

I would like to congratulate the group for putting together this manuscript that describes the second edition of the Barometer. It is a great example of how efforts can be collectively made and deliver useful information based on peer-reviewed evidence for different stakeholders on the continued degradation of the ocean systems learn from opportunities.

**We sincerely thank the reviewer for the positive and encouraging assessment of our manuscript, as well as for the insightful and constructive comments. These have been extremely helpful in improving the clarity, rigor, and overall positioning of the Starfish Barometer. We have carefully addressed all comments and revised the manuscript accordingly. Specific point-by-point replies can be found below.**

The manuscript is publishable; it requires minor edits and changes and attend simple comments enclosed:

It is important transmitting that the five dimensions do not act in isolation and add describe what is being lost with the increasing changes described.

**We thank the reviewer for this important comment. The interconnections between the five dimensions of the Starfish Barometer are indeed central to its conceptual framework. As described in the Methods section, these dimensions are not independent, and many developments span multiple aspects of the Ocean–human system. At the same time, the Barometer is intentionally designed not to impose explicit causal links between items, with each item presented as an independent, evidence-based signal. This approach aims to provide a robust and accessible synthesis while avoiding overinterpretation of complex causal relationships. To address this comment, we have clarified the interconnected nature of the five dimensions of the Barometer in the Methods section. In particular, we have expanded Section 2.5 (“Arm allocation of items”) to explicitly state that Ocean-related processes and impacts often span multiple dimensions, while also reiterating that the Barometer does not aim to establish explicit causal relationships between them. The revised text now reads:**

***“This reflects the inherently interconnected nature of the Ocean–human system, in which processes and impacts often span multiple dimensions of the Barometer. While these interconnections are acknowledged, they are not systematically developed within the Barometer, as its objective is to present a set of robust, evidence-based signals rather than to establish explicit causal relationships between dimensions, which should also strictly be based on scientific evidence (von Schuckmann et al., 2026).”***

As example “The number of threatened marine species has risen to 1,685 with intensifying level of threat” however policy makers, educators, civil society actors, and the public may not know if the number is large. May I suggest that this loss is identified with an example of people’s live, what is meant by threat and this threat intensifying.

**We agree that the absolute number of threatened species may be difficult to interpret in isolation. In addition, this indicator reflects not only changes in extinction risk, but also the evolving coverage and completeness of species assessments over time. The objective of this indicator is primarily to track changes over time rather than to convey a standalone magnitude. To address this point, we have revised the paragraph to clarify the interpretation of this indicator and to present the comparison with the previous edition more cautiously. In particular, we now state that the current assessment includes**

**eight additional threatened marine species compared with the value reported in the previous edition, rather than implying a direct measure of change in extinction risk:**

*“This indicator reflects both changes in extinction risk and the evolving coverage of species assessments over time, and should therefore be interpreted as a global signal rather than a direct measure of change in extinction risk. Compared with the value reported in the previous edition of the Barometer (1,677 species; Lévy et al., 2025), the current assessment includes eight additional threatened marine species.”*

**We also thank the reviewer for the suggestion on linking the environmental indicator to socioeconomic dimensions to increase accessibility to a wider audience. Such a context-driven approach while combining ocean indicators across the 3 pillars of sustainable development for environment, society and economy, linked to causalities derived from peer-reviewed literature (e.g., ocean narratives, von Schuckmann et al., 2026, <https://www.sciencedirect.com/science/article/pii/S0308597X25003380>) is developed as pilot elsewhere (e.g., <https://sp.copernicus.org/articles/6-osr9/2/2025/>; <https://sp.copernicus.org/articles/6-osr9/3/2025/>).**

Evidence shows that coral reefs are threatened not only by bleaching-level heat stress, but also by the combined impacts of Sargassum in the Atlantic, along with eutrophication and fishing in other tropical locations—all acting in synergy with global climate change.

**We have revised the manuscript and added one reference to acknowledge that coral reef degradation is also influenced by additional stressors acting in synergy with climate change, including eutrophication and overfishing: “Coral reef degradation is also influenced by additional stressors such as eutrophication, acidification, and overfishing, which can act in synergy with climate change (Bhuyan et al., 2026)”.**

The manuscript suggests expanding marine protection under the 30×30 initiative, coupled with effective monitoring, enforcement, and climate-adapted governance. The section mentions widespread unsustainable fishing practices and major shortcomings in transparency and governance. Expanding marine protection faces significant challenges, as only about 8-9.6% of the ocean is currently designated as protected, with far less (estimated at 2.8-2.9%) effectively managed or highly protected. The core challenges lie in transforming paper parks that are being created by trying to achieve 30x30 into active conservation zones, maintaining enforcement in remote areas, especially in ABNJ, and adapting to rapid climate change.

The authors mention that “protection efforts continue to expand”. However, these are not enough for resilience. I am not quite sure that “The stronger protection rules require to be implemented” if widespread unsustainable practices and major shortcomings in transparency and governance are increasing. Political will is needed, education at all levels since most of the conservation efforts involve larger participation and decision making by local communities that in many cases prefer to extract, have better opportunities and income that lead to loss of biodiversity.

**We note that the manuscript already distinguishes between total marine protected area coverage and the much smaller fraction that is fully or highly protected, as well as the importance of effective monitoring and enforcement. We also fully agree that political will, governance, and the engagement of local communities are critical for the effectiveness of ocean protection efforts.**

**To improve clarity, we have revised the text and referenced the handbook on sustainable ocean plans to more explicitly emphasize that:**

*“Despite this recent progress, the extent of effectively protected areas remains limited at the global scale, and their outcomes depend on implementation, monitoring, and broader enabling conditions, such as governance arrangements and incentive structures (Barzuna et al., 2025).*

**Moreover, we have updated to % area of MPA since this value has changed since submission. The new text reads:**

*Marine protected areas cover 10.01% of the global Ocean, with 3.2% fully or highly protected. Global Ocean protection has reached the 10% milestone but remains far from the Kunming-Montreal Global Biodiversity Framework target to conserve 30% of marine and coastal areas by 2030. Marine Protected Area (MPA) coverage has increased from 8.34% in 2024 to 10.01% of the global Ocean in mid 2026 (Lévy et al., 2025, *protectedplanet*, 2026).*

I suggest highlighting monetary valuation of the losses from tropical storms and floods catalyzing behavioral changes to reduce human pressures. How to overcome that in this process a complex paradox is often created where the economic focus can simultaneously heighten geopolitical instability, aggravate poverty, and shift focus away from long-term environmental research.

**We agree that the economic valuation of losses related to tropical storms and floods can play an important role in informing decision-making and potentially influencing behavioral and policy responses. However, the objective of the Starfish Barometer is not to provide an analysis of the broader socio-economic implications of the signals that we report. Rather, it aims to present a set of robust, evidence-based indicators in a consistent and neutral manner, closely reflecting the reported data without further interpretation. For this reason, these aspects are not developed in detail in the present manuscript, but we provide some linkages to existing literature while adding:**

*“Monetary valuation of losses from tropical storms and floods can shape decisions and actions to reduce exposure to risk, but these effects occur within broader socio-economic systems where underinvestment persists and losses from extreme events can reinforce vulnerability, inequality, and instability (Fischer and Patterson, 2026 ; Weerasinghe et al., 2025; Hallegatte et al., 2020).”*

**Over the long term, related economic losses have increased decade by decade since the early 1980s, with an acceleration during the past two decades ~\citep{wmo\_2021}.**

I would suggest considering that not only major in-situ ocean observing systems are shrinking. There is less financial support to generate new knowledge (science to defray the cost of working at sea), knowledge that is required to improve skills and metrics for forecasting the risks to human health and the support system for the ocean.

**We note that the manuscript already highlights the broader implications of declining observing systems for ocean science. To improve clarity, we have slightly revised the text to make more explicit the link between these trends and added two recent references:**

***“reflecting broader constraints on ocean science capacity (Tanhua et al., 2024, von Jackowski, 2025)”.***

“A treaty for the High Seas has been adopted”. I suggest using instead Biodiversity Beyond National Jurisdiction Agreement that highlights Biodiversity and mention that the agreement has been ratified in September 2025 and entered into force on January 17, 2026.

**The manuscript already refers to the Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction (BBNJ) and specifies its entry into force on 17 January 2026.**

Financial commitments remain insufficient to meet all challenges of impact to the ocean and will not remediate or restore what is being lost

**We agree that current financial commitments remain insufficient to meet the scale of challenges facing the Ocean. This point is already reflected in the manuscript, which highlights the gap between existing investments and estimated needs to achieve SDG 14. We have reinforced it: “*indicating a substantial gap between current commitments and the scale of transformation required (Johansen and Vestvik, 2020; OECD, 2025b).*”**

“Ocean sustainability objectives, including SDG 14”. I think these are the same, or are there other? They are certainly crosscutting among the other 16 SDG.

**Our intention was not to equate ocean sustainability objectives solely with SDG 14, but rather to refer more broadly to global biodiversity, climate, and Ocean-related sustainability objectives, of which SDG 14 is one important example. And yes, the ocean is very cross-cutting in the SGD framework (e.g. von Schuckmann et al., 2020). We have revised the sentence in the abstract to make this clearer: “*as reflected for example in SDG 14, the link to other SDGs, and related international frameworks (von Schuckmann et al., 2020)*”**

If the Barometer is designed for a non-specialist audience while remaining grounded in established scientific evidence its translation to diverse languages is urgently required for the policy makers, educators, civil society actors, and most importantly the public that may not read or speak English language. Although the report series “State of the Planet” is an open access journal, to reach the different stakeholders and readers specific open access initiatives and institutional programs need to facilitate it. How can this be improved?

**We agree on the importance of making the Starfish Barometer accessible to a broad and diverse audience. As indicated in the manuscript, the Starfish Barometer consists of two complementary components: the present scientific article and a broader communication platform developed through the Starfish Barometer website (<https://www.starfishbarometer.org/>) and associated outreach materials. While the article itself is published in English in line with standard scientific practice, the website provides a more accessible interface for dissemination. The 2025 edition of the Barometer was made available in both English and French, and the 2026 edition will include Spanish as an additional language. Further efforts to expand multilingual accessibility are being considered for future editions. In addition, dissemination is supported by the involvement of co-authors and partners across different countries,**

**including through communication and outreach activities. This complementary approach aims to ensure broad accessibility beyond the scientific publication.**

“Reliable accountability for a sustainable Ocean” will require a shift from voluntary commitments to transparent, data-driven, and legally binding mechanisms that ensure that policy makers, educators, civil society actors, and public take responsibility for their impacts on marine ecosystems too. Opportunities for action would be interesting.

**The reference to “accountability” in the abstract is intended to reflect the role of the Starfish Barometer in supporting accountability through transparent, evidence-based reporting of Ocean change. It is not intended to imply that the Barometer defines or prescribes specific governance mechanisms or policy frameworks. We have revised the wording in the abstract to clarify this point: “*the Starfish Barometer provides a transparent and evidence-based foundation to support accountability for a sustainable Ocean*”**

Figure:

Improve quality of Fig. 1, symbols hardly visible. Some boxes may require text in black font to avoid glaring. Some texts in the boxes can be reduced significantly to transmit the message and be more attractive.

**The quality of Fig. 1 has been improved**