



Land Subsidence and Groundwater Pumping in Montgomery County, Texas, U.S.: 2000–2020

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ABSTRACT

Groundwater-withdrawal-induced land subsidence has been a big concern in Montgomery County, Texas, USA, since the 2000s. As of 2020, approximately half of the entire county is experiencing subsidence over 5 mm/yr. This study aims to investigate ongoing land subsidence in Montgomery County associated with sediment compactions in the Evangeline and Jasper aquifers, using publicly-available groundwater-level, extensometer, and GPS datasets. According to this study, land subsidence in Montgomery County since the mid-2000s is primarily contributed by sediment compaction in the Evangeline and Jasper aquifers; the compaction of Jasper aquifer contributes approximately one-third of the land subsidence from the mid-2000s to mid-2010s; the pre-consolidation heads of the Chicot, Evangeline, and Jasper aquifers in Montgomery County are approximately 15 m to 25 m below mean sea level; the virgin-compaction/head-decline ratio is approximately 1:250 in the Evangeline aquifer and 1:800 in the Jasper aquifer in central and southern Montgomery County. As of 2020, the Jasper groundwater-level altitude is approximately 20 m to 40 m below the pre-consolidation head in the central and southern Montgomery County; the Evangeline groundwater-level altitude is about 40 to 60 m below the pre-consolidation head. Land subsidence will continue to occur as long as the groundwater-level altitude in either the Evangeline or the Jasper aquifer remains below the pre-consolidation head.

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