Annual Report

SECC-RISA: Science and partnerships for adaptation and resilience to climate change and climate variability

Performance Period – May 2011 through April 2012

SECC Executive Committee

University of Florida:	JW Jones, KT Ingram, CW Fraisse, S Asseng
Florida State University:	V Mishra, JJ O'Brien
University of Miami:	D Letson
Auburn University:	P Srivastava
University of AL, Huntsville:	J Christy
University of Georgia:	G Vellidis
Clemson University:	S Templeton
North Carolina State U:	Gail Wilkerson, Ryan Boyles

Note: Although Clemson and NCSU are included in the overall SECC, they are not funded through the SECC-RISA.

New Focus Areas and Partnerships

For the most part, instead of forming new partnership and focus areas, the SECC has attempted to strengthen the focus areas and partnerships that were begun in 2010-2011. There are, however, several notable new partnerships that we have developed through the National Climate Assessment, including: SCIPP, CISA, US EPA Region 4, US DOT Region 4, NASA Marshall Space Center, and SERCC.

Research Findings

1. Climate Sciences

- There are perceptible impacts of urbanization and irrigation on the observed surface temperature trends in the Southeast USA.
- The seabreeze along panhandle Florida has an interannual variability component that is associated with the movement of the Bermuda high in the summer season.
- Dynamically downscaled climate data seems to have value for hydrological forecasts in 28 watersheds across the Southeast US, and is shown to be superior to statistically downscaled climate data.
- The length of the wet season in Florida is shown to be modulated by the Pacific Decadal Oscillation, which manifests in the form of changing influence of ENSO on the start of the wet season from one phase of PDO to the other.

2. Agricultural ecosystems

- An online tool to manage peanut early and late leaf spot was developed for the Southeast and will be deployed for the 2012 growing season. The tool allows users to click on the nearest weather station from a map, learn the recent and current risk of leaf spot, and input his/her data to receive a spray advisory.

- For row crops in the Southeast USA, the Multivariate ENSO Index (MEI), ONI, and modified JMA all had stronger relationships with crop yields that did the JMA annual index, which give us some ability to forecast crop responses to ENSO phase..

3. Water resources

- Managers of small municipal water systems in the Apalachicola-Chattahoochee-Flint River Basin are not able to use climate information effectively in their management strategies due to their operational requirements, but they are interested in learning about potential impacts of climate change on their operating strategies as well as their long-term infrastructure planning.
- A statistical downscaling technique developed in this study accurately reproduced observed temporal mean and variability of precipitation whereas dynamical downscaling and interpolation-based statistical downscaling methods were limited in reproducing spatiotemporal variability. These limitations propagated significant errors in hydrologic simulations based on downscaled climate predictions.

4. Coastal Ecosystems and Communities

- Hurricanes striking the Gulf of Mexico coastline from 2005 to 2009 had a negative economic effect on the production of the commercial grouper (*Serranidae*) fleet. Specifically, an active hurricane season reduce the immediate-term ex-vessel revenue as much as 59% for a particular region.
- Adaptive strategies that mitigate sea level rise impacts and the associated uncertainties seem to be the best intervention option for both protecting the physical habitat along Florida's Gulf Coast and the shorebirds that are strongly habitat-dependent.

Accomplishments

Note: We list only the highlights for our previous year. Full reports from each SECC institution are available on the SECC website.

1. Climate Information for Managing Risks Symposium

The Climate Information for Managing Risks Symposium was held successfully in May 2011 in Orlando, FL.
Organizing Committee Chair: KT Ingram

2. National Climate Assessment

- The SE Region Technical Report to the National Climate Assessment was submitted 1 March 2012 with leadership from the SECC (KT Ingram) and partnership with SCIPP (L Carter), CISA (K Dow). Additional members of the writing team included representatives from SE Regional Climate Center, Centers for Disease Control and Prevention, US EPA, NASA, DoTransportation), US Forest Service; North Carolina State University, U Georgia, SeaGrant.

- Research Support to the NCA

PIs: KT Ingram, JW Jones (UF), NE Breuer (UM), JJ O'Brien, J Harrington, D Zierden (FSU), A Stewart (UGA)

Three research projects were undertaken: 1) Stakeholder Interviews; 2) Decision-maker Surveys; and 3) Social Network Analysis (SNA). A full report is available on the SECC website, here we present only the highlights of the decision-maker survey and social network analysis.

Decision-maker survey
NE Breuer

Climate is a salient topic for the majority of respondents. More than 83% have noticed changes in the climate from year to year. However, only 57% have noticed changes in the actual seasons. Slightly more than 10% mentioned that the changes in the climate did not matter to them. Most believe that climate is important to their work. Of particular importance is the effect of climate variability and change as a threat to personal property and belongings (Figure 1).

Regarding climate information-seeking behavior, respondents sought information an average of 14 times during the past twelve months. The sample population specifically mentioned several reports that were read to obtain additional information (Table 1).

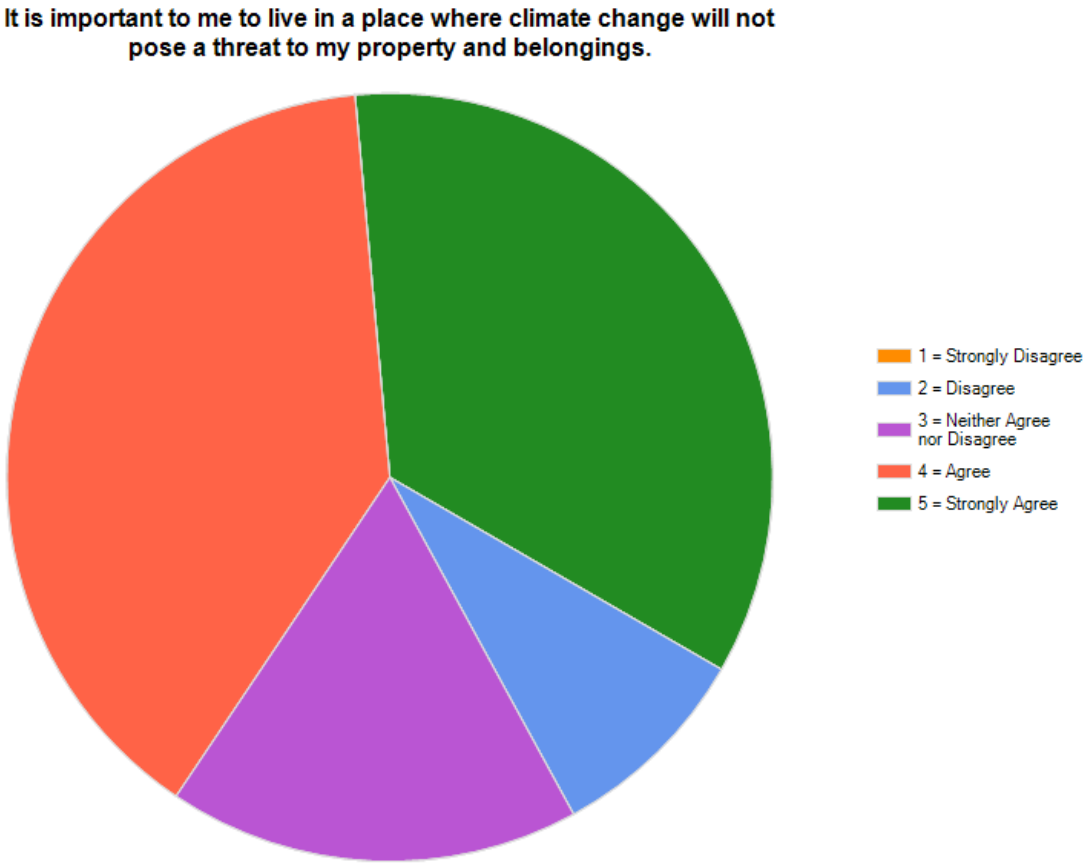

Figure 1. Climate change as a threat to personal belongings.

Table 1. Climate Reports read by the survey respondents.

Global Climate Change Impacts in the United States from the U.S. Global Climate Change Research Program.	33.3%
America's Climate Choices.	26.7%
2007 IPCC Fourth Assessment Report (AR4) Intergovernmental Panel on Climate Change.	60.0%
Florida and Climate Change: The Costs of Inaction (Stanton and Ackerman).	46.7%
Climate Change in Coastal Areas in Florida: Sea Level Estimation and Economic Analysis to Year 2080 (Harrington and Walton).	40.0%

Respondents sought information from many sources on climate issues and cited a variety of sources (Table 2). The National Oceanographic and Atmospheric Administration (NOAA), the National Weather Service (NWS), the University of Florida (UF), and National Public Radio (NPR) were among the sources most mentioned. In addition, respondents sought information from journals and from within the governmental agencies they work for as well as from meteorologists and The Weather Channel. The most trusted sources for climate information were the University of Florida and NOAA, followed by IFAS extension agents and the NWS.

Table 2. Sources from which respondents reported learning most about climate.

Answer Options	Response Percent
National Oceanographic and Atmospheric Administration (NOAA)	73.1%
Agroclimate (http://agroclimate.org/)	11.5%
Florida Climate Institute (FCI)	15.4%
Institute of Food and Agricultural Science extension agents	26.9%
Office of the State Climatologist (COAPS)	7.7%
Fox news	7.7%
National Weather Service (NWS)	42.3%
University of Florida (UF)	53.8%
Public Broadcasting System (PBS)	26.9%
Intergovernmental Panel on Climate Change (IPCC)	23.1%
Southeast Climate Consortium SECC)	23.1%
The New York Times	3.8%
University of Miami	7.7%
Wikipedia	7.7%
National Public Radio (NPR)	42.3%

Social Network Analysis

M Matthews

Co-attendance Survey Results Using Social Network Analysis (one of three studies)

The SECC has initiated several studies to investigate how connections and collaborations can be developed effectively and supported efficiently. One such study looks at conferences as catalysts for collaborative networks. The objective is to understand how conference co-attendance is related to collaboration among the different groups interested in climate-related issues and to use this knowledge to improve strategies for the dissemination of climate-related information.

Three hypotheses regarding the behavior associated with conference attendance are being tested in this research: 1) Academics are more likely to use conferences and workshops as a venue to form collaborative networks than attendees from other participant categories; 2) Due to the homophily principle, academics are more likely to form collaborative efforts with other academics as a result of their interaction at conferences and workshops than with attendees from other categories; 3) In the opinion of climate conference participants making new contacts will be a less important outcome of attending conferences than presenting and obtaining information.

Phase I Results. In the completed first phase of this research, SNA was used to determine which individuals from ten climate-related events in Florida had co-attended events. Participation lists from conferences and workshops held in Florida between 2007 and 2011 were chosen because they represented a diverse group of climate-related events organized by state government agencies and Florida universities. Participant names and organization affiliations were used to develop an adjacency matrix in Excel (Figure 2).

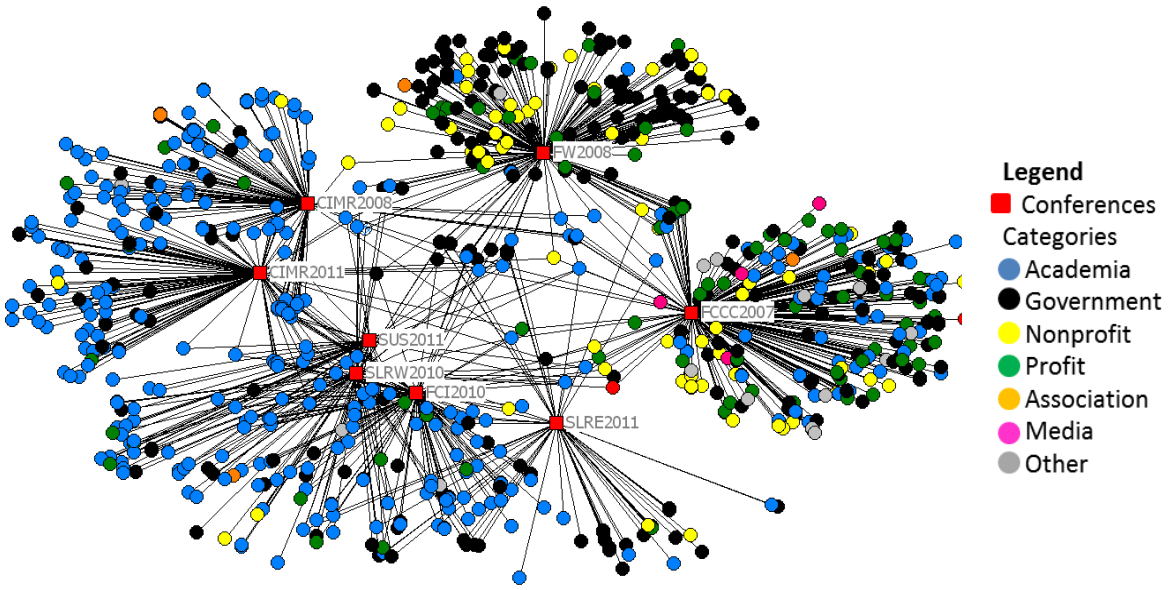

Figure 2 Participation in Florida Climate Events
While individuals from academic institutions predominate in Figure 1, there were a significant number of participants representing government agencies. Color-coding represents the organizational affiliation category of the participants

Phases II and III. Phase II began by identifying participants who co-attended multiple events using UCINet 6 to convert the 2-mode matrix into a 1-mode attendee-to-attendee affiliation matrix. The analysis was run a second time to determine which participants had attended two or more conferences together. By identifying subgroups that have attended more than one conference, it is possible to identify individuals with a higher likelihood of having interacted.

Phase I and Phase II employed SNA concepts to show which participant categories were more prevalent at the different events and to identify individuals who had co-attended multiple events. While these preliminary steps allowed us to determine *potential* interactions between event participants, we do not know the extent of their interactions.

In Phase III researchers will contact individuals who co-attended two or more conferences to ask questions regarding interactions with the other individuals who attended the same events. Analysis of responses to a two-part questionnaire will seek to determine to what degree the individuals who co-attended climate-related events interacted before, during, and after the events and how (or if) they used these events as a venue for making contacts and developing collaborative projects.

3. Coping with Drought

- Evaluation of Dynamically Downscaled Reanalysis Precipitation Data for Hydrological Application: A Case Study of Watersheds in the Southeast United States

PI: V. Misra

Skillful and reliable meteorological forcing, particularly that of precipitation, is essential for seasonal hydrologic forecasting, and generation of hydrological data which will be useable for emergency management and water resources management. However, outputs from Global Climate Models GCMs have large biases and lack sufficient resolution, making them unsuitable for hydrological simulation. Dynamic downscaling methods have come to fore in increasing the resolution of the output of GCMs. However, the existence of systematic errors in dynamically downscaled data adversely affects the skill of hydrologic forecasting. The primary objective of this study is to evaluate the streamflow forced by proxies for surface meteorological observation data, which is derived by dynamically downscaling the global atmospheric reanalysis data. The evaluation is based on the propagation of model forcing through three hydrological models. As hydrological models and their parameters have statistically significant uncertainties, hydrologic ensembles are produced by propagating model forcing through a suite of conceptual hydrological models and examining their responses for the evaluation. Three conceptual hydrological models are calibrated for 28 small-to-medium sized basins located in the southeast USA that are minimally affected by human intervention. In this study, predictions from different models are combined on the basis of a generalized likelihood uncertainty estimation framework. Calibrated hydrological models are forced with four different types of datasets: global (NCEP R2 and ERA40) at their native resolution; dynamically downscaled; synthetically generated; and bias-corrected, dynamically downscaled. Our study indicates that over the 28 watersheds in the southeast USA, the simulated hydrological response to the bias-corrected dynamically downscaled data is superior to global reanalysis, bias-corrected global reanalysis, synthetically generated data, and dynamically downscaled reanalysis. In comparison to synthetically generated meteorological forcing, the dynamically downscaled data result in more realistic hydrological simulations. Therefore, we conclude that dynamical downscaling, although resource intensive, is better suited for hydrological simulation in the southeast USA.

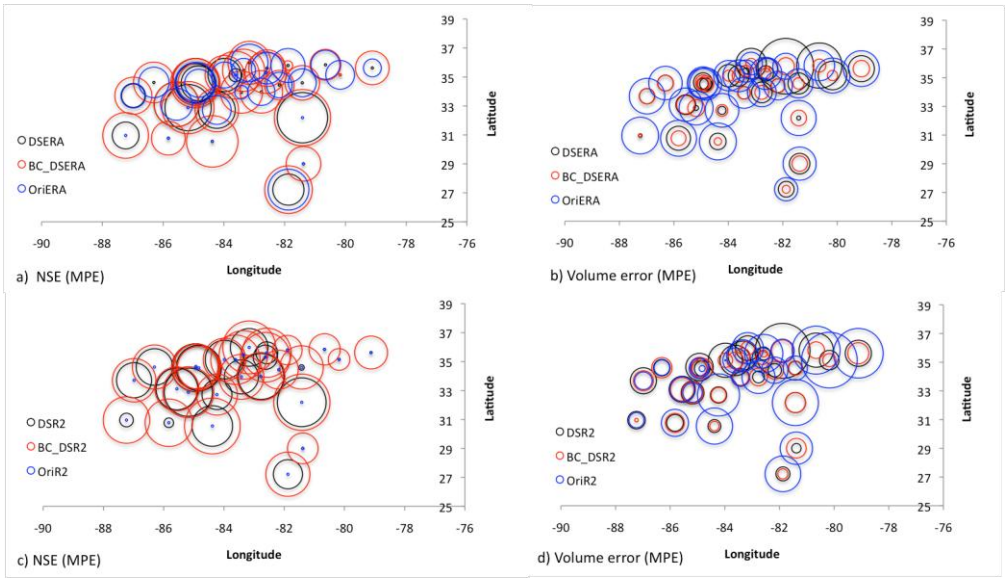

Figure 3: Bubble plot showing the value of Nash-Sutcliffe efficiency index (NSE) (a and c; larger bubbles reflect higher NSE) and volume error (b and d; smaller bubbles reflect smaller error) measured with respect to observation (ME) and control simulation (MPE).

- Support to NIDIS

PIs: KT Ingram, D Zierden, C Martinez, P Srivastava, P Knox, J Christy
Partners: USGS, USACE, SERFC, NWS (Tallahassee WFO and Southern Region), Apalachicola NERR

The SECC has led the development of a pilot drought early warning system for the Apalachicola-Chattahoochee-Flint River Basin with three principal components: webinars, newsletters, and database locator. Webinars have been conducted regularly since January 2011 and are archived at http://drought.gov. Newsletters are distributed quarterly and emphasize explanations of recent climate and weather phenomena in lay terms.

4. Core Research -- Climate Sciences

- COAPS Land–Atmosphere Regional Reanalysis for the Southeast at 10-km resolution (CLAAReS10)

PIs: V Misra, JJ O'Brien

Most of our assessment focuses on the representation of summertime subseasonal and diurnal variability. Summer precipitation in the Southeast United States is a particularly challenging modeling problem because of the variety of regional-scale phenomena, such as sea breeze, thunderstorms and squall lines, which are not adequately resolved in coarse atmospheric reanalyses but contribute significantly to the hydrological budget over the region. We find that the dynamically downscaled reanalyses are in good agreement with station and gridded observations in terms of both the relative seasonal distribution and the diurnal structure of precipitation, although total precipitation amounts tend to be systematically overestimated. The diurnal cycle of summer precipitation in the downscaled reanalyses is in very good agreement with station observations and a clear improvement both over their ‘‘parent’’ reanalyses and over newer-generation reanalyses. The seasonal cycle of precipitation is particularly well simulated in the Florida; this we attribute to the ability of the regional model to provide a more accurate

representation of the spatial and temporal structure of finer-scale phenomena such as fronts and sea breezes. Over the northern portion of the domain summer precipitation in the downscaled reanalyses remains, as in the ‘‘parent’’ reanalyses, overestimated. Given the degree of success that dynamical downscaling of reanalyses demonstrates in the simulation of the characteristics of regional precipitation, its favorable comparison to conventional newer-generation reanalyses and its cos effectiveness, we conclude that for the Southeast United states such downscaling is a viable proxy for high-resolution conventional reanalysis.

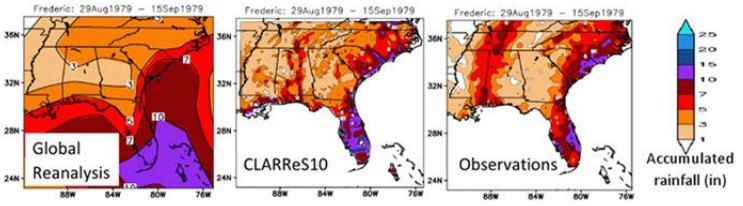

Figure 4: The depiction of accumulated rainfall from 29 August-15 September 1979 during Hurricane Fredric from Global reanalysis (left), CLARReS10 (middle), and Observations (right).

- Inadequacies of IPCC AR4 models to project climate over Florida

PI: V Mishra

Regional climate refers to the aggregate weather over a period of time (generally anything over or equal to a month) over a specific region. There are natural causes for the climate to vary from region to region, including:

- the uneven distribution of solar heating on the earth’s surface;
- the different responses and interactions of the lithosphere, cryosphere, atmosphere, hydrosphere, and biosphere to solar heating;
- the location of the region with respect to oceans (coastal or inland); and
- the altitude of the region (mountain or valley);
- the different composition of the atmosphere that vary geographically especially of the various pollutants like aerosols.

All of these factors would make Florida’s regional climate rather unique. The closest proximity of the peninsular Florida to the equator in the continental US, its rather flat terrain, its nearness to relatively warm ocean water, and insignificant contribution of the snow melt to its fresh water sources make Florida’s regional climate distinctive to the rest of the US. Florida is also one of the few regions of the US that displays a strong seasonality in precipitation and surface temperature. One would therefore assume that most of the climate models used for projection to the 21st century would have many of these features in their simulations of the 20th century climate of Florida. Unfortunately, a majority of the models in the IPCC AR4 were of very coarse horizontal resolution (~200 km grid resolution). As a consequence, in many of the AR4 models, most parts of South Florida were not resolved (Fig. 6.1). However, there were a few models, such as the Japanese MIHR model (Fig. 6), that had reasonable resolution to resolve the coastlines of Florida, but they had other issues with global climate variations, which we will argue later in this section, would make them potentially unreliable for projections over Florida

5. Core Research – Agricultural Ecosystems

- Extension videos

PIs: WL Bartels, D Duorte
Partner: NOAA CPO

After supporting a row crop climate working group over the past two years, our activities have led to the production of two short and powerful films about how two producers from the group are using climate information to adapt to changes in climate. The videos are posted on Climate Watch magazine and focus on water harvesting in dryland agriculture and climate forecasts versus the farmers' almanac.

- Climate-based agricultural risk management outreach

PIs: CW Fraisse, WL Bartels, B Ortiz, N Breuer, C Furman, M Boudreau, D Nelson, D Stooksbury, B Lassiter, H Dinon
Partners: Commodity extension specialists, leaders of boundary organizations

Our goal is to disseminate climate information and facilitate its application to risk-management strategies to agents, farmers, and other stakeholders. We developed web-based tool for peanut disease management was developed, and a prototype for an interactive instructional module on ENSO and agricultural risk was evaluated and a development framework established at the fall SECC meeting. Numerous presentations, exhibits, and workshops were provided to stakeholder groups on obtaining climate information, interpreting it, and using it for management decisions. These often included written documents or reports. Underserved groups were emphasized in these events, and information was provided for inclusion in organizational newsletters (Figure 5).

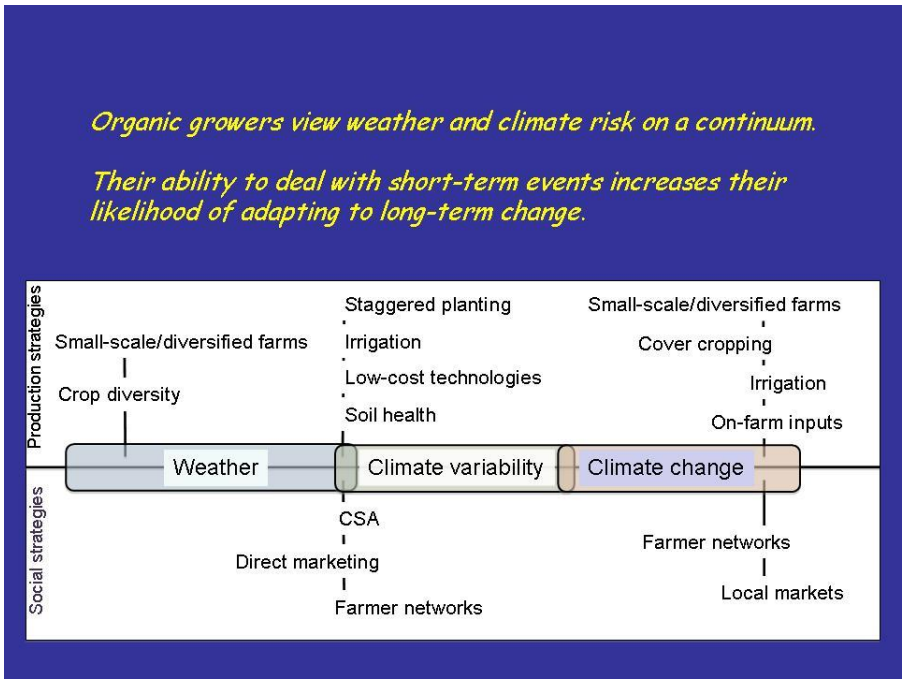

Figure 5. Diagram showing the perspective of organic growers to weather, climate variability, and climate change and how they use information at these different timescales in resource management.

We also conducted a series of workshops for beef and dairy producers dealing with the current drought. Growers were particularly interested in how drought would affect forage and hay production as well as profitability.

- Niña-following-Niño correlations with SE USA crop yields

PI: F Royce

Our goal is to improve summer-time crop yield predictions for the SE USA based on particularly rapid, consecutive-year changes ENSO state. By comparing only consecutive years, it is not necessary to detrend historical yield data, which is a significant advantage for crops that do not show clear linear trends, such as cotton and peanut. We analyzed yields of corn, peanut, and cotton, from 16 previously selected counties in AL, GA, and FL using data from 1939-2010. Comparing yields in consecutive Niño-to-Niña years (JMA-annual index), there was a statistically significant trend of higher yields in the Niña year than in the preceding Niño year for corn. Neither peanut nor cotton showed this trend. Consolidated state-level annual yield data (production divided by annual *planted* area) from AL, GA and FL using data from 1954-2011 show the same trend, with similar level of statistical significance ($p < 0.05$). Figure 6 shows that Niña years without exception show an increase in yield compared with the immediately preceding Niño year (i.e., 1989 compared to 1988).

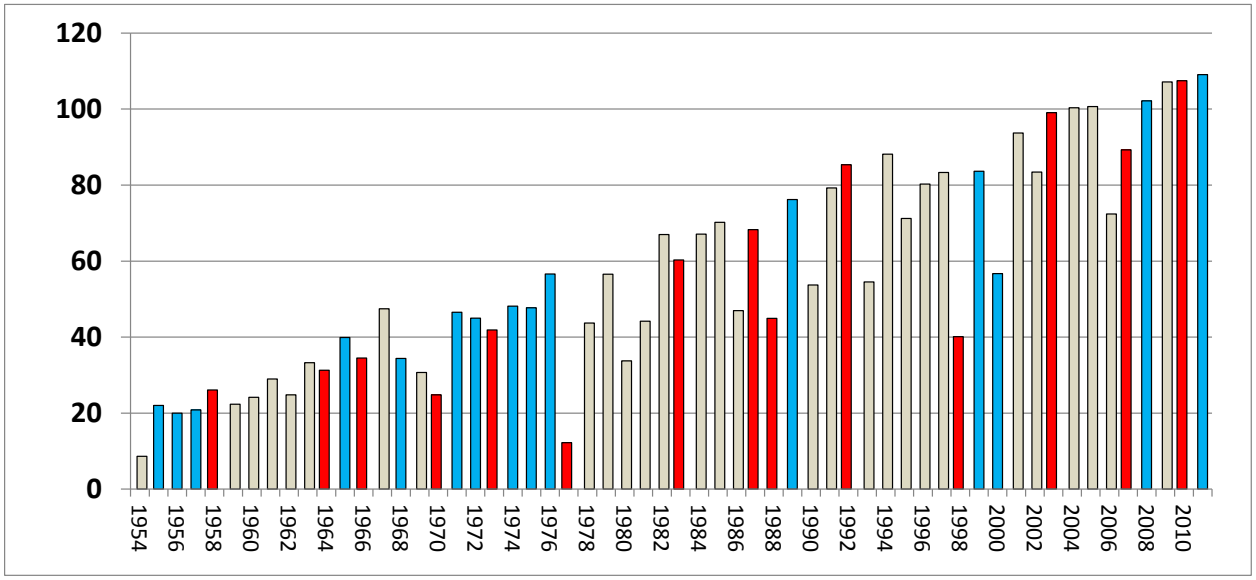

Figure 6. Observed corn yields (bu/planted acre), 1954-2011 Alabama, Florida, and Georgia. El Niño (red) and La Niña (blue).

- Working with a community-based organization to design agricultural climate strategies for African American farmers

PIs: F Royce, WL Bartels, C Furman

Leveraging: USDA NIDIS

Our goal is to develop a collaborative relationship with the community-based Federation of Southern Cooperatives in pursuit of project goals oriented toward African American farmers as part of a larger effort to develop effective climate change extension programs building on our successful climate variability programs; to develop adaptation strategies and promote management practices that aid agricultural and natural resource industries in reducing carbon, water, and nitrogen footprints while maintaining profitability. Initial workshops with African American farmers (Figure 7) have revealed an unexpected degree of diversity in world-view between them and the Euro American row crop farmers with whom we have been working for some years. In spite of farming in the same geographic region as our row crop group, listening to their local histories one would assume they were from different countries, not different counties. Evidently, the differences in history, experience, perceptions and available resources require us to work with the community-based organization to develop suitable outreach strategies and technologies. Implementation of climate-based decision support systems and technical adaptations will likely require cooperative solutions for most small farmers, including African Americans.

Figure 7. First climate and agriculture workshop with the Federation of Southern Cooperatives. Nov 16, 2011, Albany, GA

6. Core Research – Water Resources

- Continued development and assessment of SEWaterClimate.org

PIs: P Knox, D Stooksbury, CJ Martinez, P Srivastava, NE Breuer, JW Jones, R Boyles

Partners: Large and small scale water utility managers across the southeast

With a goal of developing a suite of climate-based tools that will be of value to water utility decision makers, the website was updated allow faster updates in response to changing ENSO conditions including outlook materials.

Several water managers evaluated the template web site and suggested improvements that are in the process of being included. Water managers evaluated a new tool that displays local ET data, which allows them to make more timely and accurate predictions of reservoir levels for management purposes. Managers of small municipal water systems are often not able to use climate information effectively in their management strategies due to operational constraints, but they are interested in learning about potential impacts of climate change on their operating strategies as well as their long-term infrastructure planning.

- Use of Intra-seasonal and Seasonal Forecasts to Reduce Risk in Regional Public Water Supply Management

PIs: CJ Martinez,WD Graham, JW Jones
Partners: Tampa Bay Water, UF Water Institute
Leveraging: SARP

Our goal was to integrate intra-seasonal and seasonal forecasts into hydrological forecasts used by Tampa Bay Water. We developed an analog forecast appoach using the Global Forecast System retrospective forecast archive can improve rainfall and streamflow forecasts in the Tampa Bay region between 1 day and 1 week in advance.

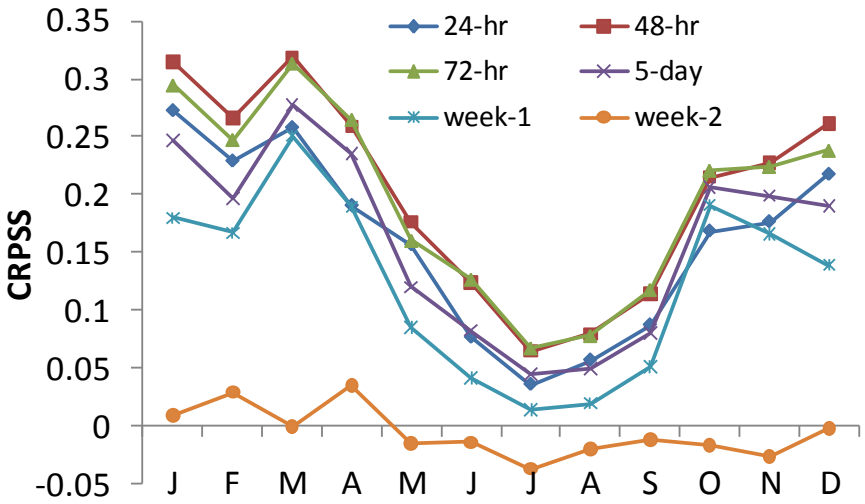

Figure 1. Continuous Ranked Probability Skill Score of forecast-analog based station accumulated rainfall forecasts in the Tampa Bay region.

7. Core Research – Coastal Ecosystems

- Integrated Climate Change and Threatened Bird Population Modeling to Mitigate Operations Risks on Florida Military Installations

PIs: G Kiker, Rl Muñoz-Carpena, C Martinez
Partner: I Linkov, USACE

Our project objectives were to (1) assess current vulnerability scenarios and information on selected Florida bases, (2) develop a set of habitat- and species-based models for selected coastal Threatened, Endangered, and Sensitive Species (TER-S), (3) assess the current prediction level and assumptions of selected categories of TER-S models for use in benchmarking model performance and uncertainty levels, and (4) integrate the scientific data, modeling and uncertainty results into a risk-informed, multi-criteria decision analysis system to allow systematic analysis of potential management options. Overall, Eglin Air-Force Base (AFB) is more stable compared to Tyndall AFB and the whole Gulf Coast of Florida, manifesting the least changes between 2010 and 2100 at SLR = 2.0 m in all land cover categories except tidal flats. As a result of these state-wide simulations, Snowy Plover population size will decline faster than the area of habitat or carrying capacity, demonstrating the necessity of incorporating population dynamics in assessing the impacts of sea-level rise on coastal species. Adaptive strategies that mitigate the change in the face of these uncertainties such as more ecologically sustainable renourishment seem to be the best intervention option for both protecting the physical habitat and the shorebirds that are strongly habitat-dependent.

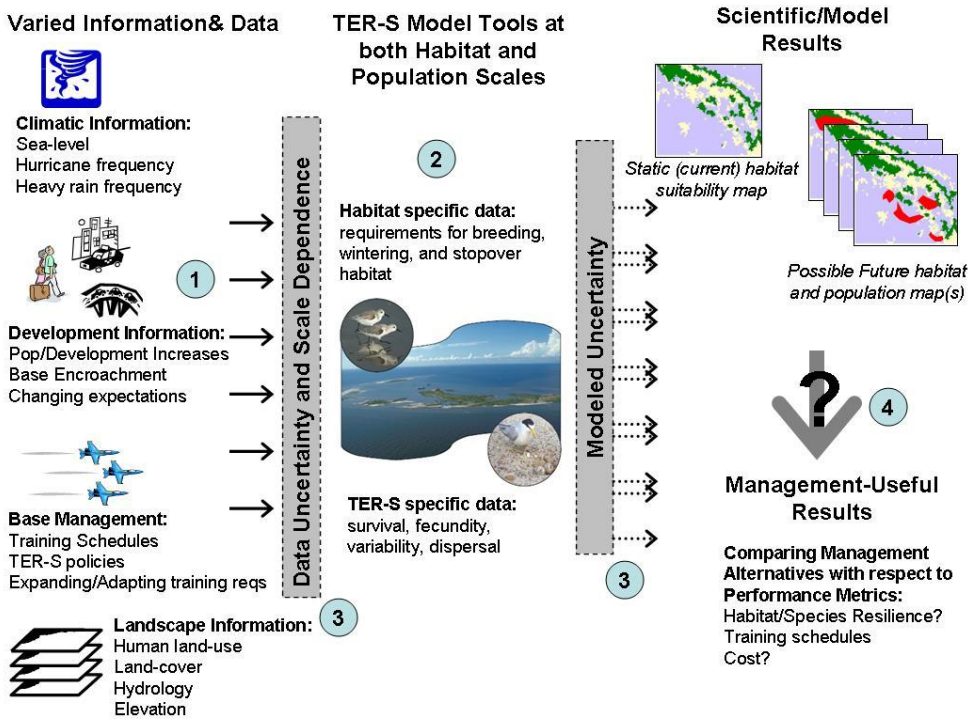

Figure 8. Conceptual model showing the relationship of varied and uncertain input information being fed into habitat- and species-focused TER-S models for creation of research products with an uncertain linkage to site-based management-related issues. Circled numbers correspond directly with listed research objectives.

Publications

(Due to space limitations, we present only refereed and technical reports here. A complete document with posters and presentations will be posted on the SECC website.)

Aiello-Lammens, M., Chu-Agor, M.L., Convertino, M., Fischer, R.A., Linkov, I., Akcakaya, H.R., (2011). The impact of sea-level rise on Snowy Plovers in Florida: Integrated Geophysical, Habitat, and Metapopulation Models, Global Change Biology, DOI: 10.1111/j.1365-2486.2011.02497.x

Arnold SA, Koro-Ljungberg M, W Bartels. 2012. Issues of power and conflict in adaptive management: Analyzing the discourse of riparian management on public lands. Ecology and Society. 17 (1): 19.

Asseng S, Cammarano D, Ingram KT, Bartels WL, Breuer NE, Furman CA, Hoogenboom G, Royce F, Ortiz BV, Fraisse CW, Fortuin C, Solis D, Letson D, Shuford SD, Jones JW. 2012a. Impact of climate change on agriculture in the Southeast USA, including key climate vulnerabilities, uncertainties, adaptation, assessment and research needs. Chapter SE Technical Report to the National Climate Assessment.

Asseng S, Foster I, Turner NC. 2011. The impact of temperature variability on wheat yields. Global Change Biology 17, 997-1012.

Asseng S, McIntosh P, Wang G, Khimashia N. 2012b. Optimal N fertiliser management based on a seasonal forecast. European Journal of Agronomy 38, 66-73

Bartels W, Arnold J, Breuer NE, Furman CA, Staal L, Irani TA, JW Jones. 2011. Supporting dialog and learning among stakeholders through climate working groups. Southeast Climate Consortium Technical Report Series: 12-001:00-00.

Bartels W, Furman CA, Royce F, Ortiz B, Zierden D, Fraisse C. 2012. Developing a learning community: Lessons from a climate working group for agriculture in the southeast USA. Southeast Climate Consortium Technical Report Series: 12-002:00-00.

Bartels W, Furman CA, Royce F. 2012. Agricultural adaptation to climate variability and change among African American growers in the Southeast USA. Southeast Climate Consortium Technical Report Series: 12-003:00-00.

Bartels W, Schmink MA, Borges EA., Duarte AP, HD, Arcos SS. 2011. Diversifying livelihood systems, strengthening social networks, and rewarding environmental stewardship among small-scale producers in the Brazilian Amazon: Lessons from Proambiente. Chapter in Payments for Environmental Services, Forest Conservation and Climate Change: Livelihoods in the REDD? Tacconi L., Mahanty S., Suich H. (eds.) Edward Elgar, Cheltenham.

Bastola S, V Misra. 2012. Evaluation of dynamically downscaled reanalysis precipitation data for hydrological application: A case study of watersheds in the southeast United States. *J. Amer. Wat. Res. Assoc.* (Submitted)

Breuer NE, Dinon H, Boyles R, Wilkerson G. 2012. Extension agent awareness of climate and new directions for research in North Carolina. J Service Climatology: http://www.journalofserviceclimatology.org/articles/2011/Breuer_et_al_2011.pdf

Chu-Agor, M.L., R. Muñoz-Carpena, G.A. Kiker, M. Aiello-Lammens, R. Akçakaya, M. Convertino, I. Linkov. 2011. Simulating the fate of Florida Snowy Plovers with sea-level rise: exploring potential population management outcomes with a global uncertainty and sensitivity analysis perspective. Ecological Modelling (Submitted)

Chu-Agor, M.L. , R Muñoz-Carpena, G. Kiker, A. Emanuelsson, and I. Linkov. 2011. Exploring sea level rise vulnerability of coastal habitats through global sensitivity and uncertainty analysis. Environmental Modelling & Software 26:593-604.

Chu-Agor, M.L., J.A. Guzman, R. Muñoz-Carpena, G.A. Kiker, I. Linkov. 2012. Changes in beach habitat due to the combined effects of long-term sea level rise, storm erosion, and nourishment. Environmental Modelling (Submitted)

Convertino, M., J. Elsner, G. Kiker, R. Munoz-Carpena, Martinez, C.J., R. Fischer, I. Linkov (2011), Do tropical cyclones shape shorebird patterns? Biogeoclimatology of Snowy Plovers in Florida, PLoS ONE, 10.1371/journal.pone.0015683.

Convertino M, Welle P, Munoz-Carpena R, Kiker G, Chu-Agor ML, Fisher RA, Linkov I. (2012) Epistemic uncertainty in predicted shorebird biogeography affected by sea-level rise. Ecological Modelling (Submitted)

Convertino M, ML Chu-Agor, RA Fischer, G Kiker, R Munoz-Carpena, JF Donoghue, I Linkov (2011), Anthropogenic renourishment feedback on shorebirds: a multispecies Bayesian perspective, Journal of Ecological Engineering (Submitted)

Convertino M, G Kiker, R Muñoz-Carpena, R Fischer, I Linkov (2011). Scale- and resolution-invariance of suitable geographic range for shorebird metapopulations, Ecological Complexity, doi:10.1016/j.ecocom.2011.07.007

Convertino M, A Bochelie, ML Chu-Agor, RA Fischer, G Kiker, R Muñoz-Carpena, I. Linkov (2011). Shorebird Patch Dynamics as Fingerprint of Coastline Variation due to Climate Change, Journal of Geophysical Research - Biogeoscience, (Submitted)

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Example of how SECC has linked with NOAA

The SECC has many examples of linkages with NOAA, but perhaps the best would be NIDIS. SECC researchers work closely with NIDIS in conducting research that improves our ability to forecast drought in the Southeast as well as conducting outreach programs that inform water managers and others in the region of drought conditions and forecasts. For more information, go to: http://www.drought.gov/portal/server.pt/community/acfrb.

NCA Priority and Activities for 2012-2013

Priority SECC activities for the NCA will focus on: 1) Publication of the SE Region Technical Report through Island Press; 2) Assisting with writing the 2013 report; 3) Finalizing reports and publications based on previous research conducted in support of the NCA; and 4) Continuing research on the evaluation of CMIP 5 model outputs and their use to updates assessments of probable climate impacts to the Southeast.

SECC Projects related to the RISA

PI	Project Title	End Date	Deliverables	Abstract/Description	Partners	RISA-led?
DW Shin (FSU)	Optimizing future crop yield projections using weighted multi-model ensemble approaches	2014	Refereed papers and models	Current climate models do not adequately represent agricultural land use in their surface parameterizations. This project aims to improve the land-atmosphere interactions for regional models	NSF (EaSM): USDA/NIFA, Guillermo Bagorria (UF); Norman Breuer and Daniel Solis (Miami)	A*
Graham, (UF)	Collaborative development of public water supply utility relevant climate information	2013	Development of new and assessment of climate information products for water supply managers	Synthesize existing GCM retrospective simulations and future predictions for the state of Florida -- including raw GCM results as well as national downscaled datasets (e.g. NAARCAP, CMIP3, CMIP5) and evaluate the simulations/predictions at time/space/event scales of interest to working group members	Public water utilities in Florida, UF Water Institute, FSU	A*
G Kiker (UF)	Integrated climate change and threatened	2012	Publications, protection of shore nesting	The project objectives are: 1) to assess vulnerability scenarios and information on selected Florida bases,	US ACE	A*

	bird population modeling to mitigate operations risks on Florida military installations		birds through development of decision analysis system	2) develop a set of habitat- and species-based models for selected coastal Threatened, Endangered, and Sensitive Species (TER-S), 3) assess current prediction level and assumptions of selected categories of TER-S models, and 4) integrate scientific data, modeling, and uncertainty results into a risk-informed, multi-criteria decision analysis system.		
Fraisse (UF)	Climate literacy for famers in the SE USA	2015	Educational materials, adaptive technologies	This USDA-funded project will develop tools, materials, and systems for farmers in the SE USA to learn how to better manage risks associated with climate variability and change	USDA NIFA	A*
Srivastava (Auburn)	Reducing drought risks in the Southeast USA: Quantification of drought information value, development of drought indices, and communication of drought	2013	Prototype tool for water managers	This SARP-funded aims to reduce drought risks for small- to mid-size communities, we will: a) assess drought-related climate information needs of these communities; b) estimate potential value of drought information for them; and c) develop drought indices and visualization methods for dissemination of drought information.	City water managers in AL and GA	A*

	information					
Srivastava (Auburn)	Forecasting streamflows in the Apalachicola-Chattahoochee-Flint river basin using ensemble streamflow predictions	2015	Improved streamflow forecasts	The objectives of the project are: 1) to engage water stakeholders in the ACF River basin and assess their needs for streamflow and stage forecast products; 2) to evaluate approaches to forecast streamflow using existing ESP data; and 3) to develop a prototype streamflow and stage forecasting tool using weekly-updated EPS from the Southeast River Forecast Center.	SERFC, NIDIS	A*