

Recommendation: Reconsider after major revisions

Scope of this review: one major concern (attribution/causality) and few minor comments focused on clarity, methodological transparency, and consistency of interpretation.

Summary

The manuscript assembles multiple observational and reanalysis products to describe Medicane Daniel and its co-occurrence with a warm-core eddy (WCE) and a moderate marine heatwave (MHW). The analysis is potentially useful as a case study, but the current framing advances causal interpretations that are not yet supported by discriminating evidence. The revision should primarily address whether upper-ocean anomalies played a determining role in the intensification, or whether the results support a more limited conclusion of oceanic modulation under favorable atmospheric forcing.

Major comments

Attribution of intensification to the WCE/MHW is not yet demonstrated

“Along the path ofmaking Daniel a deadly storm”

The results demonstrate spatial and temporal co-occurrence of (i) elevated upper-ocean thermal indicators (SST anomaly, OHC) and (ii) the period of storm intensification. However, the manuscript does not establish that the intensification point was exceptional relative to other environments sampled along the storm track.

I suggest, For each 6-hr track point, compute SST anomaly, OHC anomaly, surface enthalpy anomaly and then show a percentile rank of the intensification point. Right now we only see absolute values not relative rarity.

Minor comments

Page 1, lines 27–28:

Keywords include “deadliest Medicane,” which is subjective and non-scientific in tone. Consider removing or rephrasing to a neutral descriptor.

Page 1, lines 31–32 (Key Points):

The statement implies a causal enhancement of precipitation by WCE/OHC/MHW that is not demonstrated by the analysis. This is an interpretation issue and should be softened to reflect co-occurrence or possible modulation.

Page 2, lines ~45–50:

“Warm Core Eddy” and “warm-core eddy” are used inconsistently; please standardize capitalization and hyphenation throughout.

Page 2, lines ~52–55:

“Marine Heat Wave” and “Marine Heatwave” are used interchangeably; please adopt a single convention (e.g., *marine heatwave* following Hobday et al.).

Page 2, line ~60:

Abbreviation “CCE” appears before being formally defined in the text.

Page 3, lines ~95–100:

The term “air–sea interaction” is used broadly; consider clarifying whether this refers specifically to surface heat fluxes, momentum fluxes, or upper-ocean thermodynamic response.

Page 4, lines ~135–140:

The description of SWOT capabilities could be clarified to distinguish improved spatial resolution of SSHA from direct observation of air–sea coupling processes.

Page 6, lines ~248–249:

The definition of MHW intensity categories introduces the symbol θ without explicitly defining it at first use.

Page 7, line ~262:

Temperature is referred to without clearly stating whether it is expressed in °C or K in the context of energy calculations.

Page 8, Figure 5 caption:

The caption includes interpretive language (e.g., “indicates,” “confirms”) that would be better placed in the main text; captions should focus on describing what is shown.

Page 8, Figure 5 panels (h–k):

Green and purple arrows are not clearly identified as schematic; this should be explicitly stated in the caption to avoid implying direct diagnostics.

Page 9, lines ~436–440:

The interpretation of subsurface “secondary circulation” below ~200 m is speculative; language such as “may indicate” is appropriate but should be consistently maintained throughout the paragraph.

Page 9, line ~441:

“DCM” is used without being defined at first appearance.

Page 10, lines ~512–514:

The phrase “determine the intensity and destructiveness of these storms” overstates the conclusions; consider revising to reflect combined influence or modulation.

Line 395-396:

Clarify the Ekman pumping formulation and separate it from storm-driven turbulent mixing; provide sufficient methodological detail to reproduce the Ekman pumping estimate: input wind product, curl computation method (grid/metrics/smoothing), the source of relative vorticity (if used), and sign conventions. Also be mindful of the 2nd and subsequent key points in page 1 and 2.

Throughout manuscript:

Some colorbars in multi-panel figures use small font sizes and inconsistent unit formatting (e.g., mg m^{-3}); please standardize for readability.