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Neotropical Ostracodes as Indicator for Paleo-Hurricanes - High-temporal Calcification Periods traced by Oxygen Isotopes

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Overwash deposits in coastal lagoons are most commonly utilized for the identification of past hurricane landfalls. These deposits have a small spatial distribution and a limited preservation potential. Thus, geochemical approaches to indicate palaeo-hurricanes, such as $\delta^{18}O$ signatures of carbonate deposits, are rare besides most archives do not provide the requested high temporal resolution. Ostracodes are ideally suited for the application of paleo-hurricanes since they calcify new valves within hours to few days – fast enough to document a rainstorm event. But, information on the ostracode life cycle and influences on modern oxygen isotope compositions are limited, especially in tropical regions.

This study investigates the relationship between hydrochemistry, climate, and valve geochemistry ($\delta^{18}O$, $\delta^{13}C$) of living populations of the common Neotropical ostracode *Cytheridella* on a large geographical range. Since most of the regions in the Neotropics are sparsely covered by hydrochemical data, especially with respect to stable isotopes ($\delta^{18}O$ and $\delta^{13}C$), the present approach is based on estimation of $\delta^{18}O_{eq}$ values calcites at isotope equilibrium as references for the interpretation of oxygen isotope distribution of ostracodes.

As postulated in other studies $\delta^{18}O_{precipitation}$ and temperature are the most important controls on lake water and, consequently, ostracode $\delta^{18}O$.

Oxygen isotope composition reveals inferences to be drawn on calcification periods of *Cytheridella* within its geographical distribution. Offsets between *Cytheridella* $\delta^{18}O$ and $\delta^{18}O_{eq}$ values vary throughout the year and coincide only during spring (April/May) and autumn (October) which indicates that *Cytheridella* calcifies seasonally in all investigated regions. This implies a synchronous life cycle of *Cytheridella* in all investigated regions. Since the regions differ in climatic conditions (i.e., precipitation seasonality and amounts, temperature gradients) an environmental control on Cytheridella´s life cycle can be excluded.

The above approach yields in an improved understanding of geochemical (i.e., $\delta^{18}O$, $\delta^{13}C$) signatures of ostracode valves on a seasonal basis especially in regions where few information on

lake water hydrochemistry is available and points to δ18O values of ostracode species to be used for the identification of hurricane-related precipitation extremes by their high-temporal resolution of seasonal calcification.