Title: Direct climate effects of land-use change associated with bioenergy crops

Abstract: Recent assessments quantifying the value of bioenergy crops have largely focused on changes in greenhouse gas (GHG) emissions resulting from direct and/or indirect land-use change (LUC). In addition, implications for food security among the world's poorest highlight some of the chief harmful consequences related to current bioenergy policy directives. In this talk we address potential impacts of LUC associated with bioenergy crops in the United States on the directly altered surface energy and water balance. Using the latest version of the Weather Research and Forecasting (WRF) modeling system, we perform a number of simulations to assess bioenergy crop sensitivity to a number of biophysical parameters, attempting to isolate individual effects. We then discuss the climatic impact related to phenological differences between perennial and annual bioenergy crops and compare this local to regional-scale forcing to large-scale GHG warming. Our modeling experiments suggest that LUC associated with the conversion of annual to perennial bioenergy crops may offset a significant amount of anticipated GHG warming on the local scale, but has increasingly negligible impact at larger scales.