SIO 217a Atmospheric and Climate Sciences I: Atmospheric Thermodynamics

Fall 2010 ROAST

Concept of the ROAST exercise: Constructivist learning theory and inquiry-based educational practice stress the parallels between learning and research. Although peer review has long been a central feature of the working lives of research scientists, it has rarely found its way into the classroom. Motivated by this thought, an imaginary journal, *Reviews of Atmospheric Science Topics* (ROAST), has been integrated into SIO217a. The instructor acts as editor of ROAST. Students in the class are divided into teams and assigned topics on which to write survey papers and give in-class presentations, using the text, the Internet, the library, and other resources. The assigned topics range over the subject matter of the course. The submitted papers are sent by the ROAST editor to other members of the class, acting as anonymous reviewers. Just as in the case of real research journals, the editor asks the authors to respond to criticisms of reviewers and then sends the revised papers back to the reviewers. Each student is thus a researcher and co-author of one paper as well as an anonymous reviewer of the others. The peer review mechanism allows the student authors to address the defects in their papers, and hence in their learning, as pointed out not by an authority figure or an examination but by their own peers. As an important side benefit, the students gain experience with the peer review process itself and come to appreciate its strengths and weaknesses in evaluating scientific papers.

This year ROAST will invite a special issue of reviews on current ACPD papers (posted after 1 October). Each group will consider a different ACPD "discussion paper" and will provide a "review" of the key scientific points. The format of your review will be a 3-pg comment (excluding references, figures, tables) to include:

1) Summary: a summary (in your own words) of the work and its key findings
2) Assessment: an assessment of whether the findings are new and significant (based on your reading of the literature on this topic);
3) Evidence: an evaluation of the evidence (data, equations, models, etc.) or arguments provided to support each of their key findings (Which parts are convincing? Which parts are not well justified?);
4) Presentation: additional comments on presentation quality that would improve the manuscript (typos, legibility of figures, syntax).

(This is somewhat more formal than some reviews that you will find posted on the *ACPD* archives, but this is the proper structure of a formal review.) Other students in the class will then be asked to provide "peer comments" on your review (anonymously).

The starting point for research is the text (Curry and Webster). These starting points are exactly that: starting points. You will need to also consult additional references, including both those cited by the article and additional published work. To find these references, use the Internet, go to the library, check research journals (search ISI), talk to scientists, and try to bring your knowledge of the subject up to date.

This year's ROAST project will involve submitting a complete review for evaluation by peers, followed by preparing a presentation and submitting a revised review. Each review will be completed by a team of up to 3 people. Final reviews will be posted to the class website (submission as an *ACPD* comment is optional), so please make sure that you leave time for careful proof-reading.

For both submissions of the review, each team will email a single pdf-format file including all text, figures, and references for the written report to the class and the instructors (max. length: 3 pages text) reviewing the selected paper. Try to follow approximately the format of *ACPD* (feel free to use the online format instructions and templates). However, your review should be understandable by scientists who are non-specialists. The reports will be handed out for review on the same day they are handed in. Written reviews will be due by email to the editor. Earlier submission before the deadline is fine. They will be redacted (reviewer's identifying information removed) and returned to authors by email. Each team will give an in-class, oral presentation of approximately 10-15 min/person (maximum). Each member of the team should give part of the presentation. Please prepare and submit your presentation as a Powerpoint file.

The proposed due dates for these parts are given below:
Topic assignments, groups meet to assign reading/writing: Oct 18 (after class)
Review due to editor: Nov 17
Peer comments due to editor: Nov 22
Oral presentations: Nov 29 and Dec 1
Final revised version and responses to peer comments due to editor: Dec 1

Grades will be based on oral presentations, peer comments, responses to review, and the final revised manuscript. Peer comments are provided and graded individually, manuscript and responses are graded as a team, and presentations are graded both individually and as a team. Participation in team assignments is a privilege; failure to make timely and complete contributions to your team will result in separate manuscript grades. For the final exam, all students are responsible for knowing the material in all the papers presented.

Topics for ROAST 2010:

www.atmos-chem-phys-discuss.net/10/21867/2010/ Length and time scales of atmospheric moisture recycling

www.atmos-chem-phys-discuss.net/10/22019/2010/ Tropospheric temperature response to stratospheric ozone recovery in the 21st century

www.atmos-chem-phys-discuss.net/10/23091/2010/ Influence of convection and aerosol pollution on ice cloud particle effective radius

www.atmos-chem-phys-discuss.net/10/23381/2010/ Anthropogenic aerosols may have increased upper tropospheric humidity in the 20th century

www.atmos-chem-phys-discuss.net/10/23345/2010/ A upper limit for water dimer absorption in the 750nm spectral region and a revised water line list

www.atmos-chem-phys-discuss.net/10/24015/2010/ Where do winds come from? A new theory on how water vapor condensation influences atmospheric pressure and dynamics