



GEOGULF2021

A U S T I N
October 27–29, 2021



Study of Subsidence in North and West Harris County, Texas

A. A. Tello-Alvarado and S. D. Khan

ABSTRACT

Subsidence, the sinking of the ground due to underground movement, has been occurring in the north and west areas of Harris County, Texas, USA. In Harris County, subsidence is primarily from groundwater extraction from the Chicot and Evangeline aquifers. Other factors such as faults and petroleum extraction in the Harris County area may affect the land subsidence. This work uses multi-temporal interferometric synthetic aperture radar (InSAR) from 2016 to 2019 and GPS data to measure ground deformation and map subsidence rates. For the InSAR images, all four years had subsidence rates of around 2 cm/yr on the north and west sides of Harris County. In these same areas, the GPS stations recorded yearly subsidence rates of approximately 1 to 2 cm. One station in southeast Harris County recorded subsidence rates of 0.02 to 0.45 cm/yr. These rates were then compared to the Evangeline and Chicot aquifers' water levels and the locations of faults and oil and gas wells. Subsidence rates in the north to west Harris County have continued to stay relatively high in recent years compared to the rest of the County, especially Galveston County. The petroleum extraction and fault movement's effects on subsidence in Harris County appear to have a minor impact on overall subsidence. Hot spots and cold spots with the groundwater levels arise throughout the years. Tracking these areas will assist in monitoring locations where subsidence would occur from intense groundwater extraction.

NOTES
