AI Review of "COULD THERMAL OCEANIC HOTSPOT INCREASE CLIMATE CHANGES ACTIVITIES IN NORTH TROPICAL ATLANTIC: Example of the 2005 Caribbean Coral Bleaching Hotspot & Hurricane Katrina Interaction"

The manuscript offers an intriguing examination of the potential linkages between Thermal Oceanic HotSpots (TOHS) and the evolutionary processes of Hurricanes, specifically using the 2005 Caribbean coral bleaching event and Hurricane Katrina as a focal point. The study introduces isotopic analyses to enhance understanding of these interactions, providing a novel perspective on the regional climatic effects.

Overview

The work sets out to explore the implications of thermal oceanic hotspots on climate dynamics, particularly their influence c in the North Tropical Atlantic region. By analyzing δ18O and δ13C in marine organisms from Guadeloupe, the paper attempts to correlate sea surface temperature (SST) anomalies with the conditions

conducive to Hurricane Katrina. Implicitly, the study leans on the assumption that isotopic evidence captured in coral structures can refine our understanding of past climatic conditions better than satellite data alone.

Relevant References

Including a clear literature review helps reviewers quickly see what's new and why it matters, which can speed up the review and improve acceptance chances. The following references were selected because they relate closely to the topics and ideas in your submission. They may provide helpful context, illustrate similar methods, or point to recent developments that can strengthen how your work is positioned within the existing literature.

1. Hetzinger, Steffen, et al. “Rapid 20th Century Warming in the Caribbean and Impact of Remote Forcing on Climate in the Northern Tropical Atlantic as Recorded in a Guadeloupe Coral.” Palaeogeography, Palaeoclimatology, Palaeoecology, Elsevier BV, 2010, doi:10.1016/j.palaeo.2010.06.019.

2. Winter, Amos, et al. “On the Relationship between Coral δ^{13}C and Caribbean Climate.” International Journal of Climatology, Wiley-Blackwell, 2018, doi:10.1002/joc.5772.

3. Donner, Simon D., et al. “Model-Based Assessment of the Role of Human-Induced Climate Change in the 2005 Caribbean Coral Bleaching Event.” Proceedings of the National Academy of Sciences of the United States of America, National Academy of Sciences, 2007, doi:10.1073/pnas.0610122104.

4. Hetzinger, Steffen, et al. “Caribbean Coral Tracks Atlantic Multidecadal Oscillation and Past Hurricane Activity.” Geology, Geological Society of America, 2008, doi:10.1130/g24321a.1.

5. McWilliams, John P., et al. “ACCELERATING IMPACTS OF TEMPERATURE-INDUCED CORAL BLEACHING IN THE CARIBBEAN.” Ecology, Wiley-Blackwell, 2005, doi:10.1890/04-1657.

6. Harbott, Marie, et al. The Anthropogenic Environmental Impacts and Changes in the Tropical Atlantic - a High Resolution Cuban Coral Time Series over 154 Years. 2021, doi:10.5194/egusphere-egu21-12159.

7. Manzello, Derek P., et al. “Hurricanes Benefit Bleached Corals.” Proceedings of the National Academy of Sciences of the United States of America, National Academy of Sciences, 2007, doi:10.1073/pnas.0701194104.

8. Smith, Tyler B., et al. “Caribbean Mesophotic Coral Ecosystems Are Unlikely Climate Change Refugia.” Global Change Biology, Wiley-Blackwell, 2016, doi:10.1111/gcb.13175.

9. Carrigan, Adam D., and Marji Puotinen. “Tropical Cyclone Cooling Combats Region-Wide Coral Bleaching.” Global Change Biology, Wiley-Blackwell, 2014, doi:10.1111/gcb.12541.

10. Bove, Colleen B., et al. “A Century of Warming on Caribbean Reefs.” PLOS Climate, Public Library of Science, 2022, doi:10.1371/journal.pclm.0000002.

Strengths

The manuscript’s strengths lie in its unique focus on isotopic analyses as a method to uncover potentially overlooked aspects of climatic interactions between ocean thermal hotspots and hurricane development. Isotopic records provide a high-resolution archive that bridges gaps left by satellite data, offering insights into localized thermal anomalies that could inform climate models more precisely. The paper also effectively highlights the potential for these isotopic records to predict future climatic trends, thus contributing to the discussion around climate change effects in the Caribbean region.

Major Comments

Methodology

The methodology section would benefit from greater clarity and detail. It is vital to provide a step-by-step account of the isotopic analysis process, including sample preparation, specific isotopic ratios, calibration standards, and any analytical equipment used. Moreover, a more detailed explanation regarding the choice of coral species and collection sites would reinforce the validity of the results. Comparison with other empirical data sources, including satellite analyses, could further strengthen the argument.

Data Interpretation

There is a need for a clearer presentation of the interpretations of isotopic data. The relationship between isotopic measurements and environmental parameters should be more explicitly defined, and the statistical significance of the findings should be evaluated in-depth to ensure robustness. The current analysis assumes isotopic variations are exclusively temperature-driven, which might overlook potential confounding variables such as water chemistry.

Minor Comments

Terminology and Presentation

The manuscript contains several typographical errors and formatting inconsistencies, such as inconsistent references to figures and tables. Clarifying terminology, especially around the concept of 'Hotspot,' will greatly aid reader comprehension. Additionally, reorganizing the manuscript for smoother transitions between sections would improve overall readability.

Figures and Diagrams

Figures would be more effective with enhanced labeling and interpretation. A consistent presentation format across all figures, captions, and legends will guide the reader better. Consider adding contextual information directly on figures where possible to assist understanding without constant reference to the text.

Reviewer Commentary

This manuscript pushes forward a multidisciplinary approach combining paleoclimatology and meteorology with contemporary climate study methods, making it potentially valuable to a broad scientific audience. The integration of isotopic data in understanding complex climate interactions is commendable. Ethical considerations concerning coral sample collection have been minimally addressed, yet these are crucial given the ecological sensitivities associated with coral ecosystems.

Summary Assessment

Overall, the manuscript proposes an underexplored angle on the interplay between oceanic thermal anomalies and hurricane dynamics. It highlights significant potential for isotopic studies to contribute to our understanding of climate change and its localized impacts in the

Caribbean. The academic conversation advanced by this work underscores a growing appreciation for multidimensional climate analyses, and future iterations could focus more on methodological rigor and comprehensive data interpretation to strengthen conclusions.

In closing, the intersection of isotopic studies and climate dynamics represents a promising field of research. This work provides a stepping stone towards more nuanced understandings of climate interactions, with implications for predictive modeling in hurricane activity and reef conservation strategies.