Comments on *Nonlinear resonance in the wave–shoreline system: mechanisms and global expression.* Marius Aparicio et al 2026

Reject. The satellite data set (Almar 2023) used here (Aparicio submitted) is corrupted by tides, as detailed by Warrick et al (2024). The author's reply (Almar 2024) to Warrick does not dispute that tides can be a serious contamination. Detided shoreline data (Vos, 2023) are available online for the Pacific and parts of the Atlantic basin and a similar approach (Bergsma et al. 2024) including tidal correction is used in a recent paper with some of the same authors (Graffin et al 2025). The authors cite Graffin et al 2025 as validation of their SDS dataset, but in that paper the waterlines were indeed tidally corrected. Nonlinear triads identified in the global data set may be a tidal artifact in the satellite shorelines.

The present paper purports to study only micro-tidal beaches (range <2 m), but spring tides in Southern California are about 2m and 3m+ in Oregon, and the entire US west coast is shown in Figure 4. The horizontal tidal excursion that contaminates the waterline time-series depend on both the tidal range and the beach slope. A 2 m tide difference along a typical gently sloping beach (tanß = 0.04) introduces a 50 m horizontal error in the time-series. The severe distortion of tides on the satellite-derived shoreline data used in Aparicio et al. 2026, is illustrated at Torrey Pines (2m tide) by low correlations with a 15-yr data base of insitu surveys that are not tide-contaminated (Supplementary info, Almar et al 2023): **Annual averages R^2=0.45   Monthly averages R^2=0.2).** In the tide-contaminated shoreline data, less than 50% of the true annual variance is explained and only about 20% in the monthly variance. Removing tides (Vos, 2023) yields annual R^2= 0.88 (Oreilly et al 2025). Subsampling tide observations to 8 days (matching CoastSat) splatters aliased tide energy widely over frequency space. The present use of tide-contaminated data is both surprising and unacceptable.

The triad analysis methodology applied both to the tide-corrupted global data and to insitu data at Torrey Pines, is problematic. The residual (deseasonalized) signal analyzed for triads is small and contains only 7% of the original shoreline variance at Torrey Pines (line 277). Additionally, only about 9 cycles of the 24-30 month period oscillations are included the 20-yr CoastSat data. Bispectral analysis, widely used to study triad interactions, but not here, shows that nonstationary (transient) triads with low degrees of freedom are statistically noisy. Wavelet-based bicoherence (with confidence

limits) for detided waterlines could be used to show the proposed triad is (or more likely is not) statistically significant.

Finally, aggregation to 30km resolution is a questionable simplification, and a single reach can include a diversity of beach orientations (within +-15 degrees are retained) and beach behaviours. Shorelines are usually mapped every 100 m alongshore and then aggregated over some homogeneous spatial unit (beach/reach, littoral cell or sediment compartment). Are results sensitive to the 30km aggregation scale?

* Almar, R. et al. Influence of El Niño on the variability of global shoreline position. *Nat. Commun.* **14**, 3133 (2023).

*Almar, R., Boucharel, J., Abessolo, G.O. *et al.* Reply to: Coastal shoreline change assessments at global scales. *Nat Commun* **15**, 2317 (2024). https://doi.org/10.1038/s41467-024-46609-w

* Graffin, M., Almar, R., Bergsma, E.W.J. *et al.* Waterline responses to climate forcing along the North American West Coast. *Commun Earth Environ* **6**, 444 (2025). https://doi.org/10.1038/s43247-025-02414-x

*O'Reilly, W.C., Merrifield, M.A., Cagigal, L. *et al.* Interannual wave-driven shoreline change on the California coast. *Nat Commun* **16**, 9967 (2025). https://doi.org/10.1038/s41467-025-65944-0

* Vos, K., Harley, M. D., Turner, I. L. & Splinter, K. D. Pacific shoreline erosion and accretion patterns controlled by El Niño/Southern Oscillation. *Nat. Geosci.* **16**, 140–146 (2023).

*Warrick, J.A., Buscombe, D., Vos, K. *et al.* Coastal shoreline change assessments at global scales. *Nat Commun* **15**, 2316 (2024). https://doi.org/10.1038/s41467-024-46608-x

*Bergsma, E. W. J., Klotz, A. N., Artigues, S., Graffin, M., Prenowitz, A., Delvit, J.-M., & Almar, R. Shoreliner: A Sub-Pixel Coastal Waterline Extraction Pipeline for Multi-Spectral Satellite Optical Imagery. *Remote Sensing*, **16**(15), 2795 (2024). https://doi.org/10.3390/rs1615279