to model *this*?
- Identify the model's degrees of freedom? Are there "hidden" degrees of freedom (e.g., network topology)?
- Summarize the logic of the model. What are the premises or "inputs" (e.g., pieces of data, assumptions, etc)? What are the intermediate steps? What are the conclusions or "outputs" (e.g., parameter values, predictions, etc)? Is the logic convincing? Is it circular?
- Construct an outline of the paper. Construct an outline of the argument. Is the structure of the argument reflected in the organization of the paper?
- Carefully read the abstract and construct an outline of the paper/argument based solely on the abstract.
- Carefully examine the figures and their captions and construct an outline of the paper/argument based solely on the figures.
- Compare and contrast the points of view expressed in the papers' introductions. What do the papers' initial paragraphs reveal about the authors' modeling approach?
- Consider the paper as a narrative (i.e., a story) and summarize its dramatic structure. For example, identify the principal protagonists (e.g., conflicting hypotheses), the plot, the climax, the resolution, etc. Is the story interesting?
- What rhetorical devices (e.g., foreshadowing, repetition) do the authors employ to tell their story?
- Can you retell the "story" in a more interesting or coherent way?
- Compare and contrast the modeling techniques used in the papers. Why did the authors chose the ones they did? Might others have been more appropriate?
- Examine the paper's notation. How could it be improved?
- Critique the figures for clarity and visual style. How well do they convey the information they're intended to?
- What are the model's simplifying assumptions? Is their validity established or discussed? Are there "hidden" assumptions? How would the model/conclusions change if the assumptions were relaxed?
- Make a list of arguments, statements, conclusions, equations, etc that you do not understand.

- What are the model's predictions?
- Is the model/paper accessible to non-modelers? How well does it communicate to a wider audience? How could it be improved?
- How does the paper compare with other papers in the group? Is the model/paper interesting or elegant? If so, what makes it so? If not, why not?
- How do you assess the value of the model? How do the authors?
- Outline the major sections and subsections of the paper. Is the paper organized in the traditional "Introduction–Methods–Results–Discussion" mode? Consider alternative organizations. What are the relative merits of the various possibilities?
- Locate the model/paper along the axes of simplicity/realism, analytic/computational, theory/phenomenology, etc. Are these categories useful?
- How do the number of degrees of freedom compare with the number of empirical measurements fit?
- Are theory and experiment compared on the same graph? On the same scales? Are there reasons why or why not?
- How do the authors assess the reliability of the data upon which the model is based? How do you?
- How are model parameter values determined? How *well* are they determined (e.g., what are their uncertainties)?
- How well does the model fit the data? How well do the authors claim the model fits the data?
- What's your assessment of the "correctness" of the model? What about the model is "right"? What "wrong"? Explain your answers.
- Is the model robust?
- Does the model have interpretive and/or explanatory power?
- Does the paper convey a helpful picture of the origin of the phenomena?
- Do you get the sense that the authors *understand* their model? How well is that understanding conveyed?
- What are the strengths and weaknesses of the model relative to others in the group? Relative to your conception of the "ideal"?
- How would you improve the model? The paper?