

**2012 SEDAAG Poster
Abstracts**

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Poster Submission

Abstract

The Spatial Patterns and the Change of the International Distribution of the Korean TV Programs

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This study analyzes the spatial pattern and the characteristics of the international distribution of the Korean TV programs during 1980-2010. The results can be summarized as follows. In this study, the patterns of the exported TV programs would be divided into the fifth periods according to the total amount of the export. In the 1980s, the number of exported TV programs was infinitesimal and it lasted until the late 1990s. From 1997, the Korean TV programs started to be distributed in the overseas market with Taiwan, Singapore, China, and Hong Kong. China consumed the most number of exported Korean TV programs, followed by Taiwan with a narrow difference and Hong Kong and those patterns continued until 2001. Japan dominated in the international distribution of the Korean TV programs and retained its leading position since the Japanese surpassed the Chinese market in 2003 and the dominance of the Japanese last for the past 7 years. Actually, The Korean TV dramas have been greatly distributed to the Asian countries, making up 91% of the total export in 2010 and we can say that there are still a striking difference between the Asian countries and the others.

ABSTRACT. Making a Scene: The Geography of Modern Rock Music Performance in U.S. Metropolitan Areas.

Where are the most lively music scenes? This question goes beyond an aesthetic interest in “hip” places. Richard Florida has argued that the vibrancy of local music scenes is a good indicator of the vitality of the creative class, the demographic that he argues is the engine of growth in our post-industrial consumerist society. We introduce a new way to assess the vitality of a city’s music scene. Florida’s measure combines the number of musicians and music-related businesses. While capturing the spatial variation of the music industry, Florida does not differentiate among musical genres. But our measure does. Creative scenes are sustained by cutting-edge musical acts. Our measure focuses solely on genres of music labeled modern or alternative rock. Our data set includes all live performances during a three-year period for acts whose music made the top ten charts on college radio stations. We create a creative musical urban hierarchy of places in the United States. Similarities and differences in our ranking system and Florida’s are noted. Although we argue that our approach represents an improved way to measure the salience of scenes, we are also aware that the “underground” nature of house parties and local acts who do not tour are not adequately measured.

A Global Analysis of Inland Tropical Cyclone Maintenance or Intensification

Theresa K. Andersen and J. Marshall Shepherd
University of Georgia

Tropical systems often weaken or transition to extratropical cyclones over land due to the adverse conditions (e.g., pressure and temperature gradients) for warm-core structures. However, there are also cases of tropical cyclones maintaining or increasing strength inland (TCMIs), but these are not well forecasted due to the uncertainty in contributing factors. This research analyzes the surface and atmospheric conditions associated with TCMI events globally 1979-2008 to better understand how warm-core tropical cyclones are sustained where ocean forcing is absent. Previous studies have indicated that the land surface plays an important role in boundary layer processes, and anomalously wet soils may provide favorable energy and moisture to an approaching tropical cyclone. Surface latent heat flux, soil moisture gradients, and synoptic features are explored as possible energy sources post-landfall for each TCMI. Most intensification environments exhibit surface latent heat flux gradients and zonal flow in the mid-troposphere. Results suggest that soil moisture and corresponding latent heat flux may be important to sustaining tropical systems, particularly when baroclinicity is weak. Antecedent rainfall events may be a key component of tropical cyclone-friendly environments inland and provide insight into post-landfall forecasting.

Large, long-lived convective systems over subtropical South America and their relationships with atmospheric teleconnections

Kyle Mattingly

Western Kentucky University

This study provides a climatological assessment of persistent elongated convective systems (PECS) over subtropical South America during the austral warm seasons of 1998-2007 and a comparison of PECS frequency and physical characteristics to mesoscale convective complexes (MCCs) in the region. Relationships between the Antarctic Oscillation (AAO) and El Niño – Southern Oscillation (ENSO) teleconnections and large, long-lived convective systems (LLCSs) are explored. An average of 143 PECS and 37 MCCs occurred per warm season. PECS lasted longer on average than MCCs (17 hrs. vs. 14 hrs.) and reached a greater average maximum cloud-shield extent than MCCs (297,300 km² vs. 256,500 km²). The relative frequency of LLCS occurrence was greatest during negative AAO phases (0.906 LLCSs/day) and positive ENSO phases (28.1 LLCS/month). LLCS maximum cloud-shield extent was greatest during negative AAO phases and positive ENSO phases. LLCSs tended to be displaced southward during negative AAO phases and neutral ENSO phases. These results suggest that AAO and ENSO phases have at least some influence on LLCSs over SSA. Additionally, the high relative frequency of PECS compared to MCCs suggests they may contribute substantially to yearly precipitation totals in the region.

Developing a Fine Resolution Digital Elevation Model to Support Hydrological Modeling and Ecological Studies in the Northern Everglades

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Abstract

Accurate high resolution terrain data are essential for hydrological modeling in lowlands. This study integrates elevation survey data and vegetation data at the point and 50m scales to develop a fine resolution digital elevation model (DEM) for the northern Everglades of Florida. The terrain was divided into two vertical strata (lowland and highland) based on a 50m scale vegetation map. The DEM in highlands was interpolated with all the survey points and later adjusted using an association between vegetation and hydroperiod (the number of days per year that land is flooded). The DEM in lowlands was interpolated with elevation surveys tagged as lowland types. The two DEMs were then combined forming a new DEM with a 7.7cm mean absolute validation error; a significant (2.3cm) improvement over the previous DEM.

Key words: DEM, lowland, wetland, the Greater Everglades, restoration

Changing decisions, changing landscapes: how would the emerging biofuel market impact North Carolina forests?

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The emerging biofuel market is one example of a global change that is expected to have considerable impacts on local land use allocation. In North Carolina, demand for biofuel feedstocks is likely to affect the management and availability of forest resources, the majority of which are in private ownership. We have conducted a revealed preference survey of approximately 130 private forest owners along a gradient of urbanization in the North Carolina Piedmont to explore their current reasons for owning forested land. Included in the survey were questions regarding forest use and management, their understanding of the forest's ecological and economic values, and their general attitudes toward the natural environment. We are using multilevel structural equation modeling to test hypothesized relationships between these land owner values and their management decisions. We are now administering a visually interactive stated preference survey to gauge forest owners' receptivity to growing biofuel feedstocks under a set of potential market based scenarios. By combining data from the revealed and stated preference surveys, we explore how land owner values will affect their willingness to switch to biofuel feedstock production and how their decisions will ultimately influence landscape composition.

Historical changes in channel geometry and stream power in the Blue River, Wisconsin

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East Carolina University

Historical changes in channel geometry were examined by comparing surveys of channel cross sections in 1991-92 with archival data recorded in General Land Office (GLO) survey notes during the 1830s. Comparison of the presettlement channel width as recorded in the GLO survey with the modern channel width shows that channels in the Blue River watershed have widened substantially while depth has remained relatively constant. These enlarged modern channels are capable of conveying higher bankfull discharges that lead to a significant increase in total stream power, and therefore, have a much greater capacity to transport sediment downstream during bankfull flows. Values for bankfull unit stream power in the modern channels have only increased over presettlement values in relatively small drainage basins, reflecting downstream changes in the width/depth ratio.

EXPLORING PATTERNS AND FACTORS RELATED TO DEER-VEHICLE COLLISIONS IN CENTRAL NORTH CAROLINA

Erik Green, North Carolina Central University

Timothy Mulrooney, North Carolina Central University

The purpose of this poster is to analyze geographic patterns of deer-vehicle collisions in the state of North Carolina and explore both human and natural factors that lead to these spatial patterns. This analysis is important so traffic engineers and analysts can better understand a phenomenon that costs North Carolinians millions of dollars in damage as well as lives and injuries as a result of these collisions. Using GIS techniques and data provided by the North Carolina Department of Transportation (Traffic Analysis Unit), the locations of all 723 deer vehicle collisions that occurred in the North Carolina counties of Alamance, Orange and Durham are mapped. Grouped using a rectangular enumeration unit based on quadrat analysis, other human and natural factors were also collected at this quadrat level, mapped and analyzed to determine which of these explanatory factors correlated most with deer vehicle collisions. While many qualitative and immeasurable factors also contribute to deer-vehicle collisions, these explanatory factors include population density, proximity to highways, proximity to bridges, various permutations of land cover (as provided by NLCD data), land cover variety and average speed limit.

The Green Book: “Safe Spaces” from Place to Place

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University of South Carolina

This poster explores a 5th grade Social Studies and English/Language Arts lesson that introduces students to the difficulties faced by African Americans related to economic and social discrimination during the middle twentieth century. Using the book *Ruth and the Green Book*, students learn about “safe spaces” available to African Americans as they traveled in the United States. Student learning is enhanced by translating textual clues in the story onto a road map of the United States. After constructing a map, students will assess whether the best travel route was selected. The lesson allows students to identify the location of places, examine the conditions at these places, and make connections between places.

Title: Effects of fire on the riparian forest of a desert preserve, San Pedro River Preserve, Arizona.

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Abstract: Over the past century riparian forests have expanded on the San Pedro River, Arizona.

Against this backdrop of long term woody plant expansion, fire can quickly reduce forest abundance. Fires can cause plant mortality, create opportunities for regeneration, and change species composition due to variations in fire sensitivity and re-sprouting ability of riparian trees.

We examined the effects of a 2005 wildfire on riparian plant communities on the San Pedro River Preserve by comparing pre-fire and post-fire vegetation structure on burned and unburned monitoring transects. Fire had a large effect on vegetation structure. Riparian forest extent in burned areas was reduced from 58% pre-fire to 18% post-fire. Tree mortality rates, re-sprout rates and survival rates of sprouted stems differed among species. *Populus fremontii* had the highest mortality rate and the lowest re-sprout rate one year post-fire. *Tamarix* spp. had a high initial re-sprout rate, but low longevity of sprouted stems. *Salix gooddingii* had an intermediate mortality rate and re-sprout rate, and sprouted stems appeared to survive well. Thus, the relative importance of *S. gooddingii* increased in stands post-fire, while both *P. fremontii* and *Tamarix* spp. declined in importance.

Geomorphic and geologic controls on shoals in the Cahaba River.

Jeremiah Bishop

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Bedrock shoals are located in fluvial systems throughout the Eastern United States and are an important form of geomorphic complexity. Geomorphic complexity has been shown to be crucial to increasing species richness (Robson and Chester 1999). In this study area, the Cahaba River, shoals and their associated plant life have been found to influence the amount of nitrates that course through the system (Edmonds unpublished data). Shoals in particular have been observed to be areas of high biologic complexity that have profound impacts on a wide range of biota (Kennon 2007). Though there is a general assumption that geologic and geomorphic variability are important to shoal occurrence and distribution, specific controls influencing their formation and location are not well understood (Robson and Chester 1999). This poster presents preliminary results of geologic and geomorphic analyses conducted in 115 bedrock shoals in the Cahaba River using GIS and aerial photography. The ultimate goal of this research is to construct a predictive, statistical model for shoal occurrence to understand the spatial occurrence of bedrock shoals in rivers and to help establish and maintain river restoration and management goals.

Use of Terminal Restriction Fragment Length Polymorphism (T-RFLP) to Characterize the Microbial Community of a Black Oak Tree Throw in Robinson Forest, Kentucky.

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Abstract

Terminal Restriction Fragment Length Polymorphism (TRFLP) was used to examine the soil microbial community of a 101-year old black oak (*Quercus velutina* Lamb.) tree throw that had fallen in the University of Kentucky Robinson mixed mesophytic forest research site 4-5 years ago. Soil physical and chemical variables differed significantly between surrounding surface soils and soil samples taken from the tree throw pit and the bottom of the mound feature. The pit/bottom of the mound samples showing higher aluminum and clay particle content and lower soil organic matter, total nitrogen, phosphorus, and cation exchange capacity. The soil bacterial community was found to be more diverse than the fungal community, less heterogeneous in its distribution across all soil samples and appeared to be more influenced by soil parameters than the soil fungal community. Further detailed study of the rhizosphere microbial community after a major disturbance such as tree throw could provide clues as to the impact of tree throw on soil pedogenesis and the influence of biological energy on landscape shaping geomorphological processes.

Impacts of Urban Form on Transportation CO₂ Emissions in Metropolitan Areas of the Conterminous US

Tom Crawford, East Carolina University

Abstract: This research assembles a county-level dataset for 1,085 metro counties in the conterminous US and implements quantitative methodologies to address the following question: What is the impact of urban form (i.e. spatial patterns of urban land use) on transportation carbon emissions in the metropolitan US? US greenhouse gas emissions are dominated by carbon dioxide (84%) followed by methane (9%), nitrous oxide (5%), and other greenhouse gases (2%). Emissions by sector are led by buildings (39%) followed by transportation (33%) and industry (28%). The IPAT framework is applied using multivariate regression analysis to quantify correlations between CO₂ emissions, urban form measures and other covariates. County-level emission data were obtained from the Project Vulcan dataset. Urban form measures were derived from the National Land Cover Database and census population data. The urban form measures, (a) population per hectare of developed land use and (b) percent of developed land use that is high intensity use, were negatively correlated with emissions. After controlling for the dominant influence of population, urban form had the highest impact compared to other covariates. Results point to the need for smarter growth strategies for future development.

North Carolina Winegrowers' Perception of Climate Change Impact
Heather Blair
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Wine is a product of a specific region's climate and environment. Climate change is a source of increasing sensitivity, and winegrowers will benefit from a better understanding of this factor impacting winegrape production and adaptation strategies. This research utilizes the perceptions of winegrape growers to discover how climate change is affecting this sector of agriculture within North Carolina's three distinct climate environments: Mountain, Piedmont and Coastal regions. Results are compiled from 12 winegrower interviews and an email survey sent to all 108 wineries. Questions focus on winegrowers' perspectives of crop sensitivity to potential changes in climate as well as current experiences and adaptations to perceived changes. Preliminary results of the web survey and interview responses indicate weather and climate as a very strong element of risk. Excessive rainfall, hail, severe weather and late spring frosts are the greatest threats varying between each regions and variety. Almost all respondents indicate experiencing a change in extreme high temperatures. The majority of respondents who indicated any concern for future climate change explained preparations are in place because there is no control over the weather, only adaptation. To parallel perceptions, future climate patterns will be developed using projections of current and historical trends.

The Hat and the Cactus: cultural representations of ‘Mexican’ in the landscape
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Cultural landscapes both reflect and influence cultural processes. This poster illustrates how the cultures and landscapes of Mexico are represented on signs for restaurants identifying themselves as specifically ‘Mexican.’ In association with restaurants, representations of people, culture and landscapes of Mexico appear in a few overly simplified forms. Most often, a squat man in a very large “Mexican” hat appears in association with a cactus, usually the saguaro (*Carnegieagigantea*) though occasionally the prickly pear (*Opuntia* spp.) appears. Sometimes other culturally-associated traits, such a burro, appear. These oversimplifications or reductions serve to caricature the people and culture of Mexico in ways that reach toward stereotypes, or cultural ‘otherness’

J. Anthony Abbott, Ph.D. and Kiryssa Kasprzyk
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In the absence of a comprehensive national policy to address climate change, states have enacted a patchwork of climate change policies with debatable impact on the global. Colleges and universities, historically progressive actors on social issues, have enacted climate change policies, such as The American College and University Presidents' Climate Commitment (ACUPCC) on their own. Many signatories have published Climate Action Plans detailing strategies to reach greenhouse gas neutrality. Within the U.S. federalist structure, colleges and universities are affected by both national and state-level policies. The lack of an overarching national climate change policy results in a patchwork of state-level policies, which is likely reflected in the strategies and ability of ACUPCC signatories to reach their climate neutrality goals. A policy rating scheme combined with regression analysis indicates that the presence of strong state-level policies fosters more progressive strategies in its institutions of higher education as evidenced in published Climate Action Plans. Thus states with progressive climate change policies generally have colleges and universities with more progressive Climate Action Plans. The implication is that fragmentation among states' policies can be resolved with coherent national policy.

Spatial Characterization of Storm Internal Precipitation Distribution for the United States (1980-2009)

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ABSTRACT

Hourly precipitation data were collected from 143 first-order United States weather stations during the period from 1980 to 2009 to assess the internal distribution of precipitation events lasting at least three hours. A total of 46,595 individual precipitation events was identified and evaluated using the mean, standard deviation, skewness, kurtosis, and the number of peaks occurring within an event. Mean event duration is longest along the West and Northwest coasts, the Mid-South, the Mid-Atlantic, and the Northeast; while shorter-duration events are more frequent in the Rocky Mountains, the Southwest, and the Great Plains. Mean event precipitation and standard deviation are greatest along the Gulf Coast and decrease inland. Precipitation events are positively skewed, indicating that precipitation tends to occur earlier in the event. The most positively-skewed events are also located in regions flanking the Gulf of Mexico, while less-skewed events are common in the Northwest and Rocky Mountain regions. Event kurtosis is negative throughout the entire United States, with the highest negative values generally west of the Front Range, where cyclonic development and transition produce more evenly distributed precipitation within storms. Intra-event precipitation maxima were also evaluated, with western Florida and the desert Southwest having the greatest number per event.

Annual and Seasonal Tornado Risk Analysis

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Abstract

This study analyzed tornado risk at the annual and seasonal level using the Storm Prediction Center's severe weather GIS database. Tornado density maps were created from individual tornado tracks using a kernel density technique. Tornado tracks from 1996 to 2010 were used to produce maps at the annual and seasonal scale. This data was then compared to similar maps from 2011. The maps showed that the traditional ideas of a 'Tornado Alley' or 'Dixie Alley' are oversimplifications and that areas of high tornado activity occurred throughout the eastern United States. There were clear seasonal patterns in tornado occurrence. Spring was the most active season in terms of tornado numbers and geographical extent. Activity centers in the southeast during the winter, then moves to the central and northern parts of the country in spring and summer, and then moves back to the southeast in the fall. In 2011, tornadic activity was much higher than average, especially in the spring months and in the southeast portion of the United States.

Extent of Alabama's terrestrial nature reserve system in representing biological diversity

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University of Alabama

Numerous studies reveal that existing nature reserves do not effectively represent biodiversity. In this study, we analyzed how Alabama's public and private reserve lands represent the elements of biodiversity. The spatial distribution and characteristics of Alabama's nature reserves were examined using gap analysis, a technique used to assess the distribution of nature reserves. In Alabama, a gap analysis to our study's extent has never been done. This analysis has 2 objectives: 1) examine the distribution and characteristics of nature reserves across ecoregions; and 2) analyze where gaps in the Alabama nature reserve system exist and what characteristics influence these gaps. We collected GIS shapefiles of reserves and created a database featuring the total number of reserves, reserve ecoregion, reserve size, owner type (federal, state, local, landtrust), property type (public, private), and connectivity (distance between reserves). We observed that reserved land in the four northeastern-most ecoregions (Interior Plateau, Southwestern Appalachians, Ridge and Valley, Piedmont) were predominantly comprised of private reserves. The two southernmost ecoregions (Southeastern Plains, Southern Coastal Plain) were predominantly comprised of public reserves. Our results indicated that reserve lands cover the Southern Coastal Plain most effectively and Southeastern Plains and Interior Plateau the least effectively.

Situating Low-Income Housing: An Uneven Urban Landscape
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This research investigates the location of low-income housing in an expanding, decentralizing, and fragmented urban landscape. Fairfax County, Virginia serves as an appropriate study area given its geography, growth, and overall economic success. A comparison between existing low-income housing locations and hypothetical, idealized low-income housing locations is an important first step in revealing the local planning department's degree of flexibility. The ideal low-income housing locations in Fairfax County are derived from a site-suitability GIS model. Location factors based off the low-income housing literature are incorporated into the model, with ideal low-income housing locations as the output. This research fills a research gap by exploring what critical location factors are necessary for low income housing, and offers some initial reflections on the politics of housing location in Northern Virginia.

Spatial Patterns of Lyme Disease Emergence in Virginia

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In spite of great advancements in the control of infectious diseases over the last several decades, endemic zoonotic diseases such as Lyme disease continue to expand in range, and the mechanisms underlying these emergence events are poorly understood. Virginia has seen a steady increase in human cases since the late 1990s, but the number of cases quadrupled during the period from 2004 to 2007. Rapid yet geographically-localized suburban/periurban development and the southward expansion of the disease into Virginia, with many cases occurring in areas with a high level of development, makes the state a valuable model for addressing important scientific questions regarding the role of environmental conditions and anthropogenic habitat change on Lyme disease emergence. Our research indicates that Lyme disease is emerging toward the southwestern part of Virginia. Research in areas where Lyme disease is well-established indicates that the disease is likely to be associated with specific forest types. Generally, forests dominated by deciduous species are related to increased Lyme disease risk, and while forest type is important, the particular spatial pattern of forests and forest fragments appears to be more critical.

Fire history and forest structure of an endangered subtropical ecosystem in the Florida Keys, U.S.A.

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Abstract

We focused on the influence of historical fire and varied fire management practices on the structure of globally-endangered pine rockland ecosystems on two adjacent islands in the Florida Keys: Big Pine Key and No Name Key. We reconstructed fire history in two stands from fire scars on South Florida slash pines (*Pinuselliottii* Engelm. var. *densa* Little & Dor.) that were accurately dated using dendrochronology, and quantified stand structure to infer successional trajectories. Fire regimes on Big Pine Key and No Name Key over the past 150 years differed in fire return interval and relative spatial extent. Composite fire scar analysis indicated that fires burned at intervals of 6 and 9 years (Weibull median probability interval) on Big Pine Key and No Name Key, respectively, with the majority of fires occurring late in the growing season. On Big Pine Key, fires were significantly fewer after the National Key Deer Refuge was established in 1957, but pine recruitment was widespread, likely due to multiple, widespread prescribed burns conducted since 2000. No Name Key experienced fewer fires than Big Pine Key, but pines recruited at the site from at least the 1890s through the 1970s. Today, pine recruitment is nearly absent on No Name Key, where fire management practices since 1957 could result in loss of pine rockland habitat. Prescribed fire could help prevent the loss of these endangered habitats by restoring and sustaining structural features (e.g. low pine stand density, basal area, and fuel loads) resembling those of settlement-period rockland forests.

Assessing the Threat of Climate Change Induced Sea Level Rise to Vulnerable Populations in Southeast Florida

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Southeast Florida's low-lying topography and highly permeable limestone substrate make sea level rise (SLR) the most threatening local climate change stressor. Coastal populations are particularly at risk due to their increased probabilities for erosion, inundation and storm surge, but interior populations are also susceptible to rising water tables and flooding amplified by SLR. Most SLR vulnerability studies focus only on financial risk and do not consider whether the inhabitants of coastal and interior areas have the means to relocate. This study examines socioeconomic patterns at low elevations in the counties of Palm Beach, Broward, and Miami-Dade. Demographic census block data is combined with LIDAR digital elevation data to create a vulnerability index that incorporates likelihood of inundation with socioeconomic consequences. Results indicate that the most vulnerable populations to SLR are those living near the coast, particularly in Miami Dade County. However, there are significant inland populations in Broward and Miami-Dade counties that have a medium to medium high risk of inundation and flooding due to SLR. Results provide information that is important for incorporating SLR into planning efforts, not just to account for financial risk, but also to identify populations that are most vulnerable to increased flooding and permanent inundation.

Recommended, but Inadequate: An Analysis of Tuscaloosa Resident Tornado Shelter Adequacy
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In a two week period following the Tuscaloosa, Alabama EF4 tornado on April 27, 2011, residents living in the affected areas and those sheltering at relief stations were interviewed to collect information on their experiences. Respondents were asked about their shelter during the storm, and about any future changes to those shelter plans. A specific focus of this research evaluated the adequacy of each respondent's shelter location. Each shelter location was categorized using a Tornado Shelter Adequacy Decision Table, which was developed through the use of Enhanced Fujita Scale Degree of Damage ratings for available Damage Indicators. There was shown to be a significant difference ($p < 0.01$) in the distribution of shelter adequacy for Tuscaloosa residents when holding the shelter locations from April 27 constant and comparing adequacy ratings for "weak" (EF0-EF1), "strong" (EF2-EF3), and "violent" (EF4-EF5) tornadoes. This provides a basis for revision of recommended shelter locations to better prepare residents for the rare event in which "violent" tornadoes are forecast with reasonable certainty.

The characteristics and spatial distribution of current paleoenvironmental research on the penultimate glaciation and termination

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Abstract

A thorough review of paleoclimate literature related to the penultimate glaciation and termination was conducted in order to determine the state of the field, as well as examine the spatial distribution of records. The exact technique used to create the chronology of each record was particularly scrutinized. The search terms “Termination II,” “penultimate glaciation,” “MIS6”, and “MIS 6” were fully explored, though typically filtered with restrictions to the subject areas of geology, paleontology, physical geography, and related fields. Search results were then examined to focus on research devoting a major portion of the paper to the desired timeframe of ~200-120 ka. Approximately 90 records were judged suitable for this review. Records fell into three groups based on chronologic technique: chronology linked to orbitally-tuned benthic $\delta^{18}\text{O}$ records from deep ocean cores, chronology consisting of batches of dates determined through cosmogenic radionuclide dating (CRN), thermoluminescence (TL), or optically-stimulated luminescence (OSL), and chronology based upon U/Th dating, typically of speleothems or coral. Chronologies derived from U/Th dating typically offer the best records, due to precise dating and continuously depositing proxies. Records are much more common in Northern Hemisphere countries, with Europe having the highest concentration of records.

Keywords: paleoclimate, penultimate glaciation, MIS 6, termination II, chronology

Multidimensional health care inequality in provincial China: A case study of Henan Province

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Abstract:

This research analyzes the health care inequality in Henan Province, a province in central China. The project mainly has two objectives: (1) examining the multi-scale health care inequality; (2) revealing the spatial variation of underlying factors behind health care distribution; and (3) utilizing GIS and spatial statistic methods to further the understanding of spatial dimensions of health care inequality. The authors used GIS-based spatial statistical methods to detect the spatial-temporal variation of health care unevenness, and applied geographically weighted regression to reveal the effects of multiple transitions on the provincial health care sector. The results illustrate that Henan's health care inequality is sensitive to geographical scale and clustering. Both urban-rural and core-periphery gaps are still significant even though health care reform and new provincial policies have resulted in preliminary success at reducing inequality. The spatial patterns have been shaped by the interwoven forces at national, provincial, and local scales.

Detecting and mapping sub-canopy invasive plants in urbanizing forest landscapes using LiDAR-derived metrics

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Abstract:

Successful management of biological invasions requires landscape-scale information on the spatial distribution and abundance of the invader. Spectral reflectance properties of high-resolution multi-spectral satellite imagery provide detailed and synoptic perspectives on vegetation composition, but have limited ability to detect the structure and composition of forest understory plant species. To address this, I examined the utility of LiDAR-derived metrics to detect the spatial distribution of the sub-canopy plant Chinese privet (*Ligustrum sinense*) as a case study of a rapidly spreading exotic species in urbanizing forest landscapes. My approach uniquely integrates LiDAR-derived metrics with field data on forest structure using the Random Forest classifier for detection and mapping. I evaluated the hypothesis that the evergreen nature of Chinese privet and its height range from 1 - 5 m provide sufficient structural characteristics for LiDAR detection. Analyses confirmed the presence of Chinese privet predominantly in drainage ways, low-land and disturbed areas of forested landscapes. The relative contribution of the LiDAR metrics characterizing forest is greater than the metrics for landscape and plant-level attributes in the models. In addition, LiDAR metrics outperformed IKONOS alone in the detection of privet. The combination of these two sensors provided the highest accuracy for mapping this sub-canopy invasive plant.

Keywords: LiDAR, invasive species, Chinese privet, Random Forest algorithm, remote sensing, urban landscapes.

A Qualitative GIS Approach to Exploring Equity in Access to Physical Activity Resources: The Case of the Licking River Greenway and Trails in Northern Kentucky

This study employs a qualitative GIS approach to gaining local knowledge of the environmental factors that inhibit access to a planned urban greenway. This approach draws upon the knowledge and participation of fifteen local adolescents (ages 12-17), employing them to use an environment audit tool in order to assess walkability of neighborhoods surrounding the Licking River greenway, and to take digital photographs so as to document barriers to both walking and biking. Focus groups are then conducted to gain further insights into actual and perceived barriers to physical activity, and these data are then all integrated into a GIS and overlaid with conventional, distance-based GIS access buffers. Preliminary results suggest that safety is a major potential barrier in areas surrounding access points to the greenway, particularly in disadvantaged, low-income neighborhoods bordering the greenway. By including local perceptions of the built environment, the qualitative GIS approach provides a more realistic portrayal of access to the Licking River Greenway and Trails, and how they differ among five distinct and unique neighborhoods bordering the river. In addition, this approach includes local youth insights to these barriers to physical activity, thereby revealing additional potential issues related to inequities in access.

Remote Sensing Solution for Updating the National Coastal Wetlands Inventory

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The aim of this study is to address the issue of the invasive plant species on the coastal wetland environment. We propose some geospatial techniques that are cost-effective to monitor coastal wetlands and invasive plant species. We selected the pilot study area in the southeast coast of Collier County, Florida. We used Landsat images, aerial photos, AVRIS images, and EDDMapS for the analysis. Four invasive species (Brazilian peppers, Australian pine, melaleuca, old world climbing fern) were selected because they are the most abundant invasive species found in the study area. Pixel purity index (PPI) algorithm was used to classify these invasive species. The preliminary result shows that the overall accuracy is 51%. The producer's accuracies of the invasive species are Brazilian pepper (66.6 %), Australian pine (37.2 %), melaleuca (25%), and old world climbing fern (0%).

Under the Influence: The Neighborhood Effect and Confederate Desertion in Forsyth County, North Carolina

Maia Call

The University of North Carolina at Chapel Hill

Few studies have examined the interaction between the spatial relationships of individuals during the antebellum period and their behavior during the Civil War. This historical geography study works to fill this gap in the social history through an exploratory spatial analysis of desertion in Forsyth County, North Carolina. As a rural county with no strong bias for or against the Confederacy to influence desertion rates, Forsyth County is an ideal community for this spatial investigation. This study was conducted by creating a traditional database combining the 1860 Federal Census for Forsyth County, and the Confederate Service Records for a sample of 500 Forsyth County men who served in the Confederate Army. The traditional database was then joined with a spatial database constructed using ArcGIS and historic maps of Forsyth County from this period. The results of this study suggest that desertion from the Confederate Army was affected by antebellum spatial relationships in Forsyth County, North Carolina.

Hydrogeomorphology of Alluvial Benches in an Anabranching Reach of the Upper Yadkin River, North Carolina.

Robert Sorrells, Dan Royall
University of North Carolina at Greensboro.

Prior research has been conducted to determine the relationships between flows cited as important to channel form and the morphology of step-like features bordering streams known as alluvial benches. However, few studies have analyzed bench development along anabranching river reaches where relative flow volumes are divided and potentially more variable. In this study, low alluvial benches inset within the larger valley flat were surveyed along a two-branch anabranching reach of the Yadkin River at Patterson, North Carolina and related to calculated bench-full discharges and their recurrence intervals. The results were compared with historical discharge and flood recurrence interval data, and used to infer potential pathways for anabranch adjustment to changing flows vis-à-vis bench evolution. This study determined that most of the lowest benches present in both channels of the anabranch exist in equilibrium with their current bankfull discharges and represent incipient floodplains, that bench creation via lateral accretion is the primary method for channel dimension adjustment within this reach, and that the majority of the benches studied are proximal to the initial bifurcation, suggesting that anabranching exerts some control on bench location.

Growth response in ponderosa pine stands at Mount Rushmore National Monument, South Dakota

Kayla Pendergrass and Christopher Gentry

Austin Peay State University

Abstract

Mount Rushmore Nation Monument in South Dakota is a historic site celebrating our nation's great presidents. However, the ponderosa pine forests that surround the monument are equally important and restoration of the historic stand density will be vital for the future of these forests. Thinning processes began in an effort to reduce the fire hazard of an overgrown understory. In this research we examined the differences between non-thinned, mechanically thinned, and stands subjected to chipping treatments to determine if there has been an increase in Basal Area Increment (BAI) in the past five years since the thinning began. The results from this research suggest that there is no significant difference between radial growth in treated and untreated stands. This research suggests that climate is currently driving the growth of the ponderosa pines in these stands.

Utilizing Macroscopic Charcoal to Reconstruct Local Fire History; Laguna Limón, Dominican Republic

Jason McVay, Lisa Kennedy
Virginia Tech

Fire is a prime enforcer of environmental change that can originate from natural or human ignition. Nonetheless, macroscopic charcoal ($>125\ \mu\text{m}$) deposited into lake sediment is a record of a local fire event. Patterns of deposition, combined with long term climate records make interpreting charcoal possible. It is unknown whether tropical Caribbean forests have experienced natural fire regimes over the long term. Laguna Limón is an unstudied, large, freshwater lake on the northeastern coast of the Dominican Republic. We extracted four overlapping cores totaling 312 cm, and conducted macroscopic charcoal and Loss on Ignition analysis to gain an understanding of the long term fire and climate history of the area. Charcoal was sampled at 4 cm intervals and Loss on Ignition was conducted at 1cm. We found charcoal to be present throughout the core, revealing that fire has been an active player in shaping the environment around Laguna Limón for at least as long as the lake has existed. Charcoal fragments numbered a high of 30 at 108 cm and 112 cm. Loss on Ignition data established that the lake has only recently become organic rich, and exposed a number of possible erosion events.

Disaster Vulnerability of Migrant and Seasonal Farmworkers:
A Comparison of North Carolina and Texas

Christine Gares
East Carolina University

Previous research has identified certain population segments that are more vulnerable to natural hazards. Migrant and Seasonal Farmworkers (MSFWs) represent a particularly high risk population with respect to many health factors due in large part to poor housing, the nature of their work, a lack of social networks, and language barriers. Increasing fear of immigration authorities exacerbates their risky situation because they are less likely to seek assistance. Given the nature of their work, MSFWs may be disproportionately vulnerable to extreme natural events, including tornadoes, hurricanes, and extreme heat. Prior research in North Carolina has illustrated the overlap between MSFW locations and hazard regions. Texas also has a large agricultural industry in which MSFWs participate. Thus, the purpose of this research is to compare the risks and vulnerability of MSFWs in Texas to those in North Carolina. Through GIS mapping, analysis will illustrate areas of concern as well as provide a foundation for a greater awareness of the vulnerability of this population. The results of this work will help to fill a gap in our knowledge of the extent of risk this vulnerable population faces with implications for the public health and emergency preparedness communities.

Tornado Preparedness of Local Residents: The 2011 Tornado Disaster in DeKalb County, Alabama

Philip L. Chaney¹
Greg S. Weaver²
Susan Youngblood³
Kristin Pitts²

Department of Geology and Geography¹, Department of Sociology, Anthropology, and Social Work², and Department of English³
Auburn University

Abstract

This paper contributes to efforts at enhancing social resilience by reporting the findings of a field study conducted after the April 2011 tornado disaster in DeKalb County, Alabama. The study group included 124 local residents. Most participants had received public safety information on how to prepare for a tornado, understood the definition of a tornado warning, had participated in a tornado drill, and had a plan for seeking shelter. However, few owned a NOAA weather radio or had a tornado-resistant shelter on the premises (i.e., basement, underground storm shelter, or safe room). Most plans for seeking shelter were considered effective at reducing risk, but many of the plans that involved evacuating to a safer location included excessively long travel distances. Demographic analysis showed that older participants (60+) and households without children were significantly less likely to have participated in a tornado drill; lower income households were significantly less likely to have a tornado-resistant shelter or a plan for seeking shelter; and mobile home residents were significantly less likely to have a plan for seeking shelter. The results identify specific aspects of individual preparedness where there is opportunity for improvement, which would enhance community resilience.

Historical mapping and monitoring of the mangrove forests of Ambergris Caye (Belize) using multi-date Landsat imagery: a twenty-five year history.

Sandra Rhine and Dr. Michael Steinberg
University of Alabama

Coastal mangrove ecosystems throughout the world are increasingly threatened by habitat destruction. In the past, mapping mangrove change was difficult due to the lack of historical field data. However, with the availability and new processing techniques of Landsat TM and ETM+ imagery, it is now possible to effectively quantify mangrove forest cover changes. In this study, we analyzed historical Landsat TM and ETM+ imagery of Ambergris Caye, Belize's largest island (~46 km long and up to ~8 km wide), to examine how mangrove forest cover has changed from 1986 to 2011. Four classes were used based on spectral similarities: mangrove, thin/patchy mangrove, terrestrial scrub non-mangrove, and residential/urban/barren land. Normalized Difference Vegetation Index (NDVI) was used to assess the health and density of the mangrove vegetation. Specifically, we mapped the historical spatial distribution and coverage of mangrove forests, examined the land use/land cover changes to mangrove forest distribution and health in response to specific events across the study area and assessed the rate of change throughout the study area over a 25 year period. The results indicate that mangrove forest size and health has decreased due to the increased urban/residential and tourism-related sprawl occurring throughout the island.

Neighborhood Community Health in Greenville: A Problem-based Learning Exercise

Viva Reynolds and Katherine Jones, East Carolina University

For over a century, medical geographers and public health practitioners have realized the benefits that may be realized when these two disciplines work together to improve the health of communities. Despite the bridges built between these fields in research and practice, those links have not always extended into education. This poster describes a community health learning module that was designed collaboratively by a geography instructor and a health services researcher. The module was successfully implemented in a combined undergraduate/graduate level medical geography course in Spring 2012. The poster will describe the module, how it was implemented, the teaching objectives and results that were achieved. The module consisted of a set of lectures on neighborhood-level population health, health data sets, and spatial data analysis methods, followed by a research exercise based around a neighborhood study area. Through the exercise, students learned to apply a spatial data perspective to various community health issues, and to think holistically about neighborhood-level health problems and solutions. The lessons learned from this exercise may be useful to geographers and public health instructors as they integrate community health examples and content into their own courses.

Effective Communication of Hurricane Storm Surge Threat
Kathleen Sherman-Morris, Karla Antonelli, Amanda Lea, Carrick C. Williams
Mississippi State University

Conventions exist in mapping and visualization regarding use of color in graphics to display quantitative or qualitative data. Colors also have culturally specific associations, such as red for danger. These conventions are often not followed in images made for public consumption. This project looks at images designed to convey risk from hurricane storm surge with the goal of improving communication of it. The research involved two methodologies, an online survey of coastal residents, and an eye tracking experiment in which 40 subjects were shown 5 different images. Preliminary results from each are presented. In both methods, participants were shown storm surge forecast graphics for a hypothetical future hurricane, created with data from past hurricanes. Two variables were manipulated, color scale (red to green, yellow to purple, and blue only) and legend type (categorical text and categorical feet). Accuracy, risk perception and response time were the primary dependent variables measured. Preliminary results do not show many differences among the image conditions. Results from the eye tracking experiment do suggest that accuracy may be lower for subjects who received the yellow-purple images. Yellow to purple categorical images produced at least slightly higher risk perception judgments across both methods of analysis.

CAN-DOO Informal Climate Science Education: A University and K-12 Partnership

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The Climate Action Network through Direct Observations and Outreach (CAN-DOO) is a NASA-funded program with the mission of increasing climate awareness and promoting science literacy through climate science. Outreach efforts target learners of all ages including K-12 public and home schooled students, undergraduates, and lifelong learners at various academic institutions and education centers in North Carolina. This poster focuses on CAN-DOO Science Clubs and Citizen Science activities at two Watauga County elementary schools. Science Clubs are open to 2nd – 8th grade students and focus on the science of our climate and environment through hands-on activities. Student and parent assessments indicate that Science Club is a positive learning experience inspiring curiosity and continued participation by students. Science Club activities continue to focus on weather and climate as major drivers of environmental processes seen in students' everyday lives and schoolyards. Additionally, teachers and students are taking daily measurements, including precipitation and aerosol optical depth (AOD), as part of a CAN-DOO Citizen Science Network. These data contribute to weather forecasting and research activities and are available to CAN-DOO partners as a teaching tool. These activities represent a successful partnership between university and K-12 institutions promoting informal climate science education.

Assessing Spatial Relationships between Sites for Natural Gas Development and Natural and Artificial Features in Pennsylvania

Jamie Wheeler

East Carolina University

The spatial relationship between gas wells and artificial and natural features (e.g. roads, rivers, groundwater wells, and land use types) in the state of Pennsylvania was investigated. The hydraulic fracturing technique that has been used to develop natural gas wells has the potential to affect water quantity and quality, as well as other factors in the local environment where drilling takes place. Here Geographic Information Systems are used to assess potential effects of natural gas development on the environment.

Geospatial data layers of natural and artificial features were gathered for the state of Pennsylvania. Using density plots and buffer analysis, the distribution of gas wells with respect to roads, surface water bodies, water wells and land use categories was investigated. Preliminary results show that local roads have more gas wells close to them than any other road type, there are gas wells within 100 feet of rivers, there are a few gas wells within 200 feet of water wells, and there are more gas wells in land that is 15 - 50% cultivated than any other land use type.

The role hurricane characteristics play on people's perception of hurricane risk

William Pace and Burrell Montz

East Carolina University

Perception of risk to natural hazards is a complex topic that many researchers have evaluated based on the cognitive, situational, and contextual factors that influence a person's perceptions. Hurricane Irene presents an interesting case for the role that changes in environmental characteristics have on perception. Through the use of surveys of residents, this study explores how changes in a hurricane's track and intensity influence coastal residents' perception of hurricane related risks by using the landfall of Hurricane Irene in North Carolina as a case study.

Examining urban quality of life from environmental and socioeconomic aspects

Karla Ilic¹ and Dajun Dai¹

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Quality of Life (QoL) is an evolving measurement of influences that directly impact residents overall mental and physical health. Previous studies have offered several socio-economic indicators for assessment along with health outcomes that are predictors of QoL. This study aims to examine disparities in QoL of Atlanta from spatial variations in brownfields, drug arrests, registered sexual offenders locations, and vacant properties. Data sets were obtained from Georgia Environmental Protection Division, Georgia Bureau of Investigation, City of Atlanta Police Department, and Atlanta Regional Commission. Geographic Information Systems were utilized to visualize the geographic disparities in these environmental and socioeconomic aspects of quality of life. Results show that brownfields, drug related crimes, and registered sex offenders are clustered in certain neighborhoods in Atlanta which affects the quality of life of the residents. These factors could be potential determinants of physical and mental health useful to evaluate urban health disparities.

Subregionalization of Low-Frequency Summer Drought Variability in the Southeastern U.S.A. Jason T. Ortegren¹, Ashley Weatherall², and Justin T. Maxwell³

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³ Department of Geography, Indiana University

Abstract: Freshwater resources are particularly limited in the southeastern United States. In recent years, severe summer droughts have placed substantial strain on municipal and industrial water resources, emphasizing the need for further research on the causes of long-term moisture deficits. Previous research identified a Southeast drought region and low-frequency ocean-atmosphere influences on drought. Here, the authors identify three distinct subregions of low-frequency summer drought variability in the southeastern United States using principal components analysis. Multidecadal drought variability is most pronounced in the Southeastern Atlantic Coastal States (SEACS) subregion. The SEACS drought variability is significantly associated with ocean-atmosphere variability in the Atlantic and Pacific basins. The significance of ocean-atmosphere influences on drought in the Southeast is spatially confined within the SEACS subregion. The Eastern Gulf States (EGS) subregion exhibits a long-term increase in summer moisture that is associated with Northern Hemisphere temperature increases during the last century. The peninsular Florida (FL) subregion is characterized by high-frequency drought variability that is not associated with any of the climate indices included in this study.

Simulating fire spread in a community using an agent-based model

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Abstract:

This study employed an agent-based model to simulate fire spread in a community. In the agent-based modeling, a virtual residential environment was established and a number of fire behaviors were defined. The virtual residential environment consisted of buildings and vegetation with modifiable value of ignition point, fuel mass and heat release rate (HRR). The wind effect was simulated by defining eight directions of wind with modifiable wind strength. The simulation of fire behavior was implemented by conducting two types of logistic estimations: (1) whether the heat source runs out or fire can obtain heat from it; and (2) whether the temperature of fire reaches the ignition point of neighboring buildings or vegetation. Multiple scenarios were designed to examine how the neighborhood would be affected. Ignition point and HRR play important roles in the variation of spread rate of residential fire. Location of incombustible object (road) has impact on the fire spread rate and it also influences the final burned area before the fire is under control. The wind effect significantly changes the spread rate of fire which is at the same direction and reshapes the final burned area.

Forest disturbance variability in Shawnee State Forest, Scioto County, OH

Reece Brown
Appalachian State University Department of Geography and Planning

Abstract

In February of 2003 Shawnee State Forest in southern Ohio was severely affected by an intense glaze ice storm. Thousands of trees lost most of their scaffold limbs, while thousands of others were uprooted within the 63,000 acres managed by Shawnee State Forest. In the spring of 2009 greater than 2500 acres of the forest were subjected to an uncontrollable wildfire that scorched the forest understory and a large portion of the canopy. The combination of two extreme disturbance events within 6 years of each other occurring in the same forest presented a great opportunity to compare forest successional trends following severe disturbances. The goal of this research was to examine where/when/how white oak *Quercus alba* L. regeneration is most likely to occur in the forest. Forest stand dynamics methodology was used to analyze forest composition and tree ring width patterns within various 0.05ha plots in each type of disturbed area. Preliminary data collection has shown significantly more white oak saplings in the area that was burned, compared to the area that was only subjected to the ice storm.

Invasive plant management, spatial analysis of a control strategy in the Bahamas. John C. Rodgers III. Department of Geosciences, Mississippi State University.

An eradication control procedure was employed on two different populations of invasive casuarinas in the Bahamas. The first was at a long-established population where median heights exceeded 5 m. The second was a recently colonized site where median heights were less than 1.5 m. At both locations, initial tree heights were measured and xy locations were recorded. Then, a chainsaw or manually pulling were used to eliminate all individuals in Dec 2010. Resprouting or reestablishment of casuarinas were investigated in Jun 2011, Dec 2011, and Jun 2012. Sixteen months after the initial 112 trees were eradicated at the newly-established site, there were 32 casuarinas present, which represents 30% survivorship. The height of survivors was spatially autocorrelated suggesting that location of survivorship was not random. At the established site, 30 of the initial 83 trees resprouted (36%) after being cut. Resprouting was not statistically related to the initial tree size ($P>0.30$) but was significantly related to elevation ($P<0.01$). The location of resprouting was also spatially autocorrelated. The results indicate that alternative control strategies need to be developed.

Is the Land Development Trajectory of Southern Cities still Unsustainable? The Case of
Charlotte, North Carolina

In urban America, land development and residential real estate have passed through a number of different phases during the post-WWII era. In the contemporary discourse on urban sustainability, attention is often framed in terms of intensity of land development, lot sizes, and square-footage of housing units. In this paper, we reconstruct the land development trajectory of a rapidly growing Southern city and assess whether this trajectory has experienced any reversal in the face of socio-economic transformations that have occurred over the past decade or so. Starting from current land and real estate property records, we reconstitute the urban map of Charlotte using World War II as a starting point. Results highlight a decline in the average single family lot size over the past decade, while the average home size has consistently grown, suggesting that the city of Charlotte and its county have witnessed a densification trend along a path towards greater land development. This analysis not only helps situate Charlotte with respect to other U.S. urban regions, but also provides support for potential land use policies, especially densification, when a balance between urban development, environment preservation, energy savings, and the achievement of quality of life for current and future generations are concerned.

Sarah Heck
Department of Geosciences, Georgia State University

In the era neoliberalization, characterized by increased globalization in the market, fiscal austerity, environmental degradation, increased rates of unemployment and debt, there has been an increase in mobilization among activists to contest the current political economy. The Occupy Wall street movement is one such movement which has brought thousands of activists together in an effort to push back against the neoliberalization of the economy by physically occupying public streets, parks and buildings in a demonstration against a myriad of social, economic and political issues. This poster examines how activists in the Occupy Movement are simultaneously living within and against the neoliberal restructuring of society. This study employed extensive participant observation and in-depth interviews with activists participating in the No NATO protests held in Chicago during the month of May, 2012. This poster examines the intersection of the political visions articulated by Occupy activists and observations of their everyday practices within, against and beyond capitalism as expressed in the protest against NATO agendas.

Forest Stand Dynamics and Land-Use History of the Appalachian State University Nature Preserve

Benjamin M. Riddle, Saskia L. van de Gevel, Christopher A. Badurek
Department of Geography and Planning, Appalachian State University

Abstract: The southern Appalachian Mountains exhibit large-scale land-use change and impacts within Southern Appalachian mixed coniferous and deciduous forests. Prior research suggests spatial analysis of land-cover change is not enough to assess impacts on Appalachian Mountain ecosystems. Therefore, this study integrates dendochronological analysis with spatial analysis of land cover change to better understand the landscape dynamics of the Appalachian State University Nature Preserve (ASUNP), a protected, 70 acre plot of land in Watauga County, North Carolina. Historical aerial photographs and GIS analysis of tree age data were used to examine relationships between land use history, tree age, and terrain composition. Samples from three overstory forest plots and tree age data from old-growth red oaks and white oaks anchored the Preserve's forest history from 1766 to present. Some white oaks and tulip poplars are over 250 years old and a synchronous release in growth of 500% was recorded after 1935, which is likely the result of the Chestnut Blight. Multi-flora rose, an invasive species from China planted in ornamental gardens, was located in plots with relatively young trees. The presence of this ornamental, invasive species indicates historical structures or homesteads may have existed in the Preserve. The complex land-use history and disturbance patterns are evident in the 250-year forest history of this campus Preserve and more research should be conducted to examine the scale of disturbance events.

Dr. Eric Delmelle(1), Dr. Wenwu Tang(1), MeijuanJia (1), ColineDony(1), Dr. Irene Casas (2)

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Dengue fever is a vector-borne infectious disease, which is known to quickly develop and spread under optimal weather conditions. We apply a temporal extension of the spatial kernel density estimation (SKDE) to map and detect space-time clusters of dengue fever in Cali, Colombia for the year of 2010. A space-time K-function was used to estimate the optimal scale of space-time clusters of dengue fever. Based on these, we conducted the Space-Time Kernel Density Estimation (STKDE) in a parallel computational framework to make the involved computation tractable. Results are visualized in a 3D environment, which allows us to understand complex disease dynamics in an interactive manner. An evaluation of the impact of spatial and temporal bandwidths on our results is presented.

Matt Bozigar, Clark Gray, and Richard Bilborrow
University of North Carolina-Chapel Hill

Abstract:

The Amazon basin is a complex area of critical biodiversity importance and under more stressors and disturbances each day. Similarly, the Ecuadorian Amazon area in this study is a complex, biodiverse region where colonization, oil exploration and extraction, and indigenous activities and responses have affected the landscape. In an effort to determine trends among the indigenous components of these interactions, this study will utilize longitudinal and multi-ethnic household survey data in a statistical analysis. Specifically, the research will examine wild resource utilization including forest product provisioning, hunting, and fishing among indigenous groups. Appearance of temporal and multi-ethnic trends will provide a foundation for further study of indigenous land interactions. The research will promote a better understanding of tropical forest issues in a biodiversity, deforestation, and conservation context. We hope to use findings from this study to inform conservation and development policies.

Analysis of the Socio-Environmental Impacts of Amazonian Roads: the Puerto Esperanza to
Iñapari Road in Peru
George Appling; David Salisbury
University of Richmond

Peru's Purús watershed lies in the Ucayali and Madre de Dios regions of the Peruvian Amazon. Recently, this ecologically and culturally diverse watershed has become the target of a controversial road project. A nearly 300 kilometer road has been proposed to connect Puerto Esperanza to Inapari. Using a mixed methodology including spatial analysis with Geographic Information Systems (GIS), key informant interviews, and a literature review of historical accounts, scientific studies, project reports, legal documents, news articles and existing maps, this study explores the potential socio-environmental impacts of the proposed Purús road. An extensive body of existing research concludes road building has myriad adverse environmental impacts on the tropical rainforest. This research displays the potential spatial extent of these impacts with analysis also highlighting socio-environmental impacts on the indigenous peoples and landscapes of the watershed. Currently, 3200 people of eight different indigenous ethnicities in 22 titled indigenous territories live in the Purús, making this one of the most culturally diverse locations in the world. This research was presented at the Congress of the Republic of Peru in September of 2012.

Land cover effects on snow classification in the Southern Appalachian Mountains

Johnathan W. Sugg

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Assessing snow cover patterns in mountain regions remains a challenge for a variety of reasons. Topography (e.g., elevation, exposure, aspect, and slope) strongly influences snowfall accumulation and subsequent ablation processes, leading to pronounced spatial variability of snow cover. While in-situ observations are typically limited to open areas at lower elevations (<1000 m), satellite based observations have enabled larger scale measurements of snow variability at high elevations. However, classification performance often varies by land cover type. In this study, two products are incorporated from the Moderate Resolution Imaging Spectroradiometer (MODIS) to evaluate the effects of land cover type on snow detection in the Southern Appalachian Mountains (SAM). MODIS daily snow cover maps and true color imagery are analyzed after selected snow events (e.g., Gulf/Atlantic Lows and Northwest Upslope Flow) from 2006 to 2012 and compared with the 2006 USGS National Land Cover Dataset. Results indicate that dominant mixed forest types are of concern for improving snow cover classification techniques in the SAM. Despite some limitations related to the presence of ephemeral snow, MODIS products are useful for assessing the spatial variability of snow cover in heavily forested mountain regions such as the SAM.

The Historical Dendroarchaeology of the Log Cabin inside the Green Hotel, Cave Spring, Georgia, USA

Georgina G. DeWeese, Department of Geosciences, University of West Georgia, Carrollton, Ga

W. Jeff Bishop, Department of History, University of West Georgia, Carrollton, Ga

Lisa B. LaForest, Department of Geography, University of Tennessee, Knoxville, Tn

Cave Spring is located at the western end of Vann's Valley, Floyd County, Georgia on a historic Creek and Cherokee Indian trade route. Before the town was established by Euro-American settlers in 1832, it was inhabited by Cherokee. The Green Hotel opened for business in 1850, being built around an existing cabin, and was expanded in the 1920's. Cabin restoration experts put the construction date at 1830; the cabin is a two-story log structure made of pine. Bark is present on the logs, however the sapwood is mostly rotten indicating the logs were exposed to extreme weather and making dating difficult. The wood collected from the cabin does not date against local or regional pine chronologies, suggesting the wood was collected from somewhere outside of Georgia. Because of the wear on the logs, the authors believe the wood was salvaged from another structure before being moved to Cave Spring. There is no structure noted on the site on the Cherokee removal maps made in the 1830's. The cabin has served as a hotel, an apartment building, a library, a doctor's office, and several other businesses.

Large Woody Debris in an Ozarks River: Implications for Sediment Storage

Derek J. Martin
University of Tennessee

Large woody debris (LWD) is a significant component of river system functionality, particularly when acting as an in-channel sediment storage and bank protection mechanism. In the Big River of east Missouri, lead mining has resulted in the contamination of active channel and floodplain sediments, and thus bank stability and sediment storage are of particular importance. This study uses an extensive LWD inventory to investigate spatial patterns of LWD occurrence and investigate relationships between LWD and active channel width. Additionally, a preliminary study has been conducted to estimate the sediment storage capabilities of LWD in the Big River. Global positioning systems (GPS) were used to map the locations of LWD along 50 km of the Big River. In total, 2,662 pieces and jams of LWD were mapped. A linear nearest neighbor analysis suggests that LWD occurrence in the Big River is random at the segment scale, although clustering may be more evident at the reach scale. Preliminary results also suggest that channel width decreases with increasing LWD density. These results, combined with future calculations of LWD-related sediment storage capacity will help us better understand the fate of contaminated sediments in this system and improve the accuracy of current sediment storage models.

The Planning and Transformation of American urban freeway networks, 1955-2005

Joe Weber
University of Alabama

Abstract

The Interstate Highway System was created in 1944, though another decade was required for construction to begin. The blueprint for the urban freeway portion of this system was set in 1955 by an obscure federal document known as the Yellow Book. This provided 100 maps of cities with planned urban freeway locations for the Interstate Highway System. These systems can be classified according to several basic types based on the size of the city. This poster explores how these systems were designed, whether they were built, and how they have adapted to changing urban populations and other transformations in American metro areas in the last half century. It shows that most cities have expanded on the networks shown in 1955, especially in Sunbelt states that were largely ignored in the Yellow Book. This growth will likely continue.

Spatial Patterns of Medical Incidents in a Northwest Alabama Volunteer Fire Department
Amanda Smith

University of North Alabama

There is a lack of research in the use of GIS in rural volunteer fire departments. The study concentrates on spatial patterns of medical incidents in a fire department. The research questions include: What spatial patterns exist? Are the majority of incidents in close proximity to a station? Does a population of people 55 and older require more responses? To answer these questions, primary medical data and district boundaries were collected for 2010 from a fire department and 911 agency at Lauderdale County in Northwest Alabama. All information was spatially analyzed through the use of GIS software tasks including buffer analysis and attribute query. The empirical focus was the locations of the incidents, the proximity to a station and the socio-economic status of the incident. As a result, medical calls were found to be clustered near the two primary stations. Fifty-one percent occurred within five miles of a station and the patients aged 55 or older made up 46 percent of the incidents. Identifying trends are beneficial in discovering criminal activity, gives responders a better awareness, and helps decision makers.

A Geographic Assessment of the Importance of Bus Stops Amenities for Ridership: A Transportation Equity Approach

Selima Sultana & Matt Talbott
University of North Carolina at Greensboro

The purpose of this paper is to examine the spatial distribution of bus stop amenities and their association with the ridership from an equity perspective. While much of the prior literature regarding bus ridership examined how the location of transit stops, scheduling, pollution and the urban built environment affect ridership, there is little to no research on how bus stop amenities can affect ridership. This topic is critical for changing public transportation in the U.S, especially for bus services since they account for over half of transit ridership. Data encompassing the amount of riders at each bus stop and their amenities over a one-year period in 2010 was collected from Greensboro, Kansas City and Seattle's transit authority are used as case studies for this research. In addition, the socioeconomic characteristics of residents by block group are taken from 2000 census block group data. After the thorough examination of the spatial as well as the statistical analyses, this thesis suggest a fair distribution of bus stops and their associated amenities in areas of the transportation disadvantaged with few exceptions. This research concludes that better amenities increases ridership and shelter is the most important associated with higher ridership.

Local-Scale Variations in Floodplain Contamination by Historical Mining in the Old Lead Belt, SE Missouri.

Marc Owen and Robert Pavlowsky, Missouri State University
Scott Lecce, East Carolina University
Derek Martin, University of Tennessee

Historical mining sediment has contaminated 171 km of floodplain along the Big River in the Old Lead Belt of southeastern Missouri. Large quantities of mill waste with high levels of lead (Pb) and other metals have been released to the river since the late 1800s. Previous studies have quantified the downstream distribution of Pb concentrations in overbank deposits, however the spatial variability of contaminated sediment deposition at the local-scale is less understood. This study characterizes the distribution and thickness of contamination at twelve floodplain transects along a 1,000 m reach of the Big River downstream of the old mill sites. Sixty-one cores were collected with a 5 cm diameter soil probe and Pb concentrations were determined in the field using handheld x-ray fluorescence. Contamination thickness varies from <1 m in the backswamp, 1-3 m on the historical floodplain, and >3 m in near-channel deposits. Peak Pb concentrations coinciding with peak mining production between 1900-1930 are found 0.5-1.5 m below the surface. Post-mining aged deposits are characterized by lower levels of Pb contamination that can extend to the bottom of the core in near-channel deposits. These findings have implications for contaminated floodplain remediation efforts in the future.

Tornado Debris Characteristics and Trajectories During the 27 April 2011 Super Outbreak as Determined Using Social Media Data

Alan W. Black, John A. Knox, Jared A. Rackley, Vittorio A. Gensini, Michael Butler, Corey Dunn, Taylor Gallo, Melyssa R. Hunter, Lauren Lindsey, Minh Phan, Bobby Scroggs, SynneBrustad

Affiliations:

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Using publicly available information gleaned from the “Pictures and Documents found after the April 27, 2011 Tornadoes” Facebook page, we have created a database of nearly 1,000 objects lofted by tornadoes during the 27 April 2011 Super Outbreak in the Southeast U.S. Analysis of the takeoff and landing points of these objects using GIS and high-resolution numerical trajectory modeling techniques extends previous work on this subject that used less specific information for much smaller sets of tracked tornado debris. We find that objects can travel as far as 353 km, exceeding the previous record for the longest documented tornado debris trajectory. While the majority of debris trajectories were 10° to the left of the average tornado track vector, the longest trajectories exhibited a previously undocumented tendency toward the right of the average tornado track vector. Using a high resolution trajectory model, we relate this tendency to the altitude of lofting of debris, with the debris reaching the highest altitudes taking the rightmost trajectories. Further, we discuss the pros and cons of using social media information for meteorological research.

Parcel-based Landuse of the Southern Three Counties of Mississippi

David Harms Holt, Ph.D.

The University of Southern Mississippi, Department of Geography and Geology

A study has been completed for the southern three counties (Harrison, Jackson, Hancock) of Mississippi that surveyed parcels for human landuse. We processed over 130K of the 235K parcels through GIS lab analysis and over 54K parcels through a windshield survey using ArcGIS on portable, GPS-enabled laptops. We created a 4-digit coding scheme that with over 500 unique classifications. GIS Lab data were created by using 2012 6-inch RGB imagery and surveyed for presence of houses, mobile homes, and empty parcels. Windshield surveys were created by taking GPS enabled laptops with ArcGIS 10.0 into the field utilizing domains in a geodatabase. Using the GIS lab validation we covered 56.4% of the parcels for the southern three counties and 23% of the parcels through the windshield survey. We have completed this survey and delivered it to Gulf Regional Planning Commission and the US Department of Housing and Urban Development to help in the sustainability and rebuilding plan for the Mississippi Gulf Coast. It is the hope of HUD and GRPC to use our data to help create an amalgamation of Smart Growth and existing features along the Gulf Coast and establish a baseline for any future disasters.

Limnoarchaeology Using Commercially Available Side-Scan Sonar: The Locks of the Muscle Shoals Canal, Alabama.

Robert Kavanaugh
University of North Alabama

Opened in November 1890, the nine locks of the Muscle Shoals Canal allowed traffic on the Tennessee River to circumvent the treacherous "Muscle Shoals", an achievement that replaced an abandoned attempt from over a half century earlier. The canal would continue operations until April 1918, when construction of Wilson Dam blocked river traffic through the canal. After the completion of the dam in 1924, locks 3-9 were flooded by the newly formed Wilson Reservoir, where they have since laid undisturbed. This research aims to introduce commercially available side-scan sonar units as a viable scientific research tool in the interest of historic preservation and archaeological inventory of submerged structures and landscapes. Along with inexpensive commercial software, a single low-cost sonar unit will be capable of producing 3D bathymetry, side-scan imagery of the canal system, and detailed down-scan imagery of individual features of remaining lock components. Sonar output will be compared to historical photographs of the canal and lock structures in order to examine what level of detail is possible from this consumer grade equipment. Once this is determined, it may be possible to assign additional scientific uses to this technology.

New geomorphometric algorithms for mapping the extent of riparian areas in Southern
Appalachian headwater catchments
Cameron Carlyle and Jeffrey Colby

Appalachian State University

Headwater catchments in the Southern Appalachians are understudied and relatively little is known about the extent of functioning riparian areas in these catchments. A recent study from an ongoing research and water quality monitoring project in the headwaters of the Upper South Fork of the New River (USFNR) watershed has shown that landcover within a fixed distance of the stream is a strong predictor of water quality at the catchment outlet. Elsewhere, other studies have shown that riparian areas can significantly alter the chemical signature of the shallow subsurface flow of hillslope water before it enters the stream. This buffering capacity has been shown to have a significant influence on in stream water quality. To better assess the influence of riparian buffering capacity on water quality in the USFNR watershed, the extent of riparian areas were mapped with a method improving upon a linear distance measurement. This study describes two new geomorphometric algorithms that can be implemented in a GIS to map the extent of headwater riparian areas. The extents of riparian areas predicted by the new algorithms were verified with fieldwork, and the hypothesis that this new parameter accurately predicts the extent of headwater riparian areas was tested.

Terrestrial Laser Scanning of Coastal Blowout Dunes in Cape Cod National Seashore:
Methodological and Geomorphic Analysis
Alexander Smith
East Carolina University

Coastal blowout dunes are highly dynamic erosional features that develop in weakened areas of preexisting aeolian features. Blowouts are initiated and maintained through aeolian processes and can develop and migrate very rapidly. Coastal blowout dunes become avenues in which sand migrates within the larger dune system. Due to the high rates of temporal and spatial change Terrestrial Laser Scanning (TLS) is utilized in this study in order to produce an extremely robust data set in a relatively short period of time. The Leica Geosystems C-10 Scanstation 2 records up to 50,000 points per second with each point recording x,y,z coordinates allowing for the integration of data collected from multiple scanning positions into one three-dimensional point cloud. This raw data has to be post processed in order to remove vegetation which is necessary to make accurate volumetric and other geomorphic measurements. With the vegetation removed the x,y,z coordinates can be imported into ArcMap and a series of separate scans can be developed into DEM's and compared through the creation of difference rasters allowing for measurements to be made. This study focuses on the methodology and applicability of using TLS techniques in a geomorphological analysis of coastal blowout dunes.

Assessment of Fresh Water Resource Availability in
Coastal North Carolina

Michael T. Griffin
East Carolina University

Burrell Montz
East Carolina University

Abstract

Coastal North Carolina, a region which has historically been viewed as water rich, is beginning to see the need for adaptive water resources management. Recent droughts and a ballooning population in the region have raised awareness to the potential stress and scarcity that the future will bring. This project addresses the potential water resource issues and drivers in the region. Thorough analysis of the surface water and ground water availability at the 12 digit USGS HUC scale indicates trouble ahead. Many watersheds are transitioning towards water stress and even scarcity as a result of climate change and more prominently population growth. The result of this analysis is a recommendation for a more encompassing management strategy, one that incorporates demand management as well as supply management. It is imperative to shift management practices in order to sustain future generations in the region.

Agricultural land conversion on La Gonave, Haiti, 1990-2010

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Tropical land cover conversion is frequently driven by agricultural demands. The island of La Gonave, Haiti, is representative of the Haitian subsistence lifestyle. *A main objective of this research is to document land cover changes on La Gonave from 1990–2010 through the analysis of Landsat 5 TM satellite imagery in order to measure agricultural land conversion.* The effects of karst topography compounded with intense seasonality of precipitation delimit late January as the optimal time to collect imagery. We implemented *supervised classification methods during image processing* and 30-cm resolution aerial photographs from 2010 were cross-referenced. *The final classified images contain five terrestrial informational classes: Agriculture, Forest/Dense Vegetation, Barren/Eroded, Shrub, and Nonforested Wetlands.* Post field validation accuracy assessments reveal an overall accuracy of 87%, an *Agricultural* class accuracy of >93%, and a Kappa index agreement of 0.84. *Agriculture* composed 6.9% of the total land cover in 2010. However, it experienced a 43% decrease in total land area and 33.8% of the 1990 agricultural cover has been converted to *Forest/Dense Vegetation*. This was concentrated in the lowlands where the limestone regolith, virtually nonexistent soil horizons, and high saline environment are rapidly exhausted of nutrients.

INSTRUCTIONS: “single-spaced abstract that is no longer than 200 words total. Abstracts must begin with the paper title, followed by the author’s name(s), and institutional affiliation(s).

This is followed by the body of the abstract. If the abstract contains more than one paragraph, leave two spaces between paragraphs. Abstracts will be reformatted for listing on the web, so please do not embed unnecessary formatting in the abstract. Such formatting may cause extra work in processing or glaring discrepancies in the final format. Authors are responsible for editing and proofreading their abstracts; they will be listed as submitted. Again, only left-justify your abstract and use single spacing.”

Storm Surge Climatology for North Carolina
Robbie Munroe

East Carolina University

Abstract

Storm surge increases vulnerability through potential damage to coastal infrastructure, transportation of sediment, and the endangerment of human life. North Carolina is uniquely susceptible to storm surge associated with tropical and extratropical cyclones throughout the year due to its geographic location adjacent to the warm waters of the Gulf Stream. Changing weather patterns and rising sea levels associated with global warming contribute uncertainty to future storm surge patterns. This research aims to better understand and predict climatic controls of coastal storms responsible for storm surge events at Duck, North Carolina. This will be accomplished through analyses of storm surge in relation to climate trends, synoptic climate conditions and geospatial characteristics of coastal storms. Preliminary results indicate that storm surge occurs most frequently in the early fall and late winter with a lull in the early summer. The El Nino Southern Oscillation is a driver of storm surge with El Nino accounting for the greatest cumulative hours of surge per month, for all months, except May and August.

Key Words: *Climate, Coast, Cyclone, North Carolina, Storm Surge, Vulnerability*

Comparing Growth and Morphological characteristics of North Carolina Coastal and Piedmont Longleaf Pine Stands. By Tommy Patterson. University of North Carolina at Greensboro.

This study examines radial growth and morphological characteristics among the few remaining longleaf pine tracts in North Carolina. Two core samples were collected from 15 trees per site. Additionally, 5 needle clusters were measured per tree to analyze needle length variations. From the samples collected, measurements in wood density and climate/growth relationships were assessed. Theories which were tested as to why such morphological variations would exist include influences of ice storms, fire dependence/enhancement, and canopy competition. It was observed that variations exist amongst sites for both wood density and needle length. The results suggest that site specific genotypes may exist among the studied tracts.

Donna Selch, Department of Geosciences, Florida Atlantic University

This study compared models that used remote sensing to assess salinity in Whitewater Bay. The quantitative techniques in this research allow for a less costly and quicker assessment of salinity values. Field observations and Landsat 5 TM imagery from 2003-2006 were separated into wet and dry seasons and temporally matched. Interpolation models of Inverse Distance Weighting and Kriging were compared to empirical regression models (Ordinary Least Squares and Geographically Weighted Regression - GWR) via their Root Mean Square Error. The results showed that salinity analysis is more accurate in the dry season compared with the wet season. Univariate and multivariate analysis of the Landsat bands revealed the best band combination for salinity analysis in this local area. GWR is the most conducive model for estimating salinity because field observations are not required for future predictions once the local formula is established with available satellite imagery.

Using Terrestrial Laser Scanning to Monitor and Evaluate the Rates of Movement of the Slumgullion Landslide, CO.

Kathryn Reavis
East Carolina University

Landslides are geomorphological processes that involve the mass movement of rock from an area of high elevation to an area of low elevation due to forces related to gravity and water such as precipitation or water content. Since landslides are dominantly affected by rain events, the rate and direction of landslide movement is directly correlated with seasonal variations in pore water pressure, where more rapid velocities would take place during the spring in summer months when snowmelt and higher precipitation rates occur. Disparate rates of movement present different societal hazards. Slow movements often result in periodic damage to infrastructure, whereas rapid movements commonly destroy structures and cause human casualties. Rates and directions of movements are critical to continuous landslide monitoring and determining broad-scale remobilization. With the use of Terrestrial Laser Scanning, this study can allow for a better understanding of predicting rates and direction of flow at various landslide sites, facilitating the prevention of costly future infrastructure damages and possible human fatalities.

Mass Balance measurement of Fedchenko Glacier 2004-2009, Tajikistan

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Mississippi State University

Poster

Abstract

Mass Balance of a glacier is the sum of accumulation and ablation in a particular hydrological year. Regular monitoring of glaciers is very important as it is considered as sensitive indicator of climate change. Millions of people's lives are dependent on glacier for fresh water and irrigation purpose. Fedchenko glacier in Tajikistan, the biggest glacier in the world has been chosen for this study. Relative Digital Elevation Models of Fedchenko glacier above mean sea level were generated from ASTER image for the year 2004 and 2009. Mean Surface elevation difference was -9.05 meters; showing surface lowering of glacier during the study period. Based on the elevation data, the mass balance of Fedchenko glacier was estimated as -1.629 m of water equivalent per annum for the year 2004 to 2009. The results also indicated negative mass balance of many surrounding small glaciers in the study region.

Protecting the Mississippi Sandhill Crane through Landuse Classification and Site Suitability Modeling

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*presenting author

In support of conservation efforts at Grand Bay National Estuarine Research Reserve (GBNERR) and Mississippi Sandhill Crane National Wildlife Refuge (MSCNWR), we generated a supervised landuse classification of vegetation from 6-inch aerial imagery (RGB/near IR) for Mississippi and 6-inch imagery for Alabama. The Mississippi Sandhill Crane (*Gruscanadensispulla*) (MSC) is a critically endangered species with about 120 individuals in the wild that lives exclusively along the north central gulf coast. Nesting habitat is under pressure from local development and natural predation. It is our hope that this study will provide valuable information concerning a site suitability model for the MSC and allow for expansion of protected habitat and species management. The classification scheme that was used to identify features in this data set is based on the U.S. National Vegetation Classification (USNVC). After classifying these features and overlaying nest site data we noticed trends. We found 111 nests (38%) in cypress drains, 101 nests (37%) in grasslands, and 73 nests (25%) in the remaining classifications. These data have been released to GBNERR and SCNWR for habitat management and eventual expansion of protected areas along the coast of Mississippi and Alabama to help protect this critically endangered species.

The Upper South Fork of the New River (USFNR) Watershed Project

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Headwater streams in the Southern Appalachians are understudied and relatively little is known about the extent of functioning riparian areas in these catchments. The location for this study is the headwaters of the Upper South Fork of the New River (USFNR) watershed in western North Carolina. The overall goal of this project is to monitor the influence of land cover change on water quality. A high resolution geospatial terrain database has been developed for the watershed based on 1 and 5m resolution elevation files derived from airborne light detection and ranging (LiDAR) data. A high temporal resolution water quality monitoring program has been established using sondes installed at 7 locations collecting water quality parameters (e.g., temperature, pH, specific conductivity, and depth) at 15-minute intervals. In addition, water quality parameters (e.g., Cl^- , NO_3^- , and SO_4^{2-}) are being collected as monthly grab samples. Initial research results indicated land cover within a linear distance of up to 100m of the stream is a strong predictor of water quality. Current research includes identification of variable width riparian areas based on geomorphometric terrain characterization and 3-D representation of land cover. These efforts will be enhanced using bare earth and land cover datasets derived from highly accurate airborne helicopter point cloud LiDAR data.

Comparing flow dynamics of two dune grass species to gain insight into shear stress partitioning models

Renken, Katherine A., and Namikas, Steven L.

Louisiana State University – Department of Geography and Anthropology

The scientific community is currently not able to accurately model the fluid dynamics that lead to the initiation and development of coastal dunes colonized by a variety of grass species because we lack detailed, quantitative understanding of the basic mechanics of the feedback between aeolian fluid dynamics, dune grasses, and aeolian sediment transport. This study addresses this lack of understanding by investigating differences in aeolian fluid flow around different native dune species with significantly different physical structures. A wide range of near-surface wind velocities were measured in approximately 10m by 10m grids surrounding isolated plots of *in situ* *Uniolapaniculata*, which has a taller, denser structure, and *Sporobolusvirginicus*, which is much shorter and less dense. A comparison of the flow fields around the different species using velocity contour maps indeed confirms the difference in the flow field around the different species structures as wind energy changes. These results suggest that sediment transport patterns will vary based on the individual structure of the species being examined. Furthermore, shear stress partitioning models must account for the variation in species structure if we are to improve the accuracy of dune growth models.

Analysis of the Effects of Large Dams on Upstream Property Values in the Southeast: Is Bigger Better?

Jeff French and Christopher A. Badurek
Appalachian State University

Abstract: According to the US Army Corps of Engineers (USACE), the United States has 81,134 dams, 13,990 of which have a high hazard risk of failure. There are approximately 5,500 large dams (50+ feet in height) in the US, the second most number of large dams in the world. As these structures continue to age and more are added to the list of high hazard risk each year, research on large dams is important due to their potential impact upon the built environment. As cost benefit analyses are conducted by agencies such as the USACE and Tennessee Valley Authority (TVA), potential downstream effects and decline in upstream property value due to a large dam failure or removal should be addressed. The data used in this research included TVA owned and operated dam structures obtained from the USACE National Inventory of Dams (USACE NID) and Median Household Values from the 2010 US Census. Preliminary results indicate there was not a significant correlation between the reservoir storage capacity and median household value, further spatial analysis is being conducted with county-level land parcel data to determine potential impacts of land use and distance to dam on property values.

Relationships Between Tropical Cyclone Warning Times, Rain Event Duration, and Rain Accumulation

Ian Comstock
CoreneMatyas
University of Florida

Duration of tropical cyclone rain events are related to accumulation along National Hurricane Center designated breakpoints leading up to landfall. Rain events start in this study once hourly accumulation reaches or exceeds 1.214 mm at any breakpoint; rain events end once hourly precipitation falls below this rate or when the TC makes landfall. Duration and accumulation were tracked for all breakpoints within 4° of the landfall location. Timing of rain events were related to the timing of tropical cyclone warnings which are issued when tropical storm force winds are expected along any breakpoint within thirty-six hours. Precipitation data were obtained from Stage IV analysis.

A case study of Hurricane Ivan (2004) is presented. The first rain event of Ivan began at 13Z on 15 Sep 04 which was eighteen hours before its landfall and sixteen hours after the hurricane warning was issued in the Gulf. A strong correlation was found between rain event duration and accumulation according to a Spearman Rank Correlation coefficient of 0.818. Highest accumulations at breakpoints were associated with the longest durations. This simple relationship suggests the possibility that pre-landfall accumulation may be able to be predicted as a function of rainfall duration.

Conservation in Crisis: A Story of Community Resistance Against Hydraulic Fracturing in the Yellow Creek Conservation Zone

Ayanda M. Masilela

Virginia Tech: Department of Geography

The Yellow Creek drainage basin, in Indiana County, Pennsylvania, serves as a drinking water source and recreation site for nearly three thousand residences in Indiana and surrounding counties. In 1964, the “Yellow Creek Conservation Zone” was designated to protect the region from extensive coal mining, shallow natural gas, and oil exploitation. The purpose of this research is to examine the legal argument through which two local environmental organizations used to argue against hydraulic fracturing practices in the Conservation Zone. We juxtaposed the condition of Two Lick Lake, also in Indiana County, with that of the neighboring Yellow Creek basin. Two Lick Lake does not have a designated conservation zone, and thus, industrial activities have been much more extensive than in the Yellow Creek basin. We compared the conditions of each basin and found that Two Lick basin was significantly less healthy. A higher percentage of the total drainage basin has been subjected to coal mining, there are more shallow gas and oil wells, and the percentage of tributaries deemed “non-attaining” is also much higher than those of the Yellow Creek basin. The Two Lick reservoir itself has also been deemed a “non-attaining” stream.

Changes in vegetation and land area on the Mississippi-Alabama barrier islands, U.S.A., in the initial five years following Hurricane Katrina

Carter, G., K. Lucas, E. Otvos, and A. Criss. Department of Geography and Geology and Gulf Coast Geospatial Center, University of Southern Mississippi, Stennis Space Center, MS, 39529

The Mississippi-Alabama islands, including Cat, West Ship, East Ship, Horn, Petit Bois and Dauphin, were impacted dramatically by Hurricane Katrina in August, 2005. Image data acquired from satellites and aircraft before (2004-2005) and after Katrina (2005-2010) were compared to determine immediate storm impacts and assess the recovery of island total vegetative cover and land area. These variables were quantified using isodata classifications of spectral imagery and field observations. Immediate loss of vegetation cover was caused primarily by scouring and burial under sand sheets and washover lobes. By 2008, total land area of Cat, West Ship, East Ship, Horn, Petit Bois and West Dauphin had recovered to 92, 90, 33, 99, 93 and 91 percent, and vegetative cover to 85, 101, 85, 94, 83 and 102 percent of pre-Katrina values, respectively. Increased tropical storm frequency and intensity and accelerated sea level rise will likely inhibit the reformation of woodlands and stable dunes.

Trade-offs in Threat Perception: Evaluating Responses to Tornado Warning Graphics

Kevin Ash, Department of Geography, University of South Carolina

Gregg C. Bowser, Department of Geography, University of South Carolina

Ronald L. Schumann, III, Department of Geography, University of South Carolina

Storm-based weather warning polygons debuted in 2007, replacing county-based warnings. Recent studies show that users do not comprehend the areal extent of the threat zone and direction of motion as presented in storm-based warnings. Probabilistic threat information will be added to warnings in the future, further complicating warning communication via maps. This study tests whether the present warning design and experimental designs are interpreted differently by users. 500 students at the University of South Carolina participated by rating their perceived fear and protective action intentions at 352 positions spread across three tornado warning designs with differing color schemes. Results suggest that the current warning design is more effective at eliciting fear and protective action across the entire warned area than experimental designs incorporating risk gradients. Using the current design, however, viewers incorrectly perceive the maximum threat to be at the center of the polygon, whereas the experimental designs better communicate the most critical threat areas. The weakness of both experimental designs is that areas within the warning but outside the maximum threat zone may not be correctly perceived as under threat. By illuminating spatial trade-offs made in threat perception, this study adds to knowledge on weather risk communication.

Effects of Forest Type and Management History on Downed Woody Material and Leaf Litter in a Managed Southeastern Pine and Hardwood Forest.

Caitlin Strachan, Chris Kaase and John Kupfer.
University of South Carolina.

Downed woody material (DWM) and leaf litter play critical roles in forest ecosystems, but relatively little research has examined their relationships to forest type and management history. We collected data on the depth of leaf litter and the amount of DWM in various size classes from 68 sites within Harbison State Forest in Columbia, SC that varied in their dominant forest cover (pine-dominated vs. hardwood/mixed dominance) and fire and logging histories. The relationships between the collected data and forest type and management history were then examined using linear regression analysis. Our results indicated that the amount of fine woody debris (< 0.25" in diameter) was significantly related to fire history and forest type, with less fine woody debris on recently burned sites and on pine-dominated sites. Fire history was also a significant predictor of leaf litter depth, with recently burned sites exhibiting shallower leaf litter. On the other hand, the amount woody debris in the coarser classes (debris > 0.25" in diameter) was unrelated to any of the environmental variables examined in this study. Our results point toward the important role that fire and forest management have on DWM and leaf litter.

Maghreb Expressions of Presence in France

Ruth Bowling
Geography Department
University of Tennessee, Knoxville

This poster explores the contemporary lives of Maghreb immigrants and their descendents living in France today. As France is a secular culture, understanding ones identity as a either a foreigner or being of a different ethnicity is a challenge. Pictures and media played a major role in this research as those of Maghreb background search for their identity in France. As “Frenchness” is significant to the state, other non-French ethnic groups tend to blend into the background. The French state tends to see these experiences as the one Muslim experience - regardless of an immigrant’s actual religious or state affiliation. This poster highlights how immigrants from Africa’s northern countries have marked space in ways unique and personal to their own culture. Maghrebian immigrants’ lives are caught not only between their former and current states’ policies, but also the culture of their families. How they assert their chosen identity remains a continuous challenge in daily life, but their presence is seen in physical and verbal expressions throughout France.

A Historical Case Study of Longleaf Pine Nature Preserve: the Reintroduction of fire to a Longleaf Pine Savannah.

Abstract

This study evaluates the effects of prescribed burning (over a 4 year period) on a mature stand of longleaf pine (*Pinus palustris*) located on Longleaf Trace Nature Preserve in southern Mississippi. This plot of land was historically a longleaf pine savannah, but has been fire suppressed for more than a century. Today at the study site, the understory of this longleaf pine stand is dominated by shrubs and mixed hardwoods, which has outcompeted the grasses common to the longleaf pine savannah ecosystem. Beginning in 2009, nearly 158 acres of the Preserve have been subjected to regular prescribed burns. Both tree (greater than 5 cm dbh) and stem counts show a dramatic reduction in shrubs and mixed hardwoods in the burned study plots and demonstrate how rapidly this ecosystem can be restored with prescribed burns.

Poster Title: Modeling intermittent and perennial headwater streams in North Carolina

Abstract:

Headwater streams strongly influence watershed hydrology. Current maps used by regulatory agencies do not adequately depict headwater streams, often either underestimating channel length or omitting channels entirely. As a link between the upland landscape and larger streams within a watershed, headwater streams often account for a majority of the length of channels in a watershed, and influence processes such as pollutant and sediment transport and flooding. Intermittent and perennial headwater streams each provide unique habitat. Recent research upon which this study builds has demonstrated the ability to map headwater streams while minimizing the required fieldwork.

An approach to generate and validate headwater stream maps using GIS-based modeling coupled with field verification was tested. Current models are often based solely on drainage area, or other variables derived from a digital elevation model (DEM). Physiographic variables representing land cover were tested in this study for effectiveness in predicting stream channel location and flow duration type. Preliminary analyses indicate additional variables increased accuracy over a univariate model based on a drainage area threshold and a model with only DEM variables.

Allocation of Water within the Apalachicola-Chattahoochee-Flint Basin: Has Sustainability Been Addressed?

OnaStrikas

Florida State University

The quagmire of the tri-state water conflict between Alabama, Florida, and Georgia has persisted for over twenty years centered upon how much water Atlanta can remove from the basin. On June 26th, 2012 the Army Corps of Engineers stated it has the authority to withdraw 705 million gallons of water per day (mgd) for the Atlanta metro region by 2030. The metro Atlanta region is projected to grow 64% by 2030. This analysis investigates whether the proposed withdrawal is sustainable for the region given other water demands, and changing inputs throughout the basin. To understand the necessary water demands, the needs of primary stakeholders- users of Lake Sidney Lanier, metro Atlantans, downstream users, and Apalachicola bay fisherman- were enumerated for along with legal water quantity mandates. The analysis includes a hydrological model under different flow regimes, a land-use-land-cover change assessment for the agricultural region of Southwest Georgia, and several cost benefit analyses for water conservation measures implementing remote sensed aerial estimates. Current results suggest that 705 mgd is not a sustainable withdrawal for the basin, especially given the region's increasing propensity for drought.

Sustainability Through a Universal Karst Assessment and Repository Tool that Measures and Evaluates Human-Environmental Impacts on Karst Environments

Jason S. Polk, Leslie A. North, Victoria A. Allen, Taylor Hutchison, Chris Groves

Hoffman Environmental Research Institute, Western Kentucky University

Karst environments are complex, coupled landscape/aquifer systems vulnerable to anthropogenic impacts. The Karst Disturbance Index is one method of evaluating the anthropogenic disturbances in a karst landscape using a various data sources. We aimed to develop a universal online karst assessment tool (uKARST) for public consumption that provided an educational resource and data repository for evaluating impacts to karst environments. We performed a participatory needs assessment with stakeholders to determine how to develop this online tool. The KDI was applied to Warren County, Kentucky to evaluate how readily the KDI can be applied by non-experts in karst research in an area with arguably one of the highest concentrations of available data in the world. This process revealed the need for a modified approach to holistically evaluate karst landscapes, and a more centralized and accessible online resource to aid in this type of assessment. Thus, based on a preliminary research and the results of the evaluating the application process of the KDI to Warren County, we have developed a beta version of uKARST and are testing its application in other regions. Future research will focus on its refinement to provide a user-friendly and holistic tool for evaluating impacts on karst landscapes.

Pierce's Disease Risk within the Yadkin Valley AVA of North Carolina, a GIS Approach

This research poster attempts to illustrate an increasing risk of contracting Pierce's Disease, a deadly pathogen for *Vitisvinifera* vineyards within the Yadkin Valley AVA region of North Carolina.

Under Our Feet: Avenues for Promoting Karst Groundwater Awareness and Sustainability

Leslie A. North, Jason Polk, Jonathan Oglesby, Taylor Hutchinson, and Chris Groves
Hoffman Environmental Research Institute, Western Kentucky University

Karst terrains are distinctive landscapes, characterized by springs, caves, sinkholes, and aquifers. The rapid transport of water through karst and inability of carbonate bedrock to filter pollution from water lends these terrains to extensive environmental degradation and makes karst groundwater highly vulnerable to pollution. Additionally, rapid industrial, agricultural, and/or urban growth in karst regions has raised concerns about future groundwater availability in these locations. To promote karst groundwater awareness and encourage its sustainable use, a multi-year educational campaign was launched in 2011 in Florida and Kentucky, wherein water availability and quality are becoming increasing concerns. Since informal learning allows for both adults and youth to be simultaneously educated about a particular topic, this campaign combines the use of multiple informal learning tools including interpretative signs, webpages, infographics, workshops, community forums, social media, and multi-media productions. Since the campaign launch, more than 100 'likes' have been received on Facebook, nearly 100 participants were hosted at two workshops, a teleprompter video has aired at a Western Kentucky University sports venue, and 3 infographics were developed and distributed. To date, knowledge surveys, pledges submitted by participants, and public support and requests for additional educational materials indicate these efforts have been successful thus far.

“Sustainability Education: Teachable Moments and Strategies in Historic Preservation”
Dr. Ann Marie Legreid
Shepherd University

Historic preservation supports economic, social, and environmental sustainability; it also provides ample opportunities for experiential learning in advanced college geography courses. Students gain hands-on experience through heritage tours, architectural inventories, and GIS mapping of historic properties and districts. Specifically, students in Urban Geography and Research Methods were engaged in the delineation, description, and mapping of a historic district in a small Midwestern town; their work served as the basis for the nomination of the district to the National Register of Historic Places. The classroom component, titled “Sustainability Education,” emphasized the role of preservation as a form of community-based sustainability. This project was based on the premise that preservation, education, tourism, and revitalization are important to the long-term health of the community. Project objectives were identified for students, instructor, and community, and tied to four of the National Geography Standards. Rubrics were utilized for student performance assessment and are available as a handout. The project is consistent with the growing interest and applicability of GIS technologies to the humanities.

Estimating frost depth using the modernized Air-Freezing Index

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Abstract

Air-Freezing Index (AFI) is a common index for calculating frost depth for mid-latitude regions and is essential for determining the depth of shallow foundation construction. Past research has shown that an estimated frost depth value can be generated using daily mean air temperatures. In this method, the depth of frost penetration is determined by the yearly accumulation of daily AFI values. Daily AFI is defined as the departure of the daily mean temperature above or below 0°C (commonly the index uses Fahrenheit). The yearly accumulation of daily AFI values represents the seasonal magnitude and duration of below freezing air temperature. Previous works on the AFI were completed using the 1951-1980 climate normal. This research updates the existing methodology used in creating previous works and applies them to the recently completed climate normals for 1981-2010. AFI and frost depth values are calculated for 5,735 stations across the contiguous United States that were used in the 1981-2010 climate normals. Results were mapped and interpolated across the United States using GIS applications. The goal of this research is to develop accurate digitized frost depth maps across the United States for use by the construction industry.

Impacts of Climate Change on Coffee Production in Jamaica: Preliminary Insights

Abstract

One of the Caribbean sectors deemed as being particularly vulnerable to climate change is agriculture. Jamaica, especially, has been affected by a number of climate related hazards in recent years amounting to millions of dollars in damages to the island's agricultural sector.

This poster presents preliminary findings from an ongoing project in Jamaica geared at improving climate change adaptation planning and climate risk management at the community level. A specific objective of the study involves conducting an integrated vulnerability assessment of four farming communities, each located in distinct agro-ecological zones to provide community level household baseline data on the levels of exposure, sensitivity and adaptive capacity to climate change. The poster will showcase preliminary findings from one of the four communities – Spring Hill, an established coffee growing area located in the Blue Mountains, traditionally characterized by high annual rainfall totals. Research findings reveal that rainfall patterns have become increasingly unpredictable in the last 20 years, drought conditions are becoming more frequent and increase plant wilting and burning due to high temperatures. Several non-climatic stressors were also including poor road conditions, labor shortages, and the high cost of key farm inputs such as fertilizers and pesticides.

Analysis of the Effects of Refugee Camps on the Syrian-Turkey Border using High Resolution Satellite Imagery

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Abstract: According to the UNCHR, nearly 100,000 citizens have fled Syria for the neighboring states of Jordan, Lebanon, Turkey, and Libya. Just west of Cilvegozu, one of the busiest border crossings between Syria and Turkey, is the Turkish town of Reyhanli where a nearby refugee camp has seen consistent growth over the last few years. The negative impacts conflicts have on land cover change including decreases in vegetation and forest cover are often overlooked. Studies have shown that change detection of satellite imagery is particularly suited to analysis of the amount of vegetation, infrastructure, and distinct features surrounding refugee camps. Several change detection methods were used to study vegetation near the Reyhanli camp over the last few years. Preliminary results indicate decreases in vegetation, but the use of higher resolution imagery and a defined classification method should return more accurate findings. High resolution multispectral imagery acquired from GeoEye for 2010-2012 is also used to complete a post-classification change detection study of the area. Results from this study may be used to help support humanitarian aid efforts such as determining optimal locations for siting refugee camps in the study area.

Estimating forest profiles in an evergreen needleleaf forest using ground-based terrestrial laser scanning

Galloway, Cale

Abstract

Ground-based terrestrial laser scanning has become a more prevalent method to assessing tree architecture. In this study, a Leica Geosystem C10 terrestrial laser scanner was deployed at five scanning locations in Ameriflux's Howland Research Forest. Post processing procedures are explained in the calculation of vegetation area densities and vegetation area indices of individual trees, as well as a plot-scale domain. Results show the feasibility of individual scan locations and influences on calculation.

Secondary forest succession quantification using LIDAR analysis in the southern Appalachians

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Poster Abstract

The goal was to determine if airplane based LIDAR data could be used to accurately predict tree height. Our study site was located within the Balsam Mountain Preserve in the southern Appalachian region of western North Carolina. Tree height, forest density, forest basal area, and species distribution were measured in the field. LIDAR predicted tree height was compared to field-collected tree height. Leaf area index was measured indirectly using a leaf area meter (i.e. LAI 2000). To assess the accuracy of the LIDAR data, four forest stands of similar species composition (deciduous montane mixed oak-hickory forest), in different successional stages (30, 50, 70, and 90+ years since disturbance) were utilized for our measurements. Dominant tree height was 23.5 m in the 30 year-old stand and increased to 29.5 m in the 90 year-old stand. LIDAR data underestimated tree height by 7 to 25% depending upon stand age. We found that basal area ranged from 35.0 to 48.8 m²ha⁻¹ and peaked in the 90 year-old stand. Forest density ranged from 850 to 2000 stems ha⁻¹ and peaked in the 30 year-old stand. Leaf area index was 3.26, 4.16, 4.01, and 3.51 in the 30, 50, 70, and 90 year-old stands, respectively.

The Impact of 2007 Housing Bubble - Spatial and Temporal Analysis of Signal Family House Prices in Clearwater, Florida

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- 2) Timothy Fik, Department of Geography
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This study analyzes housing prices from 2002 to 2011 in the coastal area of Clearwater to investigate the spatial and temporal change before and after housing bubble crisis. The hot spot analysis shows that high price levels tend to cluster on or near barrier island and lagoon area, which suggests that price levels are highly influenced by coastal amenities. On the contrary, most of the cold zones were located in the inland areas. From 2006, both hot spots and cold zones decline, which is likely related to the decrease in the number of sales and the shrinking gap between the observed high and low housing prices. As profile analysis shows, the corrected prices are decrease from 2002 to 2005, and increase after 2008. By separating the profile into three geographic sub-markets: Coastal, Intermediate, and Inland Market, the result reveals each sub-market had its own unique characteristic and response to the housing bubble. It was also observed that price levels in both Coastal and Intermediate Market bottomed out in 2005. This result is partly attributable to the sluggish nature of the high-price house market. Comparatively, price levels of Inland Market had the most stable decreasing trend.