**Abstract**

**Background:** Tropical cyclone epidemiology can be advanced through exposure assessment methods that are comprehensive and consistent across space and time, as these facilitate multi-year, multi-storm studies. Further, an understanding of patterns in and between exposure metrics that are based on specific hazards of the storm can help in designing tropical cyclone epidemiologic research.   
**Objectives:** (1) Provide an open-source dataset for tropical cyclone exposure assessment for epidemiologic research and (2) investigate patterns and agreement between county-level assessments of tropical cyclone exposure based on different storm hazards.   
**Methods:** We created an open-source dataset with data at the county level on exposure to four tropical cyclone hazards: peak sustained wind, rainfall, flooding, and tornadoes. The data cover all eastern United States (US) counties for all land-falling or near-land Atlantic basin storms, covering 1996–2011 for all metrics and up to 1988–2018 for specific metrics. We validated measurements against other data sources and investigated patterns and agreement among binary exposure classifications based on these metrics, as well as compared them to use of distance from the storm’s track, which has been used as a proxy for exposure in some epidemiologic studies.

**Results:** Our open-source dataset was typically consistent with data from other sources, and we present and discuss areas of disagreement and other caveats. Over the study period and area, tropical cyclones typically brought different hazards to different counties. Therefore, when comparing exposure assessment between different hazard-specific metrics, agreement was usually low, as it also was when comparing exposure assessment based on a distance-based proxy measurement and any of the hazard-specific metrics.

**Discussion:** Our results provide a multi-hazard dataset that can be leveraged for epidemiologic re- search on tropical cyclones, as well as insights that can inform the design and analysis for tropical cyclone epidemiologic research.