GPHY 817*-Fall 2011
Physical Processes in Hydrology

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Hydrology is the scientific discipline concerned with the properties of water on and near the Earth's surface. Geographers are especially interested in hydrological processes due to their close connection to the related fields of climatology, geomorphology and ecology. In particular issues associated with water quality, supply, and hydrological risk are becoming increasingly important to planners, policy makers, leaders and the public and there are many areas of research underway in the broad field. A prerequisite for understanding the scope of these important water issues is the physical processes that form the basis of our understanding of the spatial and temporal characteristics of water and related environments.

This seminar will provide an advanced treatment of the physical processes in hydrology and related fluvial processes, particularly related to the occurrence of surface waters and the interaction with the near subsurface and the physical landscape. My experience is largely associated with cold regions, so the literature we will draw on will reflect this although the principles apply more broadly. Related topics will include isotope geochemistry, sediment erosion and paleohydrology.

There are no formal prerequisites for the seminar, however, participants should have prior coursework in hydrology (GPHY 308, 312 or equivalent, including Civil Engineering), geomorphology (or surface processes), or hydrogeology (GEOL 433). Experience with parametric statistics (e.g. a typical first course or equivalent) will be of substantial benefit.

Course content:

1. Hydroclimatology and water balance concepts
2. Snow cover and snowmelt simulation
3. Hydrological connectivity
4. Hydrograph separation: chemical and isotopic approaches
5. Hydrological modeling
6. Frequency analysis, stochastic and time series modeling
7. Sediment erosion and transport
8. Slope-channel connectivity
9. Paleohydrology

Grading:

1.	Weekly presentations	30%
2.	Research paper I, due Oct 31	30%
3.	Research paper II, due Dec 12	40%

The papers should reflect both the broader content of the course and your specific research interests. As such, the topics can be quite wide and you should consult with me early to scope out these topics.