Florida's Annual Expected Property Losses from Tornadoes

James Elsner, Emily Ryan, Georgiana Strode, and Victor Mesev

Florida State University, Tallahassee, Florida, United States (jelsner@fsu.edu)

Although known for it's hurricanes, Florida sees significant property losses every year from tornadoes. Property losses vary widely depending on location, strength, and size of the tornado strike. This variability along with large changes in structural property values over time make it difficult to use historical losses to estimate future losses. In this study annual expected property losses from tornadoes in Florida is estimated by combining a one km spatial grid of structural values from the Department of Revenue's 2014 cadastral database, a regression model for losses, and a geometric model for historical tornado events. There are 91,180 cells with at least some structural value. Total and residential structural values are $942 billion (USD) and $619 billion, respectively. Over the period 1950 through 2015 there were 3,429 individual tornado reports with a peak frequency during July. We estimate the annual statewide total and residential structural property exposure to tornadoes at $171 million and $103 million, respectively with the largest exposures during April. We find that a doubling of the residential exposure increases actual recorded losses by 31% since 2007 and a doubling of non-residential exposure increases losses by 24% controlling for changes over time. Results from a Monte Carlo algorithm that randomly permutes the historical tornado paths indicate a 5% chance that the annual loss will exceed $110 million and a 1% chance that it will exceed $257 million. These findings should be of wide interest to the property insurance and reinsurance industries for helping them gauge the risk of losses and prioritize management actions.