

Revision of manuscript [essd-2024-592](#)

This paper introduces a valuable global ocean front dataset, employing a refined Cayula-Cornillon algorithm (CCAIM), to provide a daily global high-resolution dataset spanning from 1982 to 2023. The manuscript is well-structured, clearly written, and addresses an important gap in oceanographic research. It also offers rigorous validation against in-situ data and a comprehensive comparison with other datasets. The open access to data and code is commendable and will greatly benefit the scientific community.

Overall, I recommend the manuscript for publication after minor revisions, which are provided below.

- There are frequent repetitions of similar concepts, particularly in the Introduction and Discussion sections. I suggest carefully revising these sections to minimize repetition, which would significantly improve readability.
- The manuscript uses the term "multi-satellite merged product" when referring to gap-free (Level 4) SST products. However, in satellite data terminology, "merged multi-sensor" typically refers to Level 3S (super-collated) products. I suggest using either "multi-satellite blended product," "gap-free," "L4 product," or simply "analysis."
- Lines 24–25: The sentence "...all of which provide independent validation..." is unclear. Please rephrase to improve clarity.
- Line 37: Replace "...affect global climate change..." with "...contribute to climate change..."
- Line 42: The sentence fragment "...ocean fronts oceanographers, climatologists..." seems incomplete or missing an adverb or preposition. Please revise accordingly.
- Line 47: Clarify the term "new technology." Are you referring to the algorithm? If so, consider replacing "technology" with a more specific term, such as "methodology" or "approach."
- Line 58: Replace "accessibility" with "availability."
- Line 106: Clarify "different types." Types of what?
- Line 130: The phrase "serving as a comparison..." is redundant, as this point has already been mentioned. Consider removing or rephrasing.
- Figure 2 caption: There is a typographical error: "while and d) and e)" should be corrected to remove the extra "and."
- Lines 189–190: The sentence starting with "Identifying frontal zones..." is repetitive and not strictly relevant in this section. I recommend removing it.
- Figure 5: The grey shaded area is not described in the caption. Please clarify its meaning explicitly.
- Figure 7: I recommend including the ESA CCI hit rate and precision curves here as well, even though they appear in Figure 5, for immediate comparison.
- Figures 8a, 9a/c, and 10a/c: Figure 8a employs a different map projection from Figures 9 and 10. Please use a consistent map projection to facilitate visual comparisons.
- Lines 343–344: The sentence starting with "Although ocean fronts..." is unclear. Please rephrase to improve readability.
- Line 491: Replace "expected to be widely used" with e.g. "can provide a valuable tool for..."