

# AN ANALYSIS OF SUBSIDENCE PATTERNS IN COASTAL LOUISIANA AS A RESULT OF SEASONAL WATER LOADING

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Coastal Louisiana experiences some of the most severe subsidence in the Gulf Coast, which is an ever-present concern in coastal preservation efforts. The primary goal of this project is to evaluate the influence of seasonal water loading on vertical subsidence patterns in this area. We examine daily vertical position data at over 50 CORS GPS stations throughout central and coastal Louisiana. We find there is a notable seasonal fluctuation displayed at many of the GPS stations in the region. To quantify this signal, the time series of daily GPS data was detrended and smoothed to reduce noise and highlight seasonal fluctuations. The majority of stations closer to the coastline indicate a seasonal fluctuation greater than 10mm, while some of the vertical position data in central Louisiana displays a near-zero seasonal fluctuation. We expect that this is due to an elastic crustal response to the changes in surface water loading at different times of the year. To test this hypothesis, we compare the seasonal vertical GPS displacements with stream gauge data from CRMS stations along the Louisiana coast and USGS stream gauge data in central Louisiana. Preliminary analyses suggest a relationship between surface water loads and seasonal subsidence fluctuations in the Mississippi River Delta region. This analysis is the first step toward refining a 4-D spatiotemporal loading model of seasonal subsidence, with implications for an enhanced understanding of subsidence processes across coastal Louisiana and improved interpretation of campaign subsidence observations.

## Biography:

Jesse Pfadenhauer received his Bachelors of Science at the University of Southern Mississippi studying geology and physics. He is currently a Master's candidate at LSU's Department of Geology and Geophysics. He aims to pursue a career in the federal sector upon graduation in 2019, and has recently started an internship at the Baton Rouge USGS office in order to gain experience. His main areas of interest include coastal geomorphology and hydrology, which has fueled his interest for his current research project.