

GEGN 681 Vadose Zone Hydrology Literature Review DUE November 22, 1999

Every student will conduct a comprehensive literature review on a topic in vadose-zone hydrology. The purposes of this literature review are to:

- Encourage each student to independently gain an in-depth understanding of a specific in to vadose-zone hydrology not possible with lectures alone;
- Introduce or reaffirm the importance of a literature review to successful university research;
- Provide yet another opportunity for students to improve writing skills;
- Introduce the procedure for submitting papers to a peer-reviewed journal.

In general, you may choose the topic, but I must approve it. I offer several interesting “cutting edge” topics below as examples.

Requirements

1. “Papers” should consist of ~ 20-25 double-spaced pages including abstract but not including the title page or “literature cited” section (see also *). Should include ≥ 15 articles.
2. Papers should be submitted in electronic format (MS Word or Word Perfect).
3. The format of the literature review should be similar to that in a topic-review article found in a peer-reviewed journal. I can give you an example of this if you are unfamiliar with it.
4. A journal-paper style abstract should be included.
5. References should be in the format used by the journal *Ground Water*.
6. The headings and sub-headings style of the journal *Ground Water* should be used.
7. *Follow the general format and submission requirements required by *Ground Water* as though you were submitting your paper for publication, including a cover letter. Hint: <http://www.ngwa.org/publication/grwtr.html>
8. You **MUST** include a discussion on the state of the art on your topic, as well as suggested areas for future research (and reasons for the recommendations).
9. In general, your review should probably include the following sections: Abstract, Introduction, Lit review (with sub-headings as appropriate), Conclusions, References Cited. Your discussion on the “state of the art” can be incorporated in the lit review section, or written into a separate session. I am flexible on the format.

A Few (of many possible) Suggested Topics:

- Preferential flow of water and/or contaminants in the vadose zone (in macropores, fractures, or due to fluid instabilities, etc. .
- Transport of particular contaminants in the vadose zone (e.g., pesticides, nitrates, etc).
- Traditional and innovative methods for vadose-zone measurement and monitoring.
- Causes and impact of soil-clogging on water and contaminant flow and transport.
- Satellite-based remote sensing techniques for measurement of vadose-zone parameters.

- Gas (vapor) flow in the vadose zone.
- The theory associated with selected vadose-zone or multiphase remediation techniques.
- Vadose-zone topics in *regional scale* flow-and-transport or water-resources management.
- Recent advances in multiphase flow.
- Inverse modeling methods in unsaturated zone or multiphase flow and transport.