

## Earth Science & Observation Center (ESOC) Update for 2011

### WALEED ABDALATI



Beginning January 2, 2011, I began an assignment as Chief Scientist of the National Air and Space Administration, I am currently on a two-year leave of absence from the University to fulfill my responsibilities as NASA Chief Scientist which include: serving as primary advisor to the NASA administrator on scientific matters related to NASA; interfacing with Congress, the Executive Office of the President, and other federal agencies to ensure alignment among NASA, White House, and Congressional Science priorities, representing NASA's science programs to the public and the scientific community, and serving as a voice for science within the Agency. This continues to be a challenging and fascinating experience, and I look forward to returning to the university and using what I learn in this position to better serve the university community. In the meantime, I keep a hand in the research, working with my graduate students and other colleagues at CU to carry this research forward.

### TOM CHASE



I taught CVEN 4333 (Engineering Hydrology) both in the spring and summer semesters and will teach CVEN5833 (Earth System Modeling) in the Fall. I gave an invited seminar at the Center for Ocean Land Atmosphere (COLA) this spring. I had no new funding as 5 different proposals were declined by NSF this year.

### XINZHAO CHU



An award from NSF's Office of Polar Programs is funding the Xinzhao Chu and her research group to deploy a Fe Boltzmann lidar to McMurdo, Antarctica to measure the middle and upper atmosphere for three years. Ultimately this project will complete an observational chain for Antarctica in combination with previous lidar measurements made at the South Pole and Rothera, Antarctica. Dr. Chu and her colleagues developed this lidar more than 10 years ago and with it made lidar observations from the North Pole to the South Pole. Since then the Chu research group has upgraded this lidar for deployment to McMurdo in November / December 2010. Now on her 5th trip to the Antarctic, Dr. Xinzhao Chu and her research group will complete the lidar installation at McMurdo. Please visit their blog, where they share their unique experiences in the world's harshest environment. <http://cires.colorado.edu/blogs/lidar/>

## **VIJAY GUPTA**



Presence of power laws in flood is being used to develop a predictive model based in multi-scale solutions of mass and momentum conservation equations in random self-similar channel networks. The Gupta Group are developing and testing a theory of multi-scale infiltration in the Goodwin Creek Experimental Watershed (GCEW) in Mississippi. The goal is to develop a model that can be used to assign infiltration thresholds to hillslopes that is the smallest geomorphic scale in a river basin

## **DAVID NOONE**



David Noone's team spent the months of May and June at Summit Station in central Greenland installing a series of laser-based isotope instruments and a wide variety of meteorological equipment to measure the size distribution of fog particles and image airborne snow and ice crystals. The primary motivation of this work is to understand how local meteorological conditions and isotopic chemistry influence the isotope composition of the Greenland snow pack. This work will help refine an understanding of the climate signal embedded in the multi-millennial Greenland ice core records. The scientific community relies on these ice core records to understand how Earth's temperatures have varied over the past 100,000 years and these records are therefore integral in distinguishing how uniquely warm recent temperatures have been. The system is currently running remotely from a lab that was installed below the surface of the ice and the team will monitor it over the next year and travel back to the site next summer to make necessary repairs. One important aspect of this project is the installation of video cameras, which generate live feeds allowing opportunities for others to remotely observe the weather phenomena of Greenland. This work is funded by NSF's Polar Sciences program.

## **KONRAD STEFFEN**



Despite some damage to CU Swiss Camp from an exceptional melt year in 2010, the Steffen Group enjoyed a very productive 2011 Greenland field season. The CIRES team was joined by Dr. Jay Zwally (NASA Goddard Space Flight Center) and Dr. Jose Rial (University of North Carolina) to make detailed observations at Swiss Camp (including weather, ice velocity and ice seismicity). The CIRES team then undertook some extensive travel around the ice sheet to maintain and upgrade the majority of the Greenland Climate Network (GC-Net) automatic weather stations. As Air Greenland sold its last Twin Otter in 2010, this was the first season in many years with Air Iceland aircraft support. In addition to being capable (and punctual!) pilots, the Icelanders also proved to be very excellent field hands. Aside from a meandering volcanic ash plume, which delayed departure from Swiss Camp, the weather was exceptionally cooperative this season.

## CAROL WESSMAN



Our lab is concerned with ecological resilience to multiple disturbances and their interactions. Since 1999, we have studied an area of subalpine forest in northern Colorado that has experienced, over the past decade, several large-scale catastrophic disturbances. A record-setting windstorm and blowdown in 1997 was immediately followed by salvage logging and then by a regional drought-induced wildfire in 2002. Spruce and mountain pine beetle outbreaks were triggered over the same period and currently remain epidemic. The frequency of these disturbances is shorter relative to the time required for forest regeneration processes, and our work shows evidence of thresholds in forest recovery resulting from the interactions among the disturbances. Many disturbance regimes are changing rapidly as a result of climate change and human activity. Forest disturbances in the Western US are expected to increase in frequency, extent, intensity and variety. Future interactions among multiple disturbances may be unprecedented and, very likely, unpredictable. Disturbance cascades such as those we are seeing in Colorado will interact to shape future forest landscapes and ecosystem services by altering successional rates and pathways. We were recently funded by NSF to study the potential effects and consequences of multiple disturbances on future forest carbon sequestration, and to consider management options as they influence and are influenced by these disturbances.