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Editor of *Climate of the Past*

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Submission of revised manuscript titled 'The Northwest Pacific corals unravel the NPGO0 and Victoria Mode-related temperature variability back to the 19th century' by Ito et al. (egusphere-2025-4054)

Dear Editor,

We thank you, Dr. S. C. Sanchez (Reviewer #1) and the anonymous reviewer (Reviewer #2), for the constructive comments and suggestions, which have helped us significantly improve and strengthen our manuscript. The major revisions are summarised below:

1. We have clarified the terminology and conceptual framework for the NPGO and VM, including the definition of "NPGO–VM-related variability," without implying that the two constitute a single unified mode or index.
2. We have clarified the filtering framework and now consistently distinguish between the 8–30 year bandpass filter used to evaluate decadal-scale relationships and the 8 year low-pass filter used for the long-term reconstruction.
3. We have revised the reconstruction methodology and Eq. (1) to clarify the standardisation and sign convention of the coral Sr/Ca record, as well as the rationale for using standardised Sr/Ca directly in the reconstruction.
4. We have added supporting figures, tables, descriptive text, and statistical tests to further demonstrate the robustness of our results and interpretations.
5. We have substantially revised the Discussion to address the non-stationary relationship between the NPGO and VM, clarify the limits of causal interpretation, and provide a more balanced assessment of the strengths and limitations of different proxy archives.
6. We have also corrected minor typographical and grammatical errors identified during the revision process. These corrections do not affect the main objectives or conclusions of the study.

We sincerely appreciate the time and effort devoted by you and the reviewers to evaluating our manuscript, and we look forward to the opportunity to contribute to *Climate of the Past*.

Sincerely yours,
Dr. Saori Ito (on behalf of authors)

Point-by-point response to the comments

Reviewer's comments: in dark grey - copied from their reports.

Authors' responses: in blue

RC1: Report #1, Referee #1: Sara C. Sanchez, 02 Jun 2026

For final publication, the manuscript should be - accepted as is

Suggestions for revision or reasons for rejection: --- (no specific comments)

We would like to express our sincere gratitude for reviewing our manuscript once again and for accepting the revised version for publication. We are deeply grateful for your insightful comments and constructive discussions, which have been instrumental in improving the manuscript.

Point-by-point response to the comments

Reviewer's comments: in dark grey - copied from their reports.

Authors' responses: in blue

Abbreviations in this response letter

- CE: Common Era
- CL: confidence level
- CP: Central Pacific
- ENSO: El Niño–Southern Oscillation
- ERSST5: The NOAA Extended Reconstructed Sea Surface Temperature Version 5
- NWP: Northwest Pacific
- SSHa: sea surface height anomaly
- SST: sea surface temperature
- Sr/Ca: the ratio of strontium to calcium (i.e., coral proxy)
- NPGO: North Pacific Gyre Oscillation
- VM: Victoria Mode
- VMDI: Victoria Mode Dipole Index

Notes: The abbreviations of coral proxy and instrumental records are shown in *Table A1*.

RC2: Report #2, Referee #2: Anonymous, 24 Jun 2026

For final publication, the manuscript should be - reconsidered after major revisions

Suggestions for revision or reasons for rejection:

The authors have addressed the bulk of my first-round comments, and the revised manuscript is substantially improved. Key improvements include the switch to the ERSSTv5 product for all instrumental comparisons, the redefinition of seasons to three-month averages, the addition of an independent Victoria Mode Dipole Index (VMDI) comparison that directly tests the relationship of the coral record to the influence of the VM, and additional spectral justification for the bandpass filter choices. However, the revision has introduced methodological inconsistencies surrounding filter design and the construction of the coral-based NPGO-VM index that require resolution before publication.

I therefore recommend a major revision. The record has scientific value, and these problems are correctable. Please note that the line numbers and figures referenced correspond to the revised version of the manuscript.

We sincerely appreciate your time in reviewing our manuscript again and your helpful comments. We have revised our manuscript in accordance with your suggestions. In preparing the revised manuscript, we carefully checked the text, figures, and tables for inconsistencies and corrected them. Consequently, section numbers, figure numbers, table numbers, and their order may differ from the previous manuscript (the numbers cited in this point-by-point response document correspond to the revised manuscript).

General Comments

The central issue is filter inconsistency that propagates through Sections 4.2 to 4.4. The NPGO comparison uses an 8-30-year filter; the VMDI comparison uses a 10-30-year bandpass filter, a difference that reflects partial frequency separation between the two modes (confirmed in Fig. A9). The unified coral-based NPGO-VM index is then built with an 8-year low-pass filter, mixing timescales where the two modes move together with timescales where they move independently. This inconsistency was not present in the original submission and undermines both the proxy comparisons and the interpretation of the NPGO-VM coupling.

G1. We appreciate this important comment regarding filter consistency and the interpretation of the NPGO–VM relationship. We agree that introducing a different filtering scheme for the VMDI in the previous revision reduced the methodological consistency relative to the original submission. We have therefore revised the filtering framework and terminology throughout the manuscript.

To restore methodological consistency, only two filtering approaches are now used: an an 8–30 year bandpass filter and 8 year low-pass filter. The 8–30 year bandpass filter is applied consistently to the index, spatial-field, and proxy comparisons used to evaluate relationships within the decadal band. We have also added analyses in which the same 8 year low-pass filter is applied to both the NPGO Index and the VMDI; these results are now presented in the Appendices section (*Table A5; Figures A2* and *A16)*. Applying the same low-pass filter to both indices does not alter the principal results or interpretations (Please see also our response to Specific Comment 1, *S1*).

The long coral-based reconstruction continues to use the 8 year low-pass filter because its purpose is to retain both decadal variability and lower-frequency variability at periods longer than 30 years over the full 215 year record. In this study, as main results, the relationships and decadal-scale correspondences among the Kikai coral record, the NPGO Index, and the VMDI are examined using 8–30 year bandpass filtered data. The results using 8 year low-pass filter are shown in the Appendices section (*Table A5; Figures A2* and *A16*). Variability at periods longer than 30 years is retained in the reconstruction but interpreted cautiously and is not attributed specifically to either mode. Thus, the two filtering approaches address different temporal components and are complementary rather than interchangeable.

To improve conceptual and terminological clarity, we now consistently distinguish among three related expressions. “The NPGO and VM” refers to the two individually defined climate modes and is used when discussing their dynamics, indices, covariability, or temporally varying relationship. “NPGO–VM-related variability” is used as an inclusive term for variability associated with the NPGO, the VM, or their covariability; it does not imply a single unified mode, a temporally invariant relationship, or a combined index. Where the temperature component is specifically intended, we use “NPGO–VM-related temperature variability”. Finally, “reconstructed NPGO–VM-related variability” refers specifically to the time series reconstructed in this study from the Kikai-coral Sr/Ca record. Accordingly, the reconstructed series is not intended as a direct reconstruction of either the NPGO or the VM individually, nor as a unified NPGO–VM index. Rather, it represents the temperature expression of variability associated with the NPGO, the VM, or their covariability in the NWP. We have reviewed the terminology throughout the revised manuscript to apply these distinctions consistently. These revisions improve methodological and conceptual consistency without changing the scope or principal interpretation of the reconstruction.

Specific Comments

1. The filter choices underlying the unified coral-based NPGO-VM index are inconsistent. The Kikai record was correlated to the NPGO with an 8–30-year bandpass filter and to VM with a 10-30-year bandpass filter, using different windows for different modes. Using Fig. A9 to explain this difference weakens the case for a single unified index, since the two modes don't fully overlap in frequency. The 8-year low-pass filter applied to the coral-based NPGO-VM index follows previous NPGO studies, but those studies used it on the NPGO alone. The author's own NPGO comparison then contradicts it anyway, using a bandpass filter of 8-30 years. The low-pass filter also retains variance at frequencies that the NPGO doesn't occupy (beyond 20-30 years, Fig. A9). The cited precedent doesn't apply, the filter doesn't isolate the target band, and it contradicts the bandpass filtered analysis that was used everywhere else. A consistent filter should be applied throughout, or the NPGO and VM should be treated as separate reconstruction targets rather than combined into a single index.

S1. We appreciate this important comment regarding filter selection. Following your suggestion, we have revised the analyses in the manuscript to use only two filters: an 8 year low-pass filter and an 8–30 year bandpass filter. The previously adopted 10–30 year bandpass filter has therefore been removed from the manuscript. Replacing the previously used 10–30 year bandpass filter for the VMDI with the common 8–30 year bandpass filter resulted in only minor changes in the correlation coefficients (*Table 3b*). The significant relationships between Summer Kikai-SST_{coral} and the VMDI at the 99 % CL and between Winter Kikai-SST_{coral} and the VMDI at the 90 % CL were maintained. The principal conclusions are therefore not sensitive to this revision of the filtering strategy.

The 8–30 year bandpass filtered comparisons presented in *Sections 3.1* and *3.4* are designed to evaluate decadal temperature variability associated with the NPGO and VM using a common frequency band. The spectral analyses (*Figures A10c and A10d*) further support this choice: both the NPGO Index and the VMDI exhibit significant variability within the 8–30 year band. These results support the use of a common 8–30 year band for direct comparisons while excluding variability at periods longer than 30 years and long-term trends. We clarified this point in *Lines 198–202* and *246–254.*

To evaluate your alternative suggestion that the NPGO and VM be treated as separate reconstruction targets, we also generated independent regression-based reconstructions using the approach adopted in the original manuscript. For this additional test, we applied an 8 year low-pass filter to the NPGO-related reconstruction and a 10 year low-pass filter to the VM-related reconstruction, following the filtering approaches used in previous studies of the respective modes. The two independently reconstructed records exhibited highly similar temporal variability with opposite signs (r = –0.97, 99 % CL after accounting for the reduced effective sample size), consistent with the opposite polarity conventions of the NPGO and VM indices. Equivalently, after reversing the sign of one reconstruction, the records were positively correlated (r = 0.97). This result indicates that separate NPGO- and VM-related reconstructions based on the Kikai coral record would contain largely overlapping low-frequency information. It is noted that it does not imply that the NPGO and VM constitute a single mode or that their covariance is stationary through time.

Our objective is not to produce separate coral-based indices or reconstructions of the NPGO and VM, but to reconstruct NPGO–VM-related variability from the temperature proxy of the Kikai coral record. The final reconstruction of NPGO–VM-related variability is based on an 8 year low-pass-filtered Kikai-coral Sr/Ca_{summer} record and is not intended as a combined NPGO–VM index. Unlike the 8–30 year bandpass filter, the 8 year low-pass filter retains variability at periods longer than 30 years. We agree that the climatic significance and modal attribution of these lower-frequency components remain uncertain. However, variability at periods longer than 30 years cannot be robustly characterised from the available index records because they contain only a limited number of independent low-frequency cycles (e.g., the covering period of the NPGO Index: 1950–present), and the pre-1950 VMDI is subject to greater uncertainty associated with the underlying SST data (i.e., ERSST5, Pfeiffer et al., 2017; Chan and Huybers, 2021; Chan et al., 2025). We therefore retain these components in the reconstruction but do not attribute them specifically to the NPGO or the VM. We have added a detailed explanation of this distinction in *Lines 197–202* and *Lines 232–237.*

2. The proxy comparisons in Section 4.4 are not methodologically consistent. Section 4.4 argues for the Kikai record's superiority primarily by elimination, listing weaknesses in other proxies without providing positive evidence that Kikai specifically captures NPGO variance. Similar to my first point, the comparisons are also filter-inconsistent. Clarion and Palmyra are compared against the 8-year low-pass filtered index, while the Section 3.4 validations use 8-30 and 10-30 year bandpass filters. These are not equivalent records. Null correlations under the low-pass filtered data are attributed to the limitations of the other proxies, while significant correlations are credited to the Kikai record. For example, for the Palmyra record, the authors explicitly acknowledge that the filter mismatch may drive the null correlations yet leave it uncorrected. The asymmetry is the same in both cases, where favorable results are assigned to the Kikai record, unfavorable results to the filter or the other proxy. Proxy quality cannot be separated from filter choice until one filter is applied consistently across all Section 4.4 comparisons.

S2. We appreciate this important comment regarding the objectives, methodological consistency, and interpretation of *Section 4.4*. We agree that the previous version did not sufficiently clarify the purpose of this section and could be read as arguing for the superiority of the Kikai coral record by emphasising limitations of other proxy archives. Our intention was instead to evaluate the respective strengths, limitations, environmental sensitivities, and complementary climatic information provided by different proxy archives. We have therefore substantially revised and reorganised *Section 4.4* to make this purpose explicit.

The revised section now begins by stating that the proxy comparison is not intended to rank the records. We have also divided *Section 4.4* into separate subsections for tree-ring-based, coral $\delta^{18}O$-based, and coral Sr/Ca-based reconstructions. Within each subsection, we discuss both the advantages and limitations of the relevant archive and emphasise the value of combining records with different temporal coverage and environmental sensitivities. We have also revised the concluding part of the section to emphasise multi-proxy and multi-site approaches rather than the superiority of any single archive.

We agree that the filtering framework used in the previous version was not explained with sufficient clarity. In the revised manuscript, the Kikai–Clarion and Kikai–Palmyra relationships are evaluated under two explicitly matched filtering frameworks. For the 8–30 year bandpass framework, Summer Kikai-SST_{coral} is compared with Clarion-$\delta^{18}O_{coral}$ and Palmyra-SST_{coral} after the same bandpass filter has been applied to all records (*Section 3.3*). This framework isolates variability within the targeted decadal band and is also used to evaluate the decadal-scale relationships of the Kikai coral record with the NPGO Index and the VMDI. For the 8 year low-pass framework, the reconstructed NPGO–VM-related variability, derived from the standardised Kikai-coral Sr/Ca_{summer} record, is compared with Clarion-$\delta^{18}O_{coral}$ and Palmyra-SST_{coral} after the same low-pass filter has been applied to the corresponding records (*Section 3.5*). This framework retains both decadal variability and lower-frequency variability at periods longer than 30 years and is therefore used for the 215 year reconstruction and its comparison with the long coral records in *Section 3.5*. The additional 8 year low-pass comparisons between Kikai-SST_{coral}, the NPGO Index, and the VMDI are also provided as supporting analyses (*Fig. A16*). Thus, no comparison is made between records subjected to different filters. The two frameworks overlap in their retention of decadal variability but differ in that the low-pass framework also retains variability at periods longer than 30 years. They are therefore complementary rather than interchangeable, and their correlation coefficients are not interpreted as estimates of the same frequency-domain relationship.

This distinction is now explained explicitly in *Section 4.4* and is also addressed in our responses to General Comment (*G1*) and Specific Comment 1 (*S1*). The revised comparisons show no significant relationship with Clarion-$\delta^{18}O_{coral}$ under either analytical framework: neither Summer Kikai-SST_{coral} within the 8–30 year band nor reconstructed NPGO–VM-related variability under the 8 year low-pass framework was significantly correlated with Clarion-$\delta^{18}O_{coral}$. In contrast, Summer Kikai-SST_{coral} and Palmyra-SST_{coral} were significantly correlated within the 8–30 year band, whereas reconstructed NPGO–VM-related variability and Palmyra-SST_{coral} were not significantly correlated under the 8 year low-pass framework. We now interpret these outcomes symmetrically. The non-significant relationships are not attributed solely to weaknesses of the other proxy records or to filter choice, and the significant relationship is not presented as evidence of the

general superiority of the Kikai record. Instead, we discuss how the results may reflect differences in proxy sensitivity, frequency range, and the temporal stability of the climatic relationships. In particular, we now describe coral Sr/Ca as being primarily sensitive to temperature variability, whereas coral $\delta^{18}O$ reflects both temperature and seawater $\delta^{18}O$. These different sensitivities allow the archives to preserve distinct but complementary aspects of Pacific climate variability. Similarly, the Kikai and Palmyra Sr/Ca records are interpreted as providing complementary evidence for a decadal-scale NWP–CP temperature linkage through the ocean–atmosphere bridge, rather than as demonstrating the superiority of either record.

Accordingly, *Section 4.4* now presents the proxy archives as complementary sources of climatic information and concludes by highlighting the value of multi-proxy and multi-site approaches for constraining past NPGO–VM-related variability.

3. Figure A9 shows significant power near 3.6–3.7 yr in both the NPGO and VM spectra, and the summer Kikai record shows power in the same band (Fig. A11). This shared interannual variance falls within the ENSO band and is relevant to the coupling interpretation and should be acknowledged. If the NPGO-VM co-variance at these frequencies is ENSO-mediated rather than intrinsic, the basis for a unified index changes. This should be explicitly addressed rather than treated as incidental.

S3. We thank you for this insightful comment. We agree that both the NPGO Index and VMDI exhibit significant spectral power near 3.6–3.7 years, which lies within the typical ENSO frequency band. We have therefore revised *Section 4.1.1* (*Lines 487–492*) to acknowledge explicitly that part of the shared interannual variability between the NPGO and VM may reflect ENSO-mediated coupling between tropical and extratropical climate variability.

We have also clarified that this shared interannual variance should not be interpreted as evidence that the NPGO and VM constitute a single intrinsic climate mode. In this study, the term "NPGO–VM-related variability" does not denote a unified index, but is used as an inclusive term for variability associated with the NPGO, the VM, or their covariability, as defined in *Section 2.7* (*Lines 225–226*). Because our reconstruction primarily focuses on NPGO–VM-related temperature variability at decadal and longer timescales, a detailed investigation of the ENSO-mediated interannual linkage is beyond the scope of this study.

4. For the late 1960s-1980s, poor NPGO agreement is attributed to VM dominance, where the two modes diverged, with VM accounting for most of the variance over that period (Fig. 5). This directly contradicts the premise that NPGO and VM are sufficiently coupled to justify a single index. Coupling cannot simultaneously justify the index and explain away its inconsistencies. If VM overrides NPGO for decades at a time, the index does not track one consistent target. The authors should either constrain the coupling claim explicitly in time and frequency or reframe the record as a VM reconstruction that intermittently covaries with the NPGO.

S4. We thank you for identifying this important ambiguity in our interpretation. We agree that our previous description of the late 1960s–1970s as a period of "VM dominance" was too strong and could imply that the VM overrode the NPGO during this interval. Our analyses show only that the Summer Kikai-SST_{coral} record corresponded more closely with the VMDI than with the NPGO Index during this period; they do not demonstrate that the VM accounted for most of the regional climate variance.

We have therefore removed the interpretation of "VM dominance" and revised the relevant text to describe this interval as a temporary weakening of the correspondence between the NPGO and VM (*Lines 616–624*). Although the two modes show substantial common variability during many intervals at decadal timescales, their correspondence weakens during some periods, including the late 1960s–1970s. Together

with the shared interannual variability discussed in our response to Specific Comment 3 (*S3*), this distinction constrains the coupling interpretation in both time and frequency.

We have also clarified that the reconstruction of NPGO–VM-related variability is not intended as a unified index or as a direct reconstruction of either the NPGO or the VM individually. Rather, consistent with the terminology defined in our response to General Comment (*G1*), the reconstructed series represents NPGO–VM-related temperature variability expressed in the NWP. The closer correspondence of the Summer Kikai-SST_{coral} with the VMDI during the late 1960s–1970s therefore illustrates temporal changes in the relative expression of temperature variability associated with the NPGO and VM, rather than the dominance of one mode over the other. Accordingly, we have revised *Section 4.3* to avoid implying temporally invariant coupling between the two modes and to clarify the scope of the reconstructed NPGO–VM-related variability.

5. The pre-1950 breakdown in correlations may not be solely due to data quality. The post-1950 NPGO/VM correspondence is used to validate the proxy, but the pre-1950 weakening (and the null 1900-2014 correlation) is attributed solely to reduced ERSSTv5 quality. This is plausible but untested. I recommend running the spatial field correlation for 1900-1950 alone. A coherent but non-NPGO/VM pattern would suggest a different mode dominated that period, while an incoherent pattern would support the data-quality argument. Either result strengthens the manuscript.

S5. We thank you for this valuable suggestion. Following the recommendation, we performed an additional SST field-correlation analysis for the period 1900–1949 CE using the same 8–30 year bandpass filter as in *Figure 4*. The resulting map has been added as *Figure A15*. Because this analysis was conducted as a supplementary test of the pre-1950 relationship, the map is presented in the Appendices section, while its principal result is now reported in *Section 3.4* (*Lines 358–363*) and the corresponding interpretation is added in *Section 4.1.1* (*Lines 475–480*). Although localised negative correlations are present over parts of the central Pacific, the field-correlation pattern does not reveal a coherent basin-scale structure that can be clearly attributed to a different dominant climate mode during 1900–1949 CE. Thus, the new analysis provides no clear evidence that an alternative coherent mode dominated SST variability during this interval, although contributions from other modes cannot be completely excluded. The absence of a coherent alternative pattern supports, but does not demonstrate, the interpretation that the weaker pre-1950 correlations may be attributable, at least in part, to the reduced quality and spatial coverage of instrumental SST datasets during the early twentieth century. These limitations have been documented in previous studies (Thompson et al., 2008; Pfeiffer et al., 2017; Sippel et al., 2024).

6. The manuscript switches between bandpass-filtered and year-to-year analyses without indication. It is unclear whether the Figure 4 field correlations use bandpass-filtered or unfiltered data (it appears to use unfiltered data). Since the preceding results use bandpass-filtered data, the filter applied here, if any, should be stated explicitly.

S6. Thank you for your comments. Following your suggestion, we now use the 8–30 year bandpass filtered datasets for the SST field correlations in the main figures (*Figures 1* and *4*), consistent with the principal validation analyses. We have explicitly stated the filtering procedure in the figure captions. The objectives of these field correlation maps are to identify the characteristic spatial patterns associated with the NPGO and VM in the SST field (*Figure 1*) and to examine whether Summer or Winter Kikai-SST_{coral} captures these characteristic patterns (*Figure 4*). By comparing the filtered correlation patterns in *Figure 1* and *Figure 4* with previously reported NPGO and VM patterns (Figure 4b of Di Lorenzo et al., 2008 and Figure 1a of Wen et al., 2024), we identify similarities between the SST correlation pattern associated with Kikai-SST_{coral} (in particular, Summer Kikai-SST_{coral}) and the characteristic patterns associated with the NPGO and VM. We have adopted the 8–30 year bandpass filter for these field correlation analyses to maintain consistency with

the intercomparison analyses based on internally generated decadal variability. The original unfiltered field correlation maps are retained in the Appendices section (*Figures A1 and A14*) for reference. We note that previous studies (Di Lorenzo et al., 2008; Wen et al., 2024) shown for comparison do not specify whether their field correlation patterns were calculated using filtered or unfiltered datasets; therefore, we provide the unfiltered results as supplementary information.

For the SSHa field correlation analysis, we did not apply temporal filtering because the record length is insufficient to robustly resolve decadal-scale variability after filtering.

7. The temperature conversion from Sr/Ca-SST appears unnecessary for the final coral-based index. It is built from standardized Sr/Ca alone, yet a Monte Carlo temperature conversion across four slopes is carried out through the analysis. State the rationale for the conversion in the context of the index or confine it to the sections where temperature values are actually compared.

S7. We appreciate this suggestion. We have added a detailed explanation to *Section 2.7*. The purpose of the Sr/Ca-to-SST conversion has now been clarified in *Lines 237–243.* The SST conversion was performed only for proxy validation and comparison with instrumental and coral-based SST records (*Section 3.3*). The reconstructed NPGO–VM-related variability was derived directly from the standardised Sr/Ca record because the target variables, the NPGO Index and the VMDI, are standardised indices, and this approach avoids introducing additional uncertainty associated with the Sr/Ca–SST calibration.

8. Section 4.2.2 - The early 21st century positive-NPGO/negative-VM shift is attributed to anthropogenic forcing borrowed from cited studies. These are valid, but the language should consistently signal this is an external- evidence interpretation and not what the coral record itself shows.

S8. Thank you for your comments. We have revised *Lines 607–610* to distinguish clearly between the result shown by the reconstruction of NPGO–VM-related variability and its interpretation based on external evidence. Specifically, the reconstructed NPGO–VM-related variability documents the early 21st century towards a positive-NPGO/negative-VM phase, whereas the possible association of this shift with anthropogenic climate forcing is inferred from previous observational and modelling studies. We now explicitly state that the coral record does not by itself establish the cause of the shift.

Minor/Technical Corrections/Typographical Errors:

1. Figure 6 and 7 present new results for the first time. They should be placed in the Results section rather than appearing first in the Discussion.

M1. We agree and have moved *Figure 6* and *Figure 7* to the Results section. We have also created a new subsection (*Section 3.5*) by relocating and consolidating the corresponding descriptions that previously appeared in the Discussion. These revisions reorganise the presentation of the existing results and do not introduce any new analyses or results. The corresponding interpretative discussion remains in the reorganised Discussion section.

2. Inconsistent dates for the exception period. Abstract states 1970s to the 1990s, while section 4.3 says early 1970s to the 1980s. In the conclusion, it says 1970s to the 1980s.
3. "Kika-coral SrCa" appears repeatedly – should be "Kikai-coral Sr/Ca" (e.g. Line 254, Line 260 Fig. 2 caption, etc.)
4. "Palmyla-SST" – should be "Palmyra" in Fig. 6 and 7, and in the caption of Fig. 6
5. "Lynos et al., 2024" – should be "Lyons" in Fig. A2 caption
6. "Wen et al., 2004" – should be "2024" in Fig. A1 caption
7. Table A3b header indicates Core2/Core3 overlap is "1881-1884 CE", but I believe, based on Fig. A6 the overlap is between 1884-1886 CE.

M2. Thank you for your corrections. We have revised all as you suggested.

8. Equation 1 – why is there a negative sign on sigma? Is that a typo error?

M3. We thank you for pointing out the unclear notation. The negative sign was intentional and was included to reverse the sign of the standardised coral Sr/Ca anomaly because coral Sr/Ca is inversely related to water temperature. However, we agree that placing the negative sign directly before sigma (σ) was misleading and could be interpreted as a negative standard deviation. We have therefore revised *Equation (1)* by placing the negative sign in front of the standardised anomaly. We have also added a sentence explaining that the sign was reversed to account for the inverse relationship between coral Sr/Ca and seawater temperature, such that positive values represent relatively warmer conditions. This revision changes only the mathematical notation of *Equation (1)*; the calculation itself and the resulting reconstructed NPGO–VM-related variability shown in *Figures 6 and 7* remain unchanged.

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