

Local Impacts of Drought Across the Carolinas

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What are the different timescales of drought?

- Flash droughts
 - Classified by short duration and rapid intensification
 - Typically on timescale of weeks to months
- Persistent droughts
 - Typical consideration of drought event
 - Longer timescales of months to year

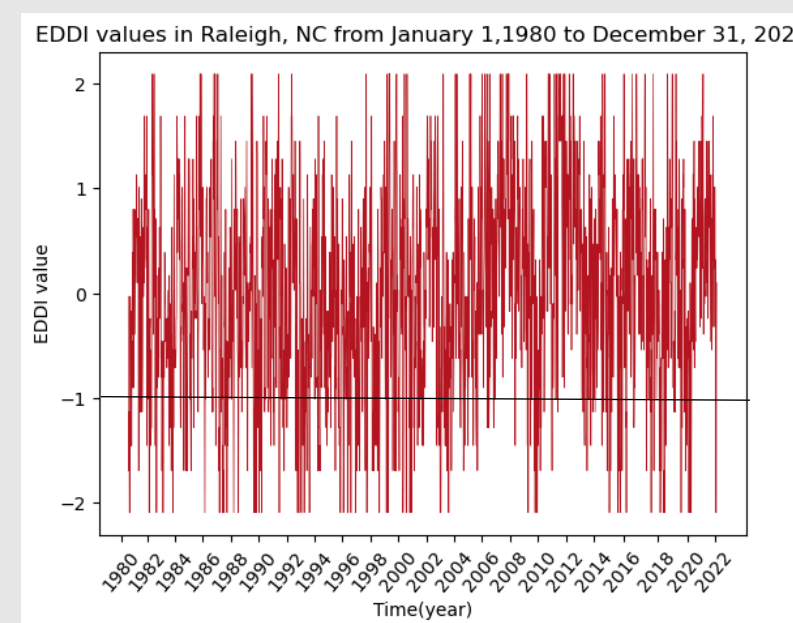
Why should we study the Carolinas?

- Many regional studies of the Southeast US may exclude or not provide individual analysis of the Carolinas
- Geographic distribution of the states provides for differing localized drought effects
- Historically, both flash and seasonal droughts have been shown to have an impact on agriculture
 - Approximately \$16 billion in reported farm income for the region in 2021
- Other impacts outside of agriculture are being analyzed in this study

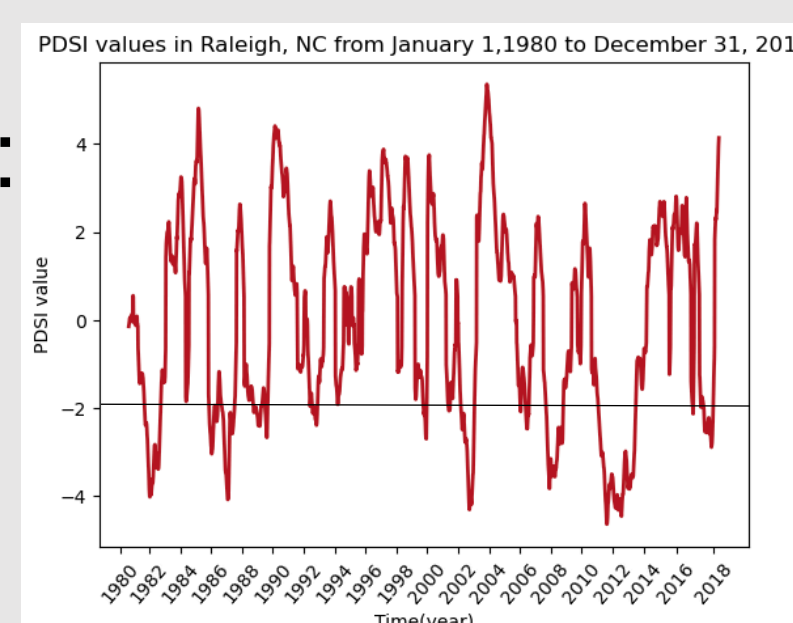
How do we study these different kinds of drought?

- Drought indices represent a departure from normal conditions
 - Negative values represent drought
 - Larger negative values represent more severe drought conditions
- Evaporative Demand Drought Index (EDDI)
 - Estimation of anomalous evaporative demand
- Palmer Drought Severity Index (PDSI)
 - Estimation of relative soil moisture conditions

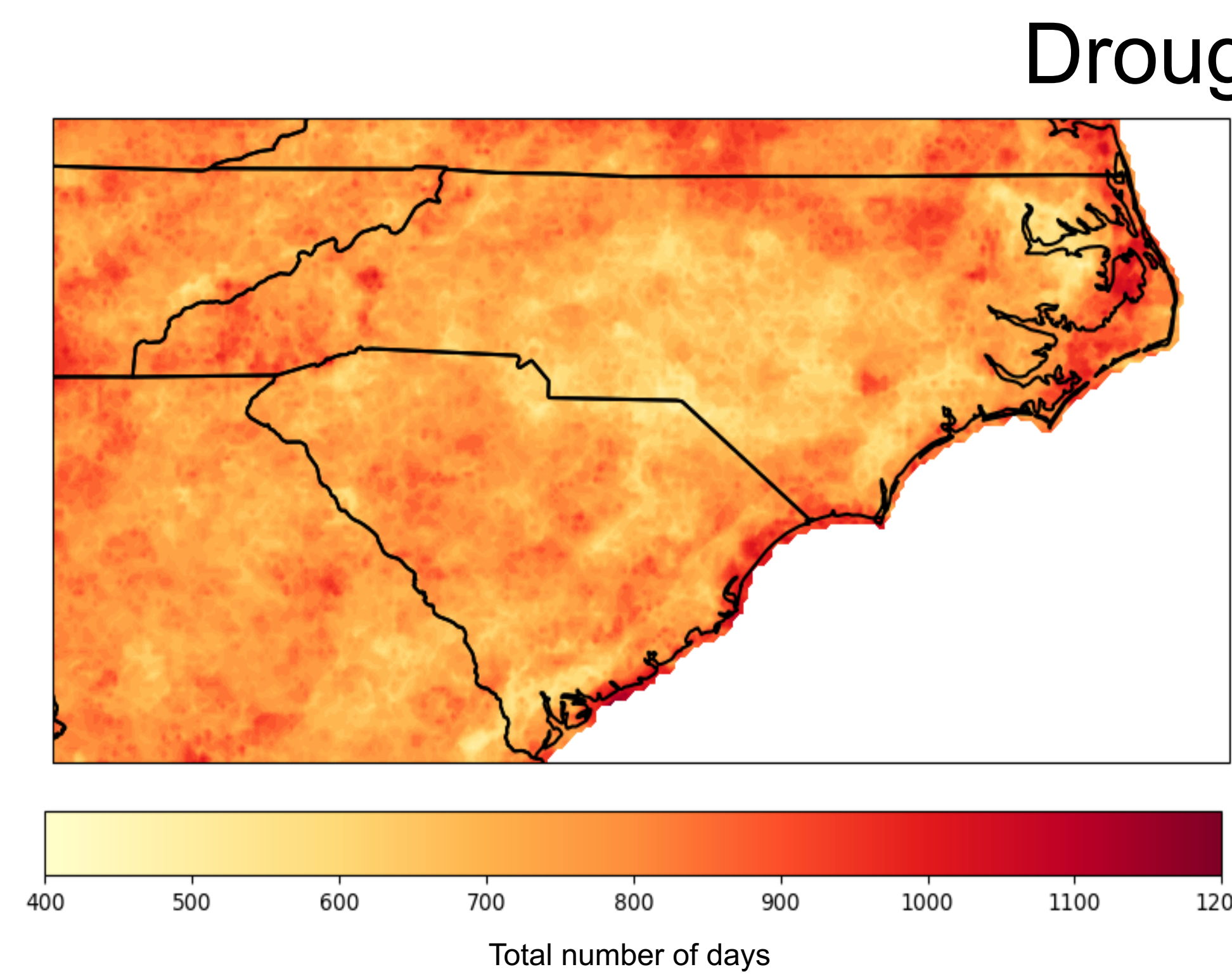
- Flash droughts are defined as:
 - EDDI values less than -1 lasting between 2 weeks and 2 months



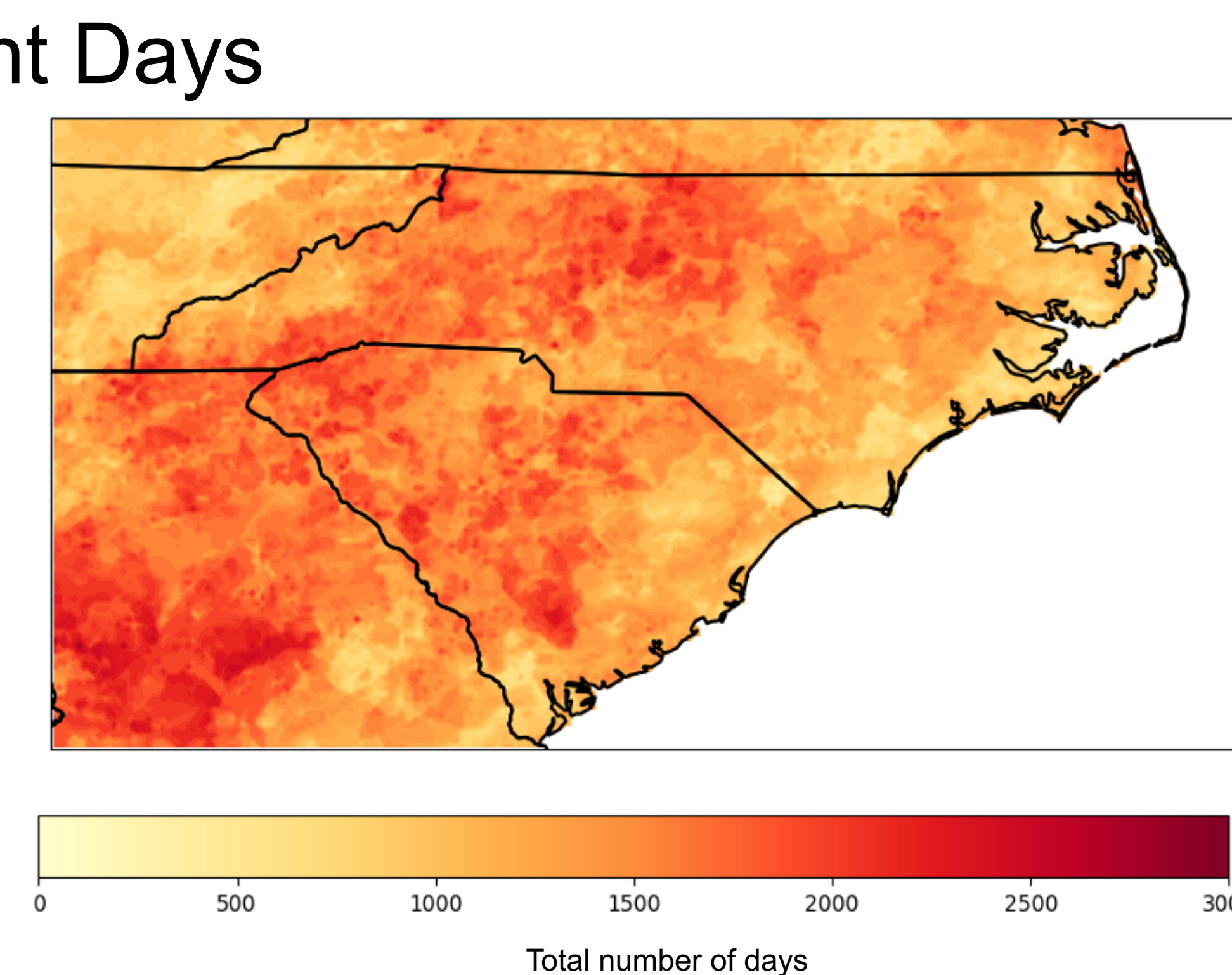
- Persistent droughts are defined as:
 - PDSI values less than -2 lasting between 2 weeks and 1 year



Flash Droughts

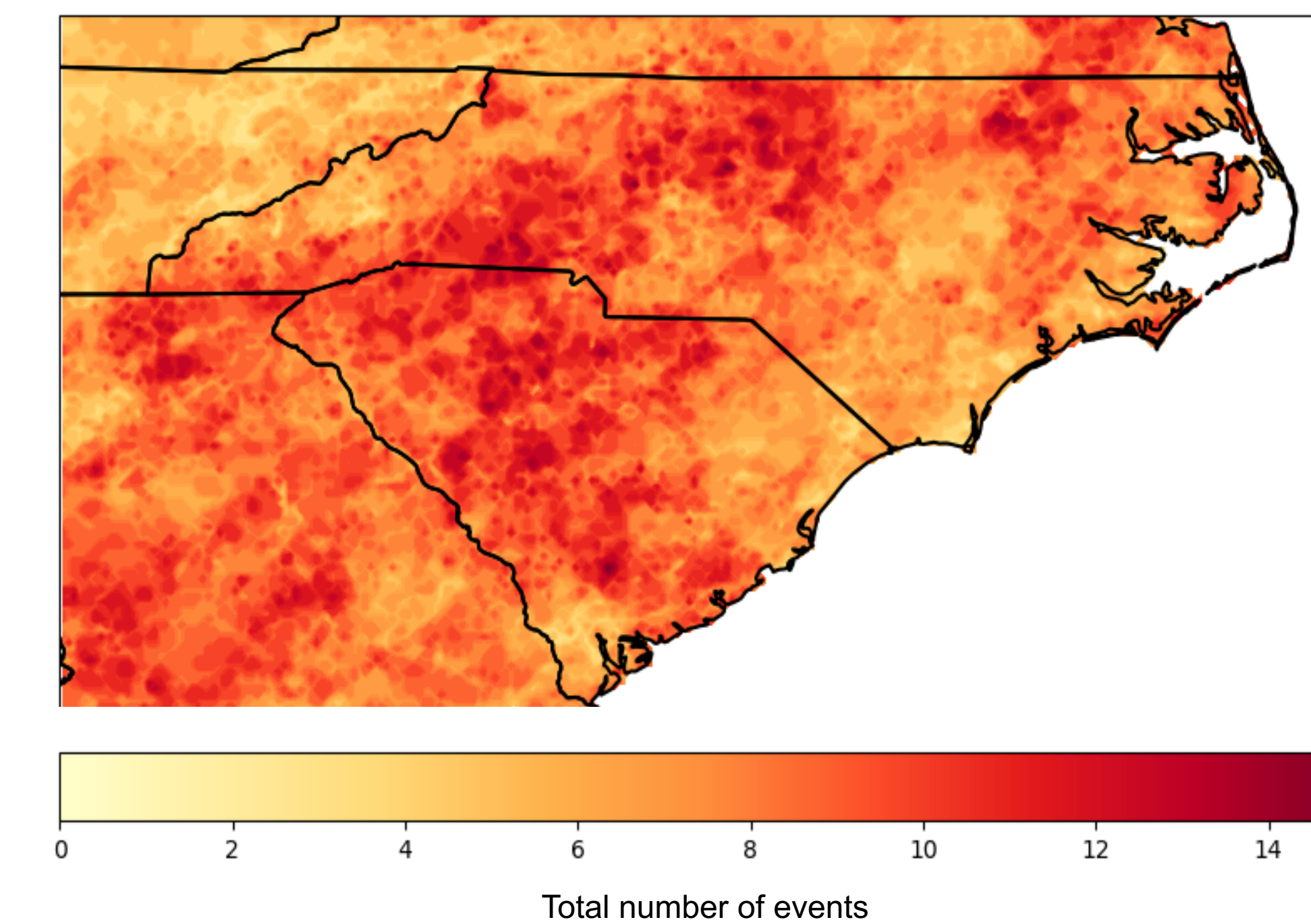
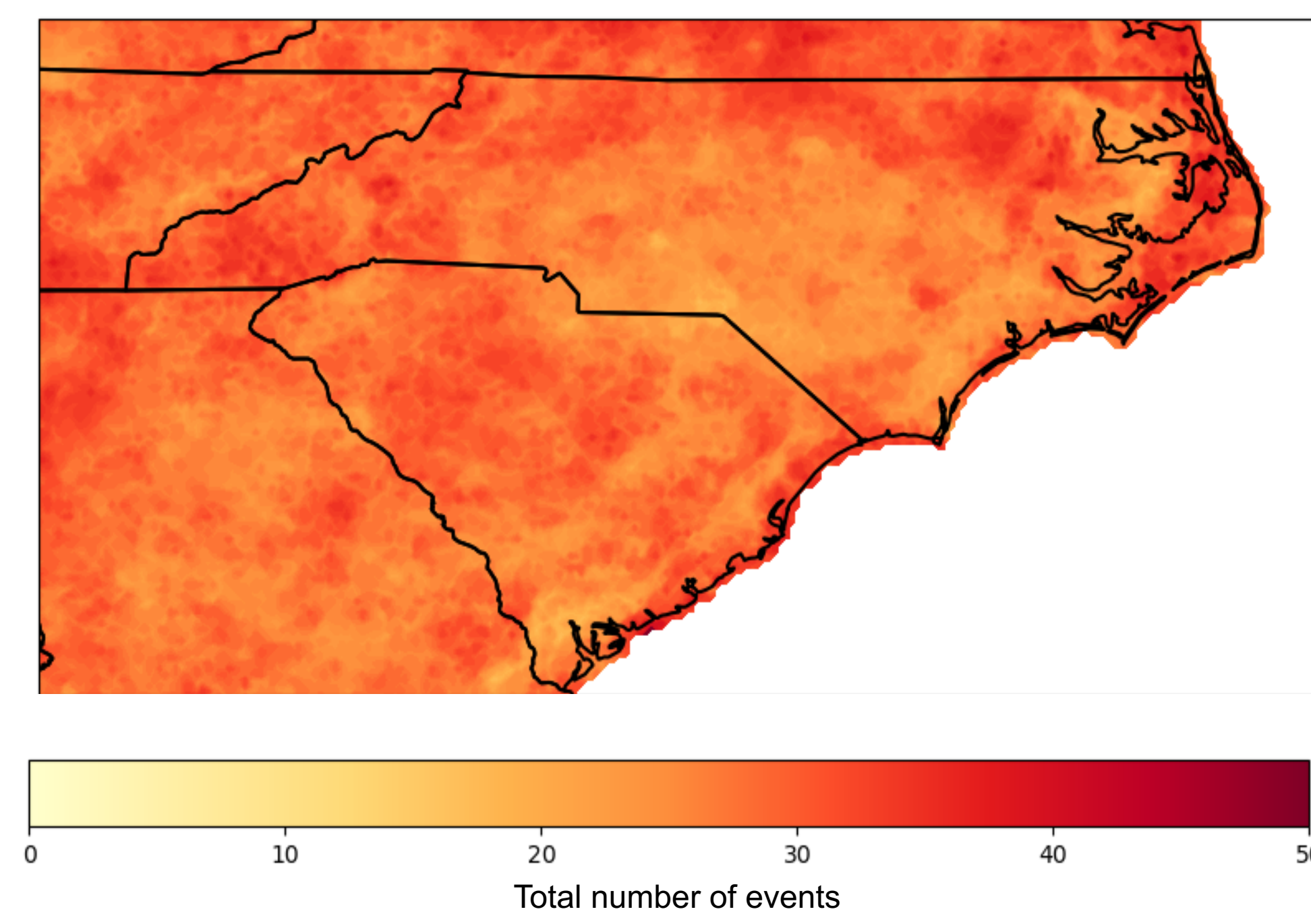


Persistent Droughts

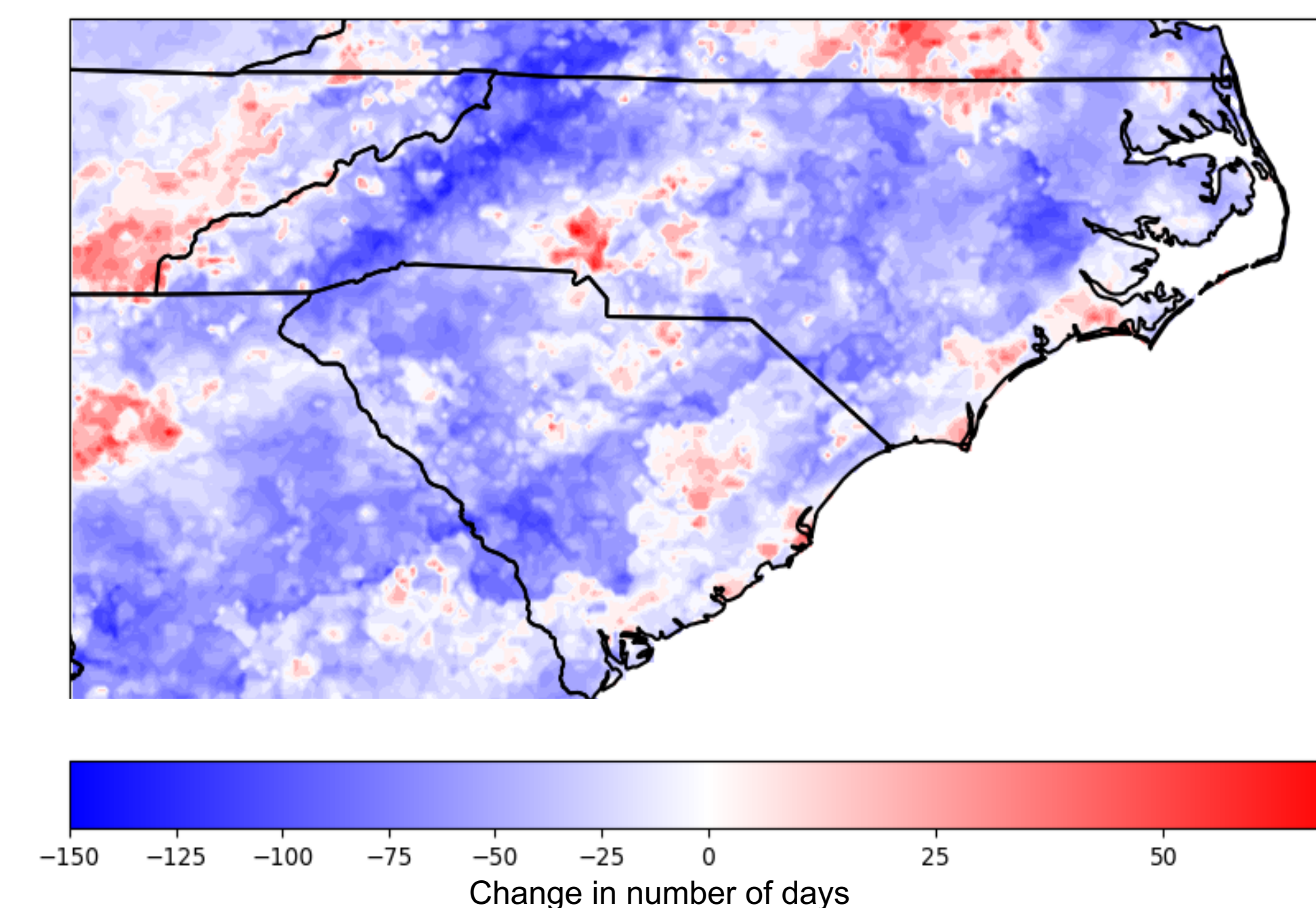
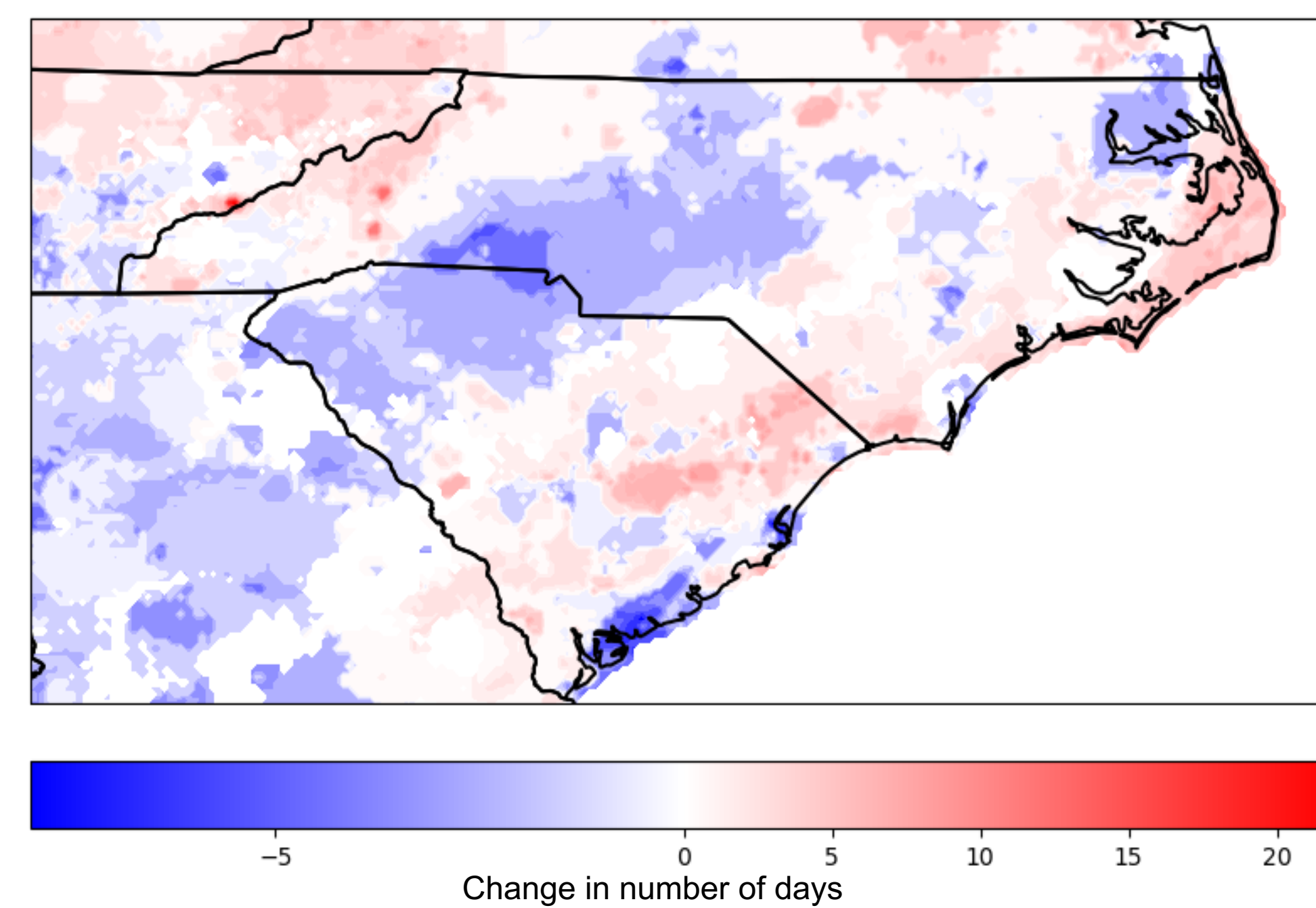


Drought Days

Drought Events



Trends from 1980-2018



Are there any differences in patterns of the drought types across the Carolinas?

- Flash droughts
 - High frequency of flash drought days along the coastlines
 - High occurrence of flash droughts mostly along coast lines
 - Small areas of high frequency in the Piedmont region
 - Positive trend of flash drought days along coast and in mountains
 - Negative trend of flash drought days in western Piedmont and small areas of coast
- Persistent droughts
 - High frequency of persistent drought days in the mountains
 - High occurrence of persistent drought events across the mountains and Piedmont region
 - Few high frequency locations along coast
 - Small areas of positive trends of persistent drought days in Piedmont and along coast
 - Negative trends in persistent drought days across majority of the region

Can Green Stormwater Infrastructure (GSI) aid in drought mitigation?

- GSI helps to replenish groundwater reserves by promoting infiltration into green spaces
- GSI can improve climate resilience to drought or water supply issues
- City of Raleigh Urban Heat Island project
 - Targeted towards using GSI to reduce UHI in disproportionately effected communities
 - Help to lessen increased temperature and insolation components of flash drought
 - Groundwater storage could provide short-term reserves for flash droughts

Could flash droughts impact the mariculture industry in the Carolinas?

- Flash drought occurrence in coastal regions area being analyzed to determine if drought could be a factor in mass mortality events experienced by oyster farmers
- Farmers have mentioned mass mortality events happening year round but mosbetween April – June
- Salinity is hypothesized to be tied to drought conditions

