



New evidence for persistent drying in the tropics linked to natural forcing and connections to multidecadal to centennial variations in North Atlantic and tropical Pacific sea-surface temperatures

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Climate projections for the future indicate a regional contrast in tropical hydrologic trends between areas that are slated to dry and those that may become wet. While much of the tropical ocean under the Intertropical Convergence Zone (ITCZ) is projected to see an increase in rainfall, a wide area of Central America and surrounding oceans is expected to experience severe drying. Approximately half the world's population lives in the tropics, and future changes in the hydrological cycle will impact not just freshwater supplies but also energy production in areas dependent upon hydroelectric power. It is vital that we understand tropical forcing mechanisms and the eventual hydrological response in order to better assess projected future regional precipitation trends and variability. Paleoclimate proxies are a valuable source of information for this purpose as they provide long time series that pre-date and complement the present, often short instrumental observations. Here we present recent paleo-precipitation data of the last few centuries from speleothems, one located on the western side of the Caribbean (Mesoamerica), and new data from a speleothem from the eastern side of the Caribbean (Puerto Rico) that both reveal similar large multi-decadal declines in regional precipitation whose onset coincides with clusters of large volcanic eruptions. This reconstruction provides new independent evidence of robust long-lasting volcanic effects on climate and elucidates key aspects of the causal chain of physical processes determining the tropical climate response to global radiative forcing. We will also discuss the connection between reconstructed Caribbean precipitation changes and multidecadal to centennial variations in North Atlantic and tropical Pacific sea-surface temperatures.