Hurricane Activity Linked to Fertilization of Coastal Mangroves

Though hurricanes can wreak havoc on coastal ecosystems and native species, there are benefits of these storms coming ashore. Recently, a publication in Proceedings of the National Academy of Sciences (PNAS) found evidence of soil nutrients increasing after a hurricane makes landfall in the Gulf of Mexico (Florida Everglades) and supplying the much-needed fuel to aid in the regrowth of mangrove forests. Researchers found and attributed landfalling hurricanes to a net increase in elevation, which can offset the effects of sea level rise in regions along the U.S. coast, Gulf of Mexico and Caribbean.

Mangrove forests in this region are critical for the sustainability of local species of economic importance, including the provision of a protective barrier from a hurricane's damaging winds and floodwaters. For these mangroves to survive and regenerate after a storm, it requires certain soil nutrients to be present such as phosphorous. Naturally, the amount of phosphorous available in the Florida Everglades is much less than other places, such as coastal Louisiana, due to its lack of a constant source depositing this nutrient in the soil. For the Florida Everglades, hurricanes are the main source of these specific nutrients, as hurricanes have the ability to remove and transport sediments and absorbed nutrients from nearby coastal waters and deposit these critical components on land.

The lack of natural nutrients in this region led researchers to analyze concentrations of nutrients in the soil from 2004-2018 and compare it to the deposits left after Hurricane Irma (2017) and Wilma (2005). Researchers found these nutrient rich soils extended up to 6-miles inland and contributed to an increase of soil elevation, far exceeding the normal amount of elevation experienced by these mangrove forests. Both the elevation and soil nutrient concentration gains contribute to the regeneration of mangroves and the natural resiliency of these coastal ecosystems to sea level rise.

The full article can be read here.