Time & Location: June 7, 2012 at 10:00 AM in Eng II CHAMPS Lab
Title: Modeling Annual Water Balance in the Seasonal Budyko Framework

In this study, the impact of interannual variability of soil water storage change on the annual water balance is assessed for 277 watersheds located in a spectrum of climate regions. The annual water storage change is quantified based on water balance closure given the available data of precipitation, runoff, and evaporation estimated from remote sensing data and meteorology reanalysis. The responses of annual runoff, evaporation, and storage change to the interannual variability of precipitation and potential evaporation are then analyzed. Both runoff and evaporation sensitivities to potential evaporation are higher under energy-limited conditions, but storage change seems to be more sensitive to potential evaporation under the conditions in which water and energy are balanced. Runoff sensitivity to precipitation is higher under energy-limited conditions; but both evaporation and storage change sensitivities to precipitation are higher under water-limited conditions. Therefore, under energy-limited conditions, most of precipitation variability is transferred to runoff variability; but under water-limited conditions, most of precipitation variability is transferred to storage change and some of precipitation variability is transferred to evaporation variability. The main finding of this part is that evaporation variability will be overestimated by assuming negligible storage change in annual water balance, particularly under water-limited conditions. The next part of this study is dedicated to provide a parsimonious model capable of modeling water balance at seasonal and interannual time scales when storage change is accounted. Budyko framework which expresses partitioning of water supply in long term mean, is adapted to be applicable in modeling water cycle in short terms i.e., seasonal and interannual scales. Seasonal aridity index is defined considering seasonal water storage changes. The seasonal water balance is modeled by using a modified Budyko curve which leads prediction of seasonal and annual storage changes and evaporation if precipitation, potential evaporation, and runoff data are available.

Major: Civil Engineering/Water Resources

Educational Career:
Bachelor's of Civil Engineering, BS, 2010, University of Tehran

Committee in Charge:
Dingbao Wang, Chair, Civil, Environmental, and Construction Engineering
Scott Hagen, Civil, Environmental, and Construction Engineering
Kaveh Madani, Civil, Environmental, and Construction Engineering

Approved for distribution by Dingbao Wang, Committee Chair, on May 23, 2012.

The public is welcome to attend.