



MISSISSIPPIVIEW 2019 - 2020

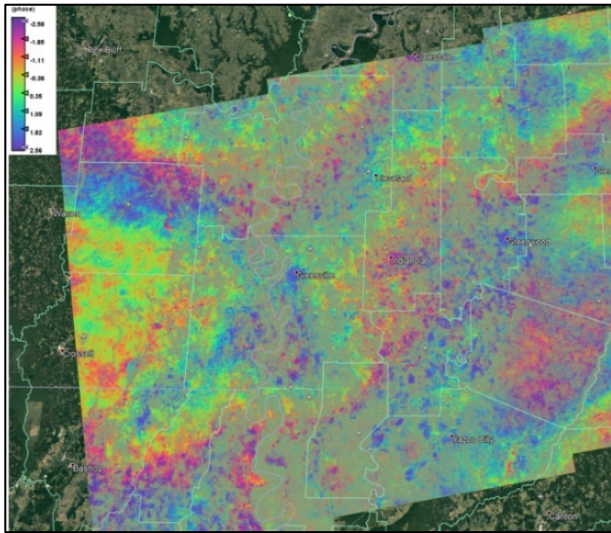


MISSISSIPPIVIEW 2019 - 2020 ACTIVITIES

MississippiView was established in 2003 and is led by the Mississippi Mineral Resources Institute (MMRI) at the University of Mississippi. We promote and facilitate geospatial data usage, research, and collaboration among the geospatial community in Mississippi while fostering national and international cooperation.

Our high impact activity (HIA) involved the use of satellite-based synthetic aperture radar (SAR) to detect and monitor ground surface subsidence. This activity brought a focus on the use of satellite data, processing software, and methods for elevation changes in the Lower Mississippi River Valley. Not only is radar data an excellent way to monitor flooding and the extent of inundation, but by comparing waveform data (interferometry) from two different dates, this data can also be used to detect elevation changes. This is important because changes in elevation can impact how well levees and floodwalls protect cities and other important infrastructure.

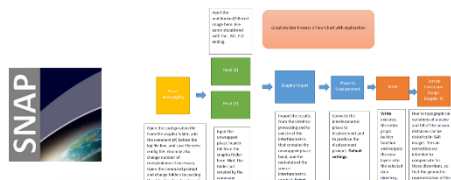
This HIA supported the research work of a geological engineering graduate student. A thesis was successfully completed, and results were distributed at conference and several local presentations.



Sentinel 1 satellite interferogram derived from Feb-March 2019 data of the Lower Mississippi River Valley. Very wet spring with significant flooding.



Methods- Unwrapped Phase Interferograms



Study Area

- The Mississippi River alluvial plain(MRAP), commonly called the "Delta", covers an area of 7,000 mi²
- Industry in area is composed predominantly of agriculture
 - Requires large amounts of water for irrigation
- Most irrigation water is pumped from the Mississippi River Alluvial Aquifer (MRAA)



Student presentation of the research results during annual meeting of the Association of Environmental Engineering Geologist (AEG) in September 2020.

In addition to active research, MississippiView is engaged in developing partnerships within the state to promote use of geoinformational data and tools. We have teamed with outreach efforts from the University of Mississippi's School of Engineering to provide spatial data and aerial imagery to support student groups at Rust College in Holly Springs, Mississippi—the state's oldest HBCU.



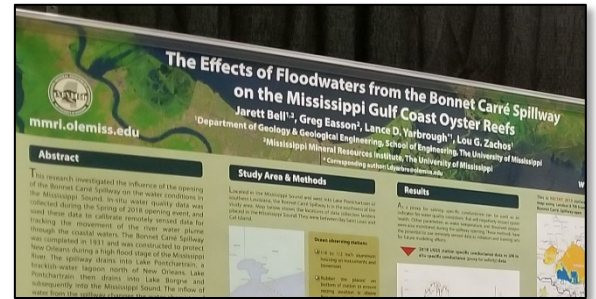
MississippiView is a member of the AmericaView Consortium, a nationally coordinated network of academic, agency, non-profit, and industry partners and cooperators that share the vision of promoting and supporting the use of remote sensing data and technology within each state. AmericaView is funded by USGS grant agreement G18AP00077.



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BENEFITS TO MISSISSIPPI

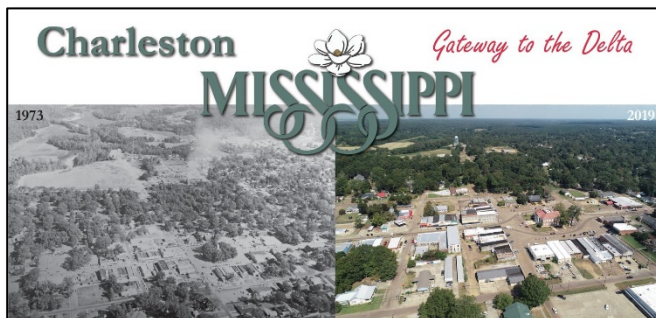
- Flooding and groundwater withdrawal are of utmost importance to the State of Mississippi. Monitoring these processes lead to a more effective response to a natural disaster and better management of a valuable resource.
- The state of Mississippi is susceptible to several geohazards including flooding, river/lake bank stability issues, regional and local subsidence, and expansive soils. Satellite-based radar products can provide valuable tools for the detection and monitoring of these geohazards.
- Seismic activity in the northern part of the state can induce liquefaction hazards. Groundwater withdrawal from shallow aquifers can, over a long period of time, produce damaging ground subsidence.
- Other projects that benefit the state include the use of satellite imagery to monitor habitat of gulf coast oysters. Oysters are an important resource to the Mississippi Gulf Coast. Landsat data is used to monitor water quality parameter such as turbidity, thermal and land use change in upland watersheds.
- The M-Partners is a program that connects University of Mississippi capabilities with the goals and needs of local communities. MississippiView has participated by collaborating with the leaders of Charleston, Mississippi. We provide geospatial and remote sensing data related to their economic development and policy, marketing and tourism, and resiliency efforts.



Student research poster presented the preliminary results of water quality monitoring of oyster reefs in the Mississippi Gulf Coast. PECORA 21 in Baltimore, Maryland in October 2019.



Monitoring water quality at depth using a custom-built sensor platform (PODs). After several weeks in the Mississippi Sound, the PODs are retrieved, analyzed, and compared to remotely sensed data.



Example product for our M-Partner community, Charleston, Mississippi. In addition to satellite imagery, Mayor Sedrick Smith requested digital restorations of several historical high-angle oblique photos and relevant updates.

Results from the research supporting our HIA and non-HIA was presented at:

- Terracina, Steven, L.D. Yarbrough, G. Easson, and B. A. Davis, 2020. Use of Synthetic Aperture Radar for Detecting Subsidence Features in the Lower Mississippi River Valley, Association of Environmental Engineering Geologist (AEG) News, (63) 4. in Program with Abstract 63rd Annual Meeting, 6–10 September 2020.
- Bell, Jarret, Greg Easson, Lance D. Yarbrough, and Lou G. Zachos, 2019. The Effects of Floodwaters from the Bonnet Carré Spillway on the Mississippi Gulf Coast Oyster Reefs, presented at Pecora 21-American Society for Photogrammetry and Remote Sensing and 38th International Symposium on Remote Sensing of Environment, October 6–11, Baltimore Marriott Waterfront, Baltimore, MD.

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