Climate of the Southeast United States: Variability, Change, Impacts, and Vulnerability

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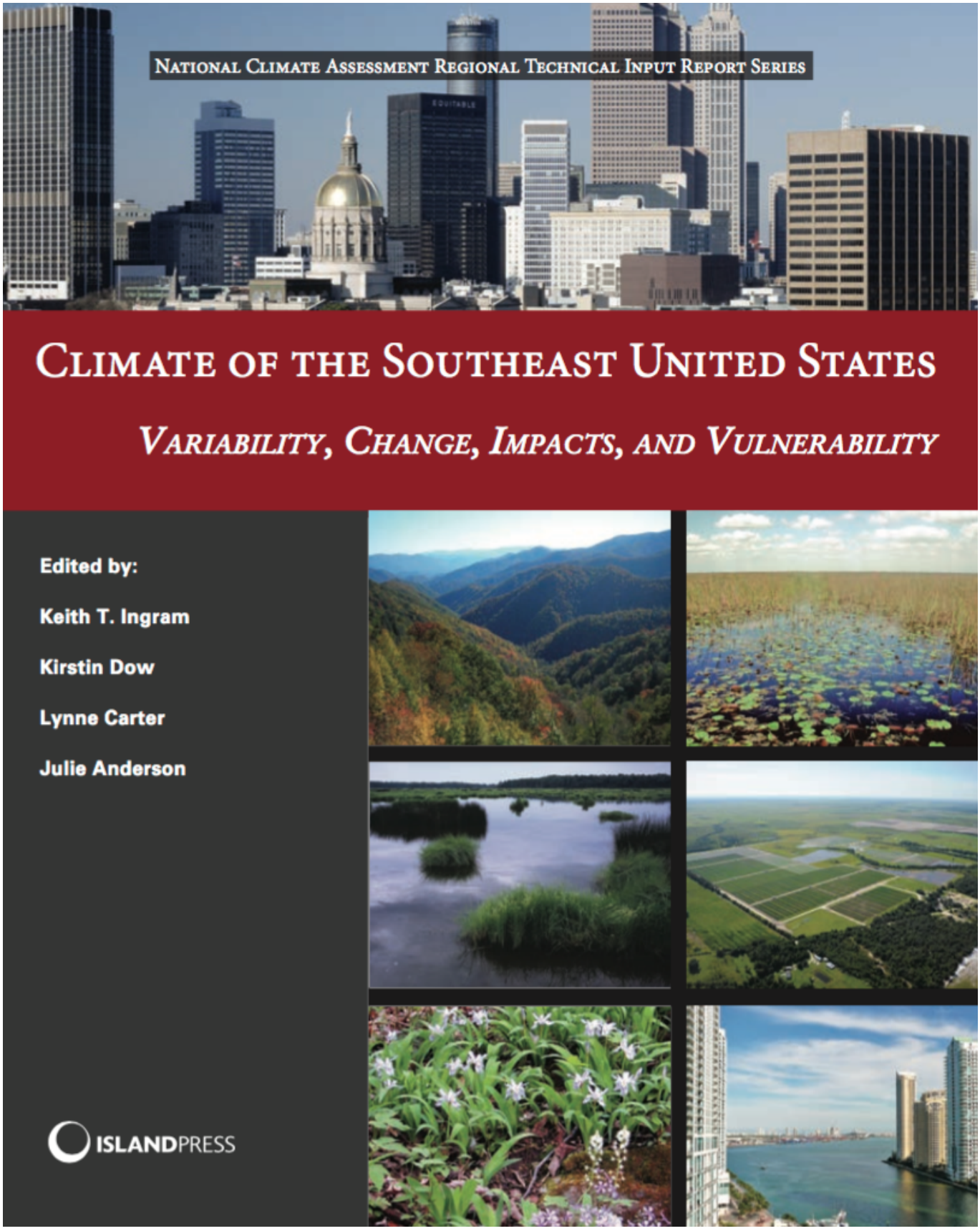
Climate of the Southeast United States.pdf



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Abstract

The SE USA is characterized by great diversity in terms of climate, natural and managed ecosystems, social and political attitudes, and vulnerabilities. While most of the SE is classified as humid, temperatures vary widely across the regions, with a transition from tropical rainforests in Puerto Rico and the US Virgin Islands to temperate forests in the southern Appalachian Mountains. This climatic diversity, which is described in detail in Chapter 2, results from a range of weather patterns that affect the region, including frontal systems that dominate during fall and winter, convective systems that dominate during the spring and summer, tropical systems that are important during the summer and fall, and sea breeze systems that are important for the coastal regions. In addition, the region is prone to other extreme weather phenomena, including droughts, floods, winter storms, and tornadoes.

The region also is subject to related risks that interact with climate variability and change. For example, sea level change and salt water intrusion already threaten many coastal communities (Chapter 5) and ecosystems (Chapters 9 and 11). Sea level change, which includes both sea level rise and land subsidence in parts of Louisiana, Mississippi, and Alabama, makes the region more vulnerable to storm surges produced by tropical storms or winter storms in the Gulf of Mexico (Mitchum 2011). Increasing atmospheric carbon dioxide concentrations might benefit agricultural (Chapter 7) and forest systems (Chapter 8) of the region through increasing photosynthesis, but benefits are likely to be offset by losses of productivity that would result from increased temperatures. Increasing atmospheric carbon dioxide concentrations are also projected to acidify surface waters, which would likely inhibit the growth of corals, shellfish, and crustaceans (Chapter 9). Finally, increasing atmospheric carbon dioxide increases pollen production by many plant species, which has been linked with increased levels of asthma and respiratory illnesses (Chapters 3 and 7).

Climate also interacts with social conditions in the Southeast, which has experienced unprecedented population growth during recent decades. All states in the region had positive growth from 2000 through 2010, with overall population growing by 8.9 million people, or about 13% (Table 1.1). Population grew the most in North Carolina (18.5%), Georgia (18.3%), Florida (17.6%), and South Carolina (15.3%), and most of that population growth has been in urban and peri-urban areas (Mackun and Wilson 2011). In the region, only Puerto Rico and the Virgin Islands had negative growth (-2.2 and -2 percent respectively) (Mackun and Wilson 2011). States with the fastest growing populations on a percentage basis were mostly states that already had relatively large populations. This trend indicates widening differences in population density among states in the Southeast. Population growth likely will compound climate related risks for most sectors. Increasing competition for water resources (Chapter 10) will likely affect the energy (Chapter 4), agriculture (Chapter 7), fisheries and aquaculture (Chapter 9), natural ecosystems (Chapter 11), and built environment (Chapter 5) sectors.

The diversity of people, natural and managed ecosystems, and resources of the Southeast provide the region with great richness. With coastlines along the Gulf of Mexico and South Atlantic seaboard, the SE has a wealth of estuaries (Chapter 12) with associated fishing industry (Chapter 9), ports with associated transportation hubs (Chapter 6), and beaches with associated tourism (Chapter 13). Inland forests constitute an important carbon sink (Chapter 8), which mitigate greenhouse gas effects on climate (Chapter 12). Its relatively humid, high rainfall environment provides the SE sufficient water resources (Chapter 10) to be a major exporter of energy (Chapter 4) to other regions at present, though future increases in competition for water resources might diminish the region's energy production capacity. Climate change threatens all of these natural resources and the industries that depend on them. Thus, it is not surprising that there are numerous efforts already underway in the SE to mitigate and adapt to climate change (Chapters 12 and 13). In addition there are ongoing

programs to educate people about climate variability, climate change, and ways society can manage climate related risks (Chapter 14).

Document Keywords

Type of Adaptation Action/Strategy:
Natural Resource Management / Conservation
Capacity Building
Infrastructure, Planning, and Development
Governance and Policy
Target Climate Changes and Impacts:
Air temperature
Flow patterns
Precipitation
Water supply
Climate Type:
Temperate
Document Type:
Whitepaper / Report

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Related Resources:
Climate Change Impacts in the United States: The Third National Climate Assessment