Dr. Brooke Anderson & Matthew Hughes

Tropical cyclones create enormous destruction in the Southeastern United States in the form of property damage, economic disruption, and human health. Building resilient communities that can adapt to this threat requires good data on both physical exposures, and human impacts. Plenty of data exists on both physical exposures and human impacts, but it is often at different spatial and temporal resolutions. When researchers study the economic, social, and health impacts that tropical cyclones have on populations, it is important to select an appropriate spatial and temporal scale in order to adequately classify exposure. Mismatches in the spatial and temporal scale of exposure data versus outcome data creates challenges when measuring and inferring associations between tropical cyclone exposures and human impacts. This is a problem because it gives an inaccurate picture of how communities and individuals’ health are impacted by these storms. Two potential implications of this mismatching are that it can introduce bias in estimated associations and that it can reduce precision in estimates of those associations. Here we explore cases and implications of integrating data at different temporal and spatial scales, focusing as an example on human impact studies of tropical cyclones in the US. We begin by investigating the reasons that spatial and temporal misalignment exist in the study of tropical cyclones. We then describe the main spatial and temporal scales used, and finally assess some of the consequences that result from integrating physical exposure data with human impacts data.