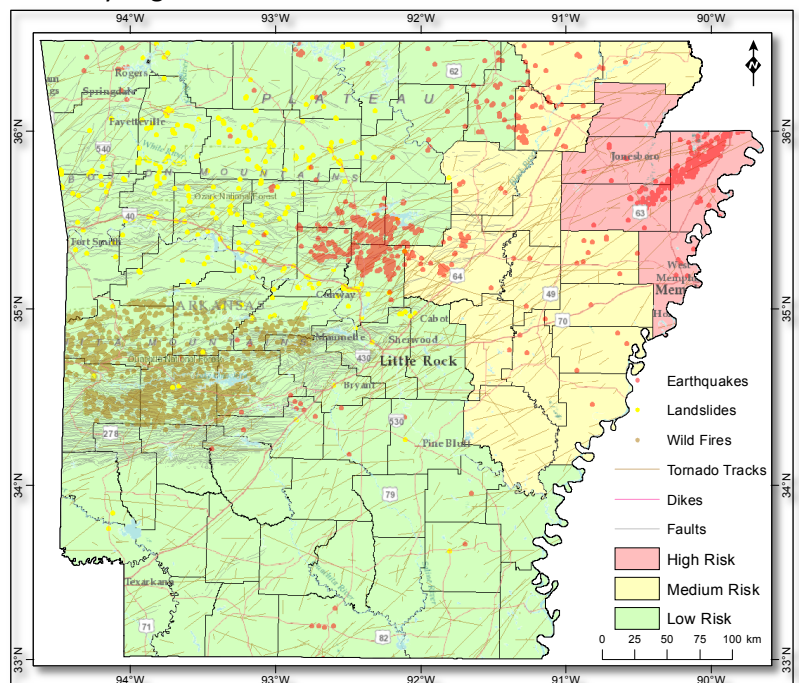


ARKANSASVIEW 2021 - 2022 ACTIVITIES

- In 2021 – 2022, ArkansasView focused on applied remote sensing to study geohazards in Arkansas. The StateView conducted a cost-effective Synthetic Aperture Radar Interferometry (InSAR) study for monitoring and modeling the spatial and the temporal patterns of crustal deformation to characterize its underlying causes in Central Arkansas. The atmospheric phase-delay was eliminated by applying a sequence of temporal and spatial filtering, and the digital elevation data acquired by the Shuttle Radar Topography Mission (SRTM) of 1-arc sec spatial resolution were used to model and remove the topographic contribution from the interferometric phase. The study area has moderate topography in some locations; thus, the altitude-dependent atmospheric phase delay was modeled and subtracted from the interferometric phase, as well, to produce high precise crustal deformation maps.
- This multi-sensor InSAR study included data acquired with different radar geometries at the C- and L-bands. C-band data have a short wavelength, which enabled detection of slow Earth’s surface motions in major cities due to natural and anthropogenic processes. L-band polarimetric data have a longer wavelength, which make them less sensitive to the atmospheric variations compared to C-band data. Due to their relatively long wavelength, L-band data captured details of deformation in densely vegetated areas. The use of L-band data to monitor crustal deformation in Arkansas demonstrates the potential for NASA’s NISAR planned L-/S-band mission to monitor Earth’s surface motions in densely vegetated areas.
- The StateView created two StoryMaps: one focused on “Sensors” (<https://tinyurl.com/mswp2mw6>) and the other one highlighted the “Remote Sensing Research” (<https://tinyurl.com/bdhujpk4>) within ArkansasView, which allows sharing experience with all other StateViews participating in the AmericaView consortium.
- The ArkansasView director, Dr. Mohamed Aly, co-chaired the Geological Society of America (GSA) 2021 NC/SC Joint Section Meeting and served as an at-large faculty advisor to the Geosciences GeoHog Conference, held at the University of Arkansas in 2022.

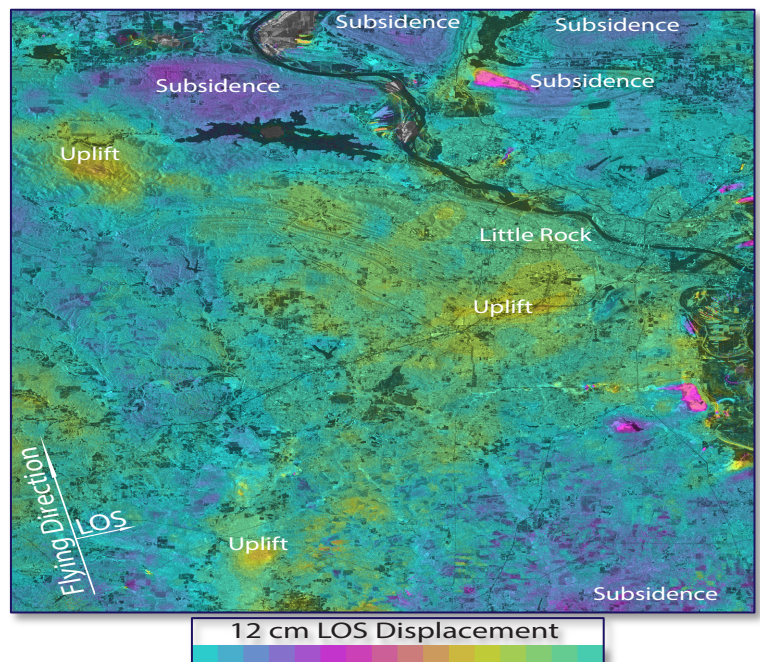


Location map of major features and geohazards in Arkansas. It shows rates of seismic risk across the state, estimated by USGS based on only earthquake activity in the New Madrid Fault Zone. Small red dots represent recent earthquakes. The major fault systems, dikes, tracks of recent tornados, and locations of documented active landslides and common wildfire events are also represented as indicated in the legend.

BENEFITS TO ARKANSASVIEW

- This pioneer interferometric study addressed the contemporary strain accumulation due to recent seismic activities and investigated ground stability in Little Rock and its surroundings; therefore, the study outcomes are anticipated to help the decision-makers in determining if remedial actions should be taken to prevent broad structural damage in the study area. Furthermore, the study outcomes will support the sustainable development in Arkansas, which demonstrates the value of geodetic research for societal benefits.
- Three ArkansasView graduate students at the University of Arkansas were trained as summer interns: two of them (Rasool Vahid, a PhD student in Environmental Dynamics, and Mahmud Afroz, an MS student in Geography) were partially funded by ArkansasView and had the opportunity to promote their research and remote sensing skills. The third graduate student (Travis Tipton, an MS student in Geology) had an internship fully sponsored by the Arkansas Geological Survey (AGS) to study active landslides in Arkansas. His summer internship was supervised by Martha Kopper, the Geohazard Section Supervisor at AGS. This extended the collaboration ties with AGS and provided Travis with the opportunity to continue studying active landslides in his MS degree using advanced machine learning techniques under the supervision of Dr. Mohamed Aly.
- The StateView PI, Dr. Aly, taught a couple of online Global Campus classes focused on geospatial technologies, which allowed him to communicate his remote sensing experience to a boarder range of off-campus students from the industry and other academic institutions across the entire State of Arkansas. Such courses help prepare the next generation of researchers, scientists, and educators.

Ground motions (color fringes) in central Arkansas and its surroundings draped over the amplitude image (grey scale). Each color cycle indicates 12 cm of displacement in the satellite line-of-sight (LOS) over the three-year period of this study.



ARKANSASVIEW CONSORTIUM MEMBERSHIP



Federal consortium members identified above do not receive funding from AmericaView.

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