

**ATS/CIRA Colloquium**

**Abigail Swann**

**Visiting ATS from the University of Washington Department of Atmospheric Sciences**

**Ecoclimate Teleconnections: remote effects of the interactions between ecosystems and climate**

**Hosted by Emily Fischer**

**Friday, February 21, 2014**

**ATS room 101; Discussion will begin at 11:15am**

**Refreshments will be served at 10:45am in the weather lab**

In this talk I will show that large-scale afforestation in the northern mid latitudes warms the Northern Hemisphere and alters global circulation patterns in climate model experiments. An expansion of dark forests increases the absorption of solar energy and increases surface temperature, particularly in regions where the land surface is unable to compensate with latent heat flux due to water limitation. Atmospheric circulation re-distributes the anomalous energy absorbed in the northern hemisphere, in particular towards the south, through altering the Hadley circulation, resulting in the northward displacement of the tropical rain-bands. Precipitation decreases over parts of the Amazon basin affecting productivity and increases over the Sahel and Sahara regions in Africa. We find that the response of climate to afforestation in mid latitudes is determined by the amount of soil moisture available to plants with the greatest warming found in water limited regions. Mid latitude afforestation is found to have a small impact on modeled global temperatures and on global CO<sub>2</sub>, but asymmetric heating from the increase in forest cover is capable of driving unintended and undesirable changes in circulation and precipitation. The ability of vegetation to affect remote circulation has implications for strategies for climate mitigation.

Link to colloquium videos and announcement page: <http://www.atmos.colostate.edu/dept/colloquia.php>