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Morphometric analysis of the terrain over time to characterize subsidence. Case study: Mexico City, Mexico.

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It is well known that groundwater overexploitation can generate land subsidence due to the compaction of compressible aquitards. Mexico City's soils are an important example of highly compressible lake sediments in compaction due to groundwater extraction that have significantly damaged the urban and commercial building structures. Previous studies indicate that there is annual subsidence of 15 to 25 cm in the Mexico City International Airport, 10 cm in downtown, and between 10 to 15 cm in the Southeast Mexico City area. Soil fracturing is an indicator of differential subsidence that has damaged buildings and infrastructure, including hydraulic pipes, sidewalks, and pavements. For this reason, it is necessary to carry out specific studies related to topographic deformation. This talk presents a characterization of the terrain changes over time and a zoning map for Mexico City subsidence susceptibility. To this end, free access elevation models generated from 2000 to 2018 by different sensors and methodologies were compared. The resulting model is validated by mapping information from active GPS stations, whose data is also freely available. Besides, a spatial comparison of land subsidence areas and sites previously identified as flooding and aquifer overexploitation areas is presented. The results will serve as a basis for future monitoring to be carried out in the area with high-resolution tools.