El Niños and La Niñas as a Function of Observed and Projected Sea Surface Temperatures

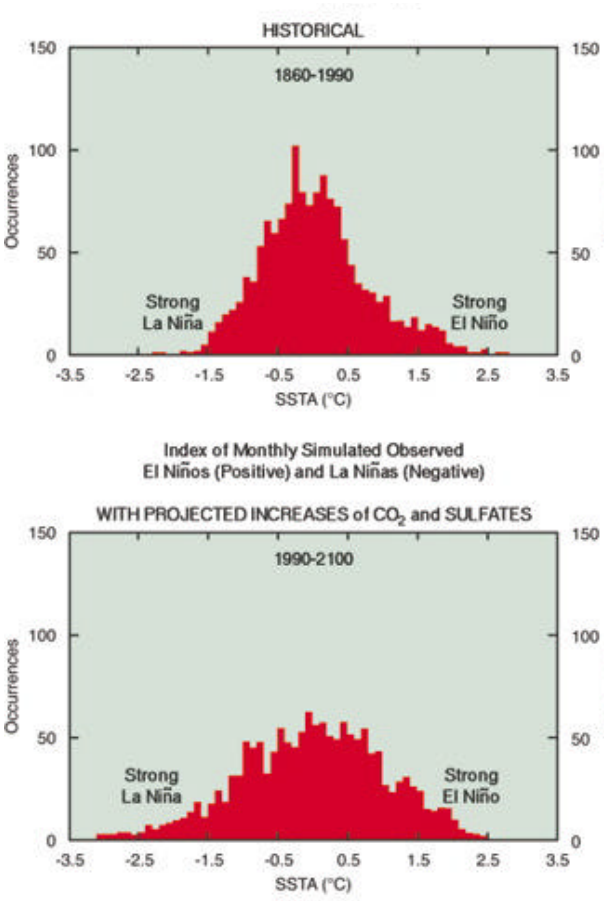

Figure 2. These model projections suggest stronger and more frequent El Niños and La Niñas as a result of climate change. Sea Surface temperature anomalies (SSTA) in the equatorial Pacific are used to measure the strength of El Niños and La Niñas. These model projections by the Max Planck Institute suggest a wider range of SST deviations from normal and thus more extreme El Niños and La Niñas in the future. The high bars in the center are occurrences of normal SSTs. In the projections in the bottom graph, these normal temperatures occur less frequently, while lower (La Niña) and higher (El Niño) SSTs occur more frequently. The Max Planck model is used here because it has been able to reproduce the strength of these events better than other models due to its physics and ability to resolve fine scale structure in the ocean. Source: Timmermann et al., 1999

Freshwater Lens Effect in Island Hydrology

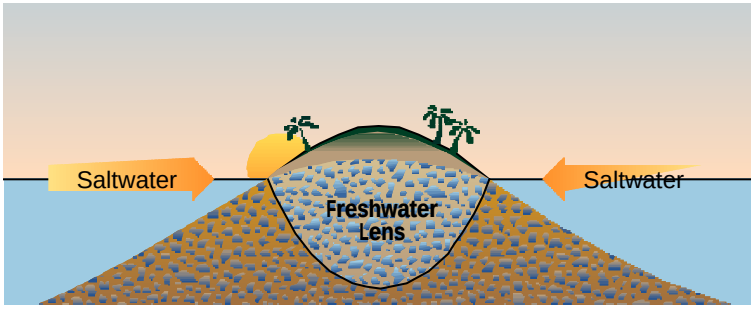

Figure 3. On many islands, the underground pool of freshwater that takes the shape of a lens is a critical water source. The freshwater lens floats atop salt water. If sea level increases, and/or if the lens becomes depleted because of excess withdrawals, salt water from the sea can intrude, making the water unsuitable for many uses. The size of the lens is directly related to the size of the island: larger islands have lenses that are less vulnerable to tidal mixing and have enough storage for withdrawals. Smaller island freshwater lenses shrink during prolonged periods of low rainfall, and water quality is easily impaired by mixing with salt water. Short and light rainfall contributes little to recharge of these sources. Long periods of rainfall are needed to provide adequate recharge. Source: Illustration by Melody Warford.

Path of Hurricane Georges in Relation to Puerto Rico with Precipitation Totals

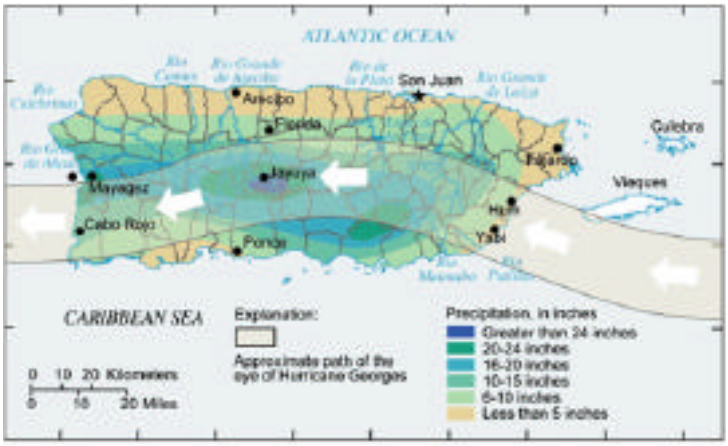

Figure 4. On September 21, 1998, Hurricane Georges swept across Puerto Rico. The eye of the hurricane was 25-30 miles wide and passed within 15 miles of the capital, San Juan, leaving a trail of devastation in its wake. The path of the hurricane and rainfall totals are shown here. Some areas received up to 26 inches of rain within 24 hours. Flooding, landslides, and catastrophic losses in infrastructure resulted. Hurricane Georges Map –USGS: http://water.usgs.gov/pubs/FS/FS-040-99/images/PR_fig01.gif