Carbon and nitrogen storage in monoculture and mixed plantation stands of nitrogen-fixing tree species in subtropical China. Shi, Z., Luo, D., Cheng, R. (*Chinese Academy of Forestry, China; shizm@caf.ac.cn; luoda2010@163.com; chengrm@caf.ac.cn*).

Three young plantation stands (a monoculture *Erythrophleum fordii*, a monoculture *Pinus massoniana*, and a mixed stand of the two species) in subtropical China were selected to assess the potential of carbon and nitrogen sequestration. The results showed that the total carbon storage of the mixed plantation stand was 137.75 Mg/ha, higher than that of monoculture stands of *E. fordii* (134.07 Mg/ha) and *P. massoniana* (131.10 Mg/ha). Nitrogen storage ranked in order of *E. fordii* (10.19 Mg/ha), the mixed plantation (8.68 Mg/ha), and *P. massoniana* stands (7.01 Mg/ha). The spatial distribution of carbon and nitrogen were identical across the plantation stands, with the majority found in the 0~100 cm soil (occupied 81.49% and 96.91% of the total, respectively), followed by aboveground biomass represented by the trees (17.52% and 2.69%, respectively), and then understory and litterfall (all less than 0.5%). The above/underground ratios of carbon and nitrogen suggested that these three plantation stands have a tremendous potential for carbon and nitrogen sequestration. The results also indicated that mixed plantation stands with a nitrogen-fixing species could provide a better silvicultural model for carbon and nitrogen sequestration in comparison to monoculture stands in this area.

Potential vegetation dynamics under climate change in a semi-arid ecosystem in the Western United States. Shrestha, R., Glenn, N., Flores, A. (*Boise State University, USA; rupeshshrestha@boisestate.edu; nancyglenn@boisestate.edu; lejoflores@boisestate.edu*).

Modeling the future composition of terrestrial ecosystems in response to coupled dynamics of climate change and disturbances such as fire relies heavily on model parameterization. Fine-scale field-based measurements can provide the necessary parameters for constraining models at a larger scale. But the time- and labor-intensive nature of field-based data collection leads to sparse sampling and significant spatial uncertainties in retrieved parameters. In this study we quantify fine-scale vegetation dynamics in the Reynolds Creek Experimental Watershed in southern Idaho, United States. We used locally downscaled climate projections to run a dynamic global vegetation model, the output of which was used to inform a state-and-transition model to assess the fine-scale vegetation dynamics under climate change scenarios. We also leverage field-measured vegetation data along with airborne LiDAR to initialize a process-based fire model to examine vegetation dynamics in response to stochastic fire events. The results will improve our understanding of fine-scale vegetation dynamics in a semi-arid ecosystem and will provide a basis for generating ensembles of spatially-explicit alternative scenarios to guide future land management decisions in this and similar regions.

Which factors can explain changes in the distribution range of *Mimusops andongensis* Hiern in Benin? Sinasson Sanni, K. (*University of Abomey-Calavi, Benin; sinasson.gisele@gmail.com*), Shackleton, C. (*Rhodes University, South Africa; c.shackleton@ru.ac.za*), Sinsin, B. (*University of Abomey-Calavi, Benin; bsinsin@gmail.com*).

Mimusops andongensis is a multipurpose species with the wood used for construction, to produce charcoal, and as firewood. Its bark, roots, and leaves are used for local healthcare needs, and fruits and bark for alimentary uses. It can be found in many African countries on different habitat types: gallery and riparian forests, forest-savannah transition zones, dense humid and semi-deciduous forests, savannah and fallows in last stages of succession. In Benin, the species can hardly be found in other natural habitats except semi-deciduous forest. Also, changes are occurring in climate and environment and may impact its distribution range. This research aims to understand specific factors which explain *M. andongensis* current distribution range and highlight factors which may impact the species ecological niche under shifts in environment. Data on the presence, morphology, and phenology of the species will be collected through forest inventory. Climatic data will be obtained from WorldClim database and soil data will be analyzed to describe the ecological characteristics of forests to be sampled. Data collection began in August 2012 and will be finalized in May 2014. Potential changes in the distribution range of *M. andongensis* will be discussed using scenarios under future climatic conditions.

Hydro-climatic variation and its interactions with landscape units in the Brazilian Pantanal, South America. Soares, M.T.S., Soriano, B.M.A., Crispim, S.A., Santos, S.A., Fernandes, F.A. (*EMBRAPA, Brazil; marcia.toffani@embrapa.br; balbina.soriano@embrapa.br; sandra.crispim@embrapa.br; sandra.santos@embrapa.br; fernando.fernandes@embrapa.br*), Wrege, M., Salis, S.M.

In the Brazilian Pantanal, one of the largest wetlands of the planet, the delicate relationship between the dynamics of water, vegetation cover, and antropic disturbance in livestock activity remains unclear. The present study aims to monitor climatic parameters and fluctuation of the water table in different landscape units, relating them with the biomass productivity of areas used for beef cattle management activity. The study is being conducted in the Nhecolândia sub-region, Pantanal, western Brazil. From March 2009 to July 2010, we monitored rainfall (mm) and the fluctuation of the water table in 10 monitoring wells distributed in the savannah woodland and open grasslands with predominance of native grasses and *Urochloa* pastures, established in place of the native forest. Productivity parameters in open grassland with predominance of *Mesosetum chaseae* were also evaluated. The natural vegetation cover interfered distinctly with the behavior of subsurface waters, whereas under forestry cover, the periods of groundwater responses to rainfall were higher. In native pasture, cumulative rainfall and groundwater level were related to increased soil cover by grasses. It is expected that the long-term monitoring of hydro and ecological relationships can generate key information to support programs for sustainable management of the cattle ranches in Pantanal wetlands.

Simulating the dependence of aspen net primary productivity on redistributed snow. Soderquist, B., Kavanagh, K. (*University of Idaho, USA; sode5734@vandals.uidaho.edu; katyk@uidaho.edu*), Seyfried, M., Winstral, A (*Agriculture Research Services, USA; mark.seyfried@ars.usda.gov; adam.winstral@ars.usda.gov*), Link, T. (*University of Idaho, USA; tlink@uidaho.edu*).

In the semi-arid mountainous regions across the western United States, the distribution of aspen (*Populus tremuloides*) is often directly related to heterogeneous soil moisture subsidies resulting from redistributed snow. With increasing temperatures, the amount and timing of snowmelt subsidies are changing, therefore future trends in aspen net primary productivity (NPP) remain