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Analysis of sinkhole distribution in the Tampa Bay area, Hillsborough County, Florida

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Sinkhole formation in Florida is a common event. The Florida karst plain is significantly altered by human development and sinkholes cause considerable property damage throughout much of the state. Within the framework of a research project aimed at evaluation of the sinkhole risk in the Tampa Bay area, we present in this paper the first results derived from morphometric analysis of karst depressions and their relation with the known distribution of sinkholes. We selected the Tampa Bay area because it is particularly susceptible to the evolution of karst depressions in relation with development of the built-up environment. Karst depressions were mapped from the 1:24,000 USGS topographic maps and a morphometric analysis was performed by using parameters such as shape, circularity index, perimeter, area, length, width, and orientation. Maps showing the distribution of depression density, and the sectors with greatest areas of karst depression were produced using a GIS. These results were compared with data compiled from the database of sinkhole occurrences in Florida maintained by the Florida Geological Survey and a database of notable sinkhole occurrences identified in a Lexus/Nexus database search. Our analysis demonstrates that the distribution of new sinkhole occurrences differs from the distribution of existing sinkholes, indicating that there are human factors that are influencing the current processes that drive karst landscape formation.