Geospatial analysis of Oktibbeha County of Mississippi, USA

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Enter author note here.

The authors made the following contributions. Hafez Ahmad: Conceptualization, Writing - Original Draft Preparation, Writing - Review & Editing; Ernst-August Doelle: Writing - Review & Editing.

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Abstract

One or two sentences providing a **basic introduction** to the field, comprehensible to a scientist in any discipline.

Two to three sentences of **more detailed background**, comprehensible to scientists in related disciplines.

One sentence clearly stating the **general problem** being addressed by this particular study.

One sentence summarizing the main result (with the words “**here we show**” or their equivalent).

Two or three sentences explaining what the **main result** reveals in direct comparison to what was thought to be the case previously, or how the main result adds to previous knowledge.

One or two sentences to put the results into a more **general context**.

Two or three sentences to provide a **broader perspective**, readily comprehensible to a scientist in any discipline.

*Keywords:* keywords

*Word count:* X

Geospatial analysis of Oktibbeha County of Mississippi, USA

###we can use citation add symbol (Mukhopadhyay et al., 2018)

### 0.0.1 git ###initiate the upstream tracking of the project on the GitHub repo git remote add origin <https://github.com/hafez-ahmad/R-markdown-article-class.git>.

###pull all files from the GitHub repo (typically just readme, license, gitignore) git pull origin master/ main

###set up GitHub repo to track changes on local machine git push -u origin master

# 1 Introduction

we will write about vegetation, temperature and rainfall and a little bit demography

Monitoring vegetation over time is an essential component of geographical resource management applications. On-site monitoring is frequently carried out by taking detailed measurements, such as canopy level measurements. In situ measurements are time-consuming, labor-intensive, and difficult to carry out over large geographic areas. Remote sensing, on the other hand, is a very viable option for monitoring numerous vegetation characteristics using various vegetation indices such as Normalized Difference Vegetation Index, Near-Infrared / Red Ratio, Soil and atmospherically resistant vegetation index (Im & Jensen, 2008).

Land cover and land use analysis are critical for determining how people and local ecosystem services interact today and in the future. It serves as the foundation for a comprehensive analysis of the research topic(Mukhopadhyay et al., 2018).

# 2 Methods

## 2.1 Participants (First and Last name (Your email))

1. Hafez Ahmad ([ha@msstate.edu](mailto:ha@msstate.edu))

# 3 Material

## 3.1 Study area

### 3.1.1 we write about Oktibbeha county.

Oktibbeha County is a micropolitan county in east-central Mississippi that is home to Starkville city and Mississippi State University. The county is located within Mississippi’s golden triangle region. The name of the county is derived from a Native American term that means “bloody water” or “icy creek” (Gannett, 1902). According to the 2020 United States Census, the county had 51,788 people, 17,798 households, and 9,263 families.

## 3.2 Procedure

## 3.3 Vegetation and Landuse

Landsurface temperature was download from  
1. MOD11A2.006 Terra Land Surface Temperature and Emissivity 8-Day Global 1km

### 3.3.1 Data analysis.

We used R [Version 4.1.2; R Core Team (2021)] and the R-packages *dplyr* [Version 1.0.7; Wickham, François, Henry, and Müller (2021)], *forcats* [Version 0.5.1; Wickham (2021a)], *ggplot2* [Version 3.3.5; Wickham (2016)], *gridExtra* [Version 2.3; Auguie (2017)], *lattice* [Version 0.20.45; Sarkar (2008)], *papaja* [Version 0.1.0.9997; Aust and Barth (2020)], *purrr* [Version 0.3.4; Henry and Wickham (2020)], *raster* [Version 3.5.2; Hijmans (2021); Perpiñán and Hijmans (2021)], *rasterVis* [Version 0.51.0; Perpiñán and Hijmans (2021)], *readr* [Version 2.0.2; Wickham and Hester (2021)], *rgdal* [Version 1.5.27; Bivand, Keitt, and Rowlingson (2021)], *RStoolbox* [Version 0.2.6; Leutner, Horning, and Schwalb-Willmann (2019)], *sp* [Version 1.4.5; Pebesma and Bivand (2005)], *stringr* [Version 1.4.0; Wickham (2019)], *tibble* [Version 3.1.5; Müller and Wickham (2021)], *tidyr* [Version 1.1.4; Wickham (2021b)], and *tidyverse* [Version 1.3.1; Wickham et al. (2019)] for all our analyses.

## 3.4 Data preprocessing

## character(0)

## [1] "meta\_NA" "meta\_NA" "meta\_NA" "meta\_NA"

### 3.4.1 Radiometric calibration and Atmospheric Correction.

1. Conversion DN values to spectral radiance
2. Conversion of spectral radiance to reflectance

## 3.5 Statistical analysis

## 3.6 Land surface temperature and precipitation

## 3.7 Tests

# 4 Results

Table 1:

*Descriptive statistics of Land surface temperature*

| Mean | Median | Max | Min | SD |
| --- | --- | --- | --- | --- |
| 21.03 | 23.43 | 35.53 | -0.53 | 7.70 |

*Note.* MOD11A2.006 Terra Land Surface Temperature and Emissivity 8-Day Global 1km

# 5 Discussion

# 6 Conclusion

# 7 References

Auguie, B. (2017). *gridExtra: Miscellaneous functions for "grid" graphics*. Retrieved from <https://CRAN.R-project.org/package=gridExtra>

Aust, F., & Barth, M. (2020). *papaja: Create APA manuscripts with R Markdown*. Retrieved from <https://github.com/crsh/papaja>

Bivand, R., Keitt, T., & Rowlingson, B. (2021). *Rgdal: Bindings for the ’geospatial’ data abstraction library*. Retrieved from <https://CRAN.R-project.org/package=rgdal>

Gannett, H. (1902). The origin of certain place names in the state of mississippi. *Publications of the Mississippi Historical Society*, *6*, 339–349.

Henry, L., & Wickham, H. (2020). *Purrr: Functional programming tools*. Retrieved from <https://CRAN.R-project.org/package=purrr>

Hijmans, R. J. (2021). *Raster: Geographic data analysis and modeling*. Retrieved from <https://CRAN.R-project.org/package=raster>

Im, J., & Jensen, J. R. (2008). Hyperspectral remote sensing of vegetation. *Geography Compass*, *2*(6), 1943–1961.

Leutner, B., Horning, N., & Schwalb-Willmann, J. (2019). *RStoolbox: Tools for remote sensing data analysis*. Retrieved from <https://CRAN.R-project.org/package=RStoolbox>

Mukhopadhyay, A., Hornby, D. D., Hutton, C. W., Lázár, A. N., Amoako Johnson, F., & Ghosh, T. (2018). Land cover and land use analysis in coastal Bangladesh. *Ecosystem Services for Well-Being in Deltas: Integrated Assessment for Policy Analysis*, 367–381. <https://doi.org/10.1007/978-3-319-71093-8_20>

Müller, K., & Wickham, H. (2021). *Tibble: Simple data frames*. Retrieved from <https://CRAN.R-project.org/package=tibble>

Pebesma, E. J., & Bivand, R. S. (2005). Classes and methods for spatial data in R. *R News*, *5*(2), 9–13. Retrieved from <https://CRAN.R-project.org/doc/Rnews/>

Perpiñán, O., & Hijmans, R. (2021). *rasterVis*. Retrieved from <https://oscarperpinan.github.io/rastervis/>

R Core Team. (2021). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. Retrieved from <https://www.R-project.org/>

Sarkar, D. (2008). *Lattice: Multivariate data visualization with r*. New York: Springer. Retrieved from <http://lmdvr.r-forge.r-project.org>

Wickham, H. (2016). *ggplot2: Elegant graphics for data analysis*. Springer-Verlag New York. Retrieved from <https://ggplot2.tidyverse.org>

Wickham, H. (2019). *Stringr: Simple, consistent wrappers for common string operations*. Retrieved from <https://CRAN.R-project.org/package=stringr>

Wickham, H. (2021a). *Forcats: Tools for working with categorical variables (factors)*. Retrieved from <https://CRAN.R-project.org/package=forcats>

Wickham, H. (2021b). *Tidyr: Tidy messy data*. Retrieved from <https://CRAN.R-project.org/package=tidyr>

Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L. D., François, R., … Yutani, H. (2019). Welcome to the tidyverse. *Journal of Open Source Software*, *4*(43), 1686. <https://doi.org/10.21105/joss.01686>

Wickham, H., François, R., Henry, L., & Müller, K. (2021). *Dplyr: A grammar of data manipulation*. Retrieved from <https://CRAN.R-project.org/package=dplyr>

Wickham, H., & Hester, J. (2021). *Readr: Read rectangular text data*. Retrieved from <https://CRAN.R-project.org/package=readr>