M.S. Defense Announcement
Michael Cheeseman
Monday, September 10 at 3:00pm

Michael Cheeseman
M.S. Defense

September 10, 2018
3:00pm

Defense
ATS Large Classroom (101 ATS)

Post Defense Meeting
Riehl Conference Room (211 ACRC)

Committee:
Scott Denning (Advisor)
Chris O'Dell (Co-advisor)
Elizabeth Barnes
Julia Klein (Ecosystem Science and Sustainability)

Productivity and phenology in a process-driven carbon cycle model

The carbon cycle is a major source of uncertainty in predicting future climate, especially with regard to changes in the terrestrial biosphere. One obstacle in predicting the sources and sinks of the carbon cycle is accurately predicting phenological transitions of the terrestrial biosphere with a global process-driven model. We hypothesize that the terrestrial biosphere and its phenological transitions can be simulated with a set of universal biological strategies and a simple set of plant functional types in the Simple Biosphere (SiB4) model. In order to test our hypothesis, we compare the SiB4 output to a suite of satellite observations of the terrestrial biosphere including solar induced fluorescence (SIF) from the Orbiting Carbon Observatory (OCO-2), and MODIS based LAI and NDVI. Our first analysis compares modeled canopy SIF to satellite observed SIF, finding that the model consistently over predicts pixel-scale SIF. In analyzing phenology, we find that SiB4 is quite successful simulating growing season onset, but often simulates late senescence, especially in grasslands. SiB4 is overly productive in boreal grasses and forests. We also find that SiB4 simulates crops well in the United States but fails to properly predict the planting and harvesting time of crops in other regions, especially the developing world.