



North Atlantic tropical cyclone track migration since 1550 A.D. revealed using a Belizean stalagmite

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A gradual shift in the geographic distribution of hurricanes and tropical storms from the western Caribbean to the US Atlantic Coast between 1550 and 1983 A.D. is revealed by an annually-resolved, 456-year record of tropical cyclone (TC) activity reconstructed using sub-annually resolved carbon and oxygen isotope ratios in stalagmite YOK-G from Yok Balum Cave, southern Belize. Annual geochemical cycles combined with ^{230}Th dating provide excellent chronological control, and the hurricane season signal intensity is reconstructed using seasonally-specific isotope ratios. The stalagmite hurricane season signal correlates very well with HURDAT2 western Caribbean TC count over the calibration period (1945-1983) as well as over the 25-year verification period. Our record suggests very few TCs affected the western Caribbean in the mid-1500s, but that this was followed by gradually rising western Caribbean TC activity that peaked during the Little Ice Age (LIA). Western Caribbean TC activity then decreases gradually from the mid-1600s to present day, with abrupt shifts at 1790 A.D. and 1870 A.D. Comparison with basin-wide TC reconstructions reveals a northward shift in the geographic distribution of TC impacts over the past few hundred years, from dominantly western Caribbean during the LIA to substantially more along the North American Atlantic margin during the 20th Century. Our reconstruction suggests that NAO variability played a major role in driving these shifts in dominant storm tracks through time.