

Researcher finds human activity muddies causes of Texas floods

August 8 2013, by Gary Galluzzo

Periodic flooding in Texas—one the most flood-prone states in the nation—cannot be firmly linked to climate change due to numerous dams and other manmade structures introduced over the years, according to a University of Iowa study.

The researchers also found that [tropical cyclones](#) are less responsible for major floods in the region than in the eastern United States.

The study, which looked at 70 years of records, appears in the August 2013 issue of the *Journal of the American Water Resources Association*.

Lead author Gabriele Villarini, assistant professor in the Department of Civil and Environmental Engineering and assistant research engineer at IIHR-Hydroscience & Engineering, indicates that although the problem is severe, the causes of Texas flooding are less clear.

"In this study, we examined the time series of the largest flood peaks every year from 62 stations in Texas with a record of at least 70 years," he says. "We were interested in examining whether flood magnitudes changed during the study period and, if so, what was the cause of these changes.

"We found that most of the changes we detected were related to human modification of the catchments and more specifically to river regulation."

He points out that there are more than 7,100 permitted dams in Texas, with some 2,000 of them designed for flood control.

"We also examined the link between flooding and tropical cyclones. Tropical cyclones are an important flood agent with regionally varying effects. However, they are not associated with the largest flood events to the same degree we found for the eastern United States," he says.

Historically, Texas experiences frequent flooding, resulting in numerous fatalities and extensive property damage. In fact, Villarini says, studies show that Texas led the nation in flood-related injuries and fatalities during the period from 1959 through 2005 and that Texas is the only state with fatalities occurring every year from 1960 through 2002.

But surprisingly, there are relatively few studies of Texas flooding focused on the long-term changes in hazardous flooding.

"Despite the large economic and societal impacts of flooding, there are few studies focusing on changes in annual maximum [flood](#) peak distribution in Texas. This is particularly important because of the possible acceleration of the hydrological cycle associated with human-induced [climate change](#), which could potentially result in an increase of floods," he says.

Villarini says that two of his future studies will also focus on flooding and tropical cyclones and their economic impact on the continental United States.

His colleague in the study, James A. Smith, is a professor in the Department of Civil and Environmental Engineering at Princeton University.

More information: The paper is titled "Flooding in Texas:

Examination of Temporal Changes and Impacts of Tropical Cyclones."
[DOI: 10.1111/jawr.12042](https://doi.org/10.1111/jawr.12042)

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