Tropical cyclones and their expressions in shallow-marine sedimentary strata

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Tropical cyclones (TCs) are among the most devastating natural hazards on Earth and are predicted to increase in frequency and severity as the atmosphere warms. Assessing changes in TC frequency and severity requires tracking their prevalence through time using their preserved expressions in the rock record as a proxy. Presently, TCs are common to the world's oceans at latitudes of 7° to 40° north and 7° and 23° south of the equator. The processes and products of TCs have been well studied, and direct expressions of TCs in shallow-marine strata (e.g., Hummocky Cross-Stratification) are well defined. In this presentation, we will explore the depositional processes that occur during TCs and the range of TC deposits that occur in shallow-marine and shelf environments (10–150 m water depth). Two modern settings that experience regular TCs will be presented: the northern Gulf of Mexico and the Taiwan Strait. We will also evaluate TC deposits in shallow-marine strata. Together, these data provide a more complete picture of the mechanisms and processes that are active during TCs and their multiple expressions in the rock record. In turn, these results contribute to our understanding of past extreme-weather events and potentially can provide insights into future changes in TC frequencies and intensities as the Earth's climate warms.