MEASURING HURRICANE MARIA'S IMPACTS AND RECOVERY REMOTELY WITH BLUE-ROOF-TARPS AND NIGHTTIME LIGHTS THROUGHOUT PUERTO RICO

Yesenia Marie Rivera-López[1,2], Ernesto Rodríguez-Fernández[3], and David Lagomasino[4]

[1]University of Puerto Rico – Mayagüez Campus,
[2]NOAA EPP/MSI Scholar
[3]National Weather Service
[4]Coastal Studies Institute, East Carolina University – Outer Banks Campus

yesenia.rivera7@upr/yesenia.rivera-lopez@noaa.gov

On an island experiencing threatening hurricanes, earthquakes, and intermittent blackouts, it is imperative to increase systems' resilience and identify vulnerable communities. Therefore, it is critical to evaluate the recovery efforts on infrastructure and public services after Hurricane Maria's landfall in Puerto Rico as a category 4 hurricane. Through this study, we address restoration processes by quantifying Hurricane Maria's damages to infrastructure. We expect to determine that Puerto Rico's orography induces an extremely slow restoration process in municipalities with large hilly areas compared to metro municipalities like San Juan, the capital. Due to this, the lack of accessibility to alternate routes contributes to limitations in acquiring resources. Not all evidence of damage to communities can be observed from space. Still, certain markers stand out as likely candidates for rapid assessment of the scale of hurricane damage and relief efforts, such as the recovery of the electric grid. In addition, due to the rarity of blue features in satellite data over land, the blue-roof-tarps distributed by FEMA officials following hurricane damages are spatially and temporally unique in the satellite data record. Recovery responses were quantified through high-resolution airborne (<1m) and satellite imagery by assessing nightlights, infrastructure damages, and socio-economics processes, using free-available data from NOAA, ESA, NASA, and US Census. As a result, we found that roughly 90% of the island's electric grid was restored by early March (2018), and 901 buildings (out of 14,111) installed a blue tarp 75-days after Maria.