



## Basin Tectonics and Harvey Flooding

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### ABSTRACT

This session on Harvey is not because we live on a coastal plain and it rains a lot. It is being held because it is not that simple. Causes and mitigations of flooding are complicated and difficult. We should endeavor to understand the problems and explore solutions. Our first problem is the geology, which has dealt us a bad hand. Very simply, salt and depositional tectonics have rotated the tilt (drainage) some 90 degrees, since the Pleistocene, from east to south across much of the central Houston Salt Dome Basin, which includes the Houston area.

Principal drainage for the Houston area is to the east toward Trinity Bay, when the general basin tilt is shifting to the south. Trinity Bay is a major salt withdrawal basin. It is a tectonic feature, not erosional. This can be seen in the subsurface evidence, but is clearly demonstrated in the surface evidence. From the end of the Pleistocene the influence of the bay has waned and the impact of the overriding depositional tectonics has been more effective in changing basin tilt toward the Gulf of Mexico. In other words, the principal drainage goes eastward into Trinity Bay, when the water has increasing desire to go south toward the Gulf of Mexico.

This problem of tectonics is only the beginning. Houston sits of a coastal plain with around one degree of tilt, with is flatter than the average dining room table. Spilling a glass of water on a table may give one a good idea of Houston flooding. Continuing, the area has experienced high and low stand Pleistocene glacial epochs, which has sculpted the geomorphology and further complicated drainage patterns.

Houston probably has hundreds of active depositional faults, which have affected drainage patterns. Cultural development and population density across the entire area have greatly modified drainage. Lastly, groundwater withdrawal has added another layer of subsidence complexity upon the existing tectonic subsidence. We must put all this together to understand flooding in the Houston area, from the regional causes to the local solutions.