

Two flaws raised in our review 1) Tidal aliasing and 2) Bispectral methods, are not addressed satisfactorily by the authors reply.

(1) Tidal aliasing. Figs 1,2 (below) show the authors statement that aliasing only “effects periods of a few weeks, rather than producing coherent oscillations at multi-month or interannual timescales” is wrong. The aliased sampling redistributes tidal energy broadly over frequencies (periods from a few months to a few years). Fig 4 (below, from the manuscript) shows results from Oregon and Washington where spring tides are 3+m, almost double the San Diego tides and with a similar increase is aliasing.

(2) Bispectral methods. As noted in our review, bicoherence with records including relatively few cycles (~8) of the 30mo signal are statistically noisy. The 95 % significance level for zero bicoherence with 16 dof=0.61 (Haubrich, 1965 and many others). The authors acknowledge that noise is an issue and do not claim statistical significance of Torrey Pines results. However, they say “the core results rest entirely on the observational evidence and the insitu validation at Torrey Pines”.

*"We note, however, that a full surrogate-based significance map for the cross-wavelet bicoherence is poorly constrained in this specific near-degenerate configuration. Because $f_1 \approx f_2$ and $f_3 \ll f_1$, the admissible frequency space satisfying $f_3 = f_1 - f_2$ within the narrow interannual band is extremely limited under the present wavelet parameterization. As a result, the null distribution of frequency-resolved bicoherence values becomes unstable and highly sensitive to sampling. For this reason, we regard the cross-wavelet bicoherence as a supporting diagnostic, whereas the **formal statistical assessment** of the triadic interaction is provided by the amplitude-weighted **phase-coherence metric R_w** and its permutation test* “\

The amplitude-weighted phase-coherence metric R_w is an adhoc bicoherence not previously used to my knowledge. The “formal statistical analysis” includes

Finally, because the analysis relies on remotely sensed observations of real-world signals, an additional effect-size criterion was imposed by requiring $R_w > 0.5$ Although not prescribed by existing studies, the threshold $R_w = 0.5$ represents a conservative and pragmatic choice to retain only locations exhibiting both statistical significance and physically meaning.

Fig 4 from their reply (attached) shows much of the shoreline is near the $R_w = 0.5$ threshold (values < 0.5 are presumably excluded). Weak triad coupling may be

present, but this is likely associated with aliasing and other artifacts. The large bispectra literature includes nonstationarity and wavelets (brain waves, EKG, machinery gear failure) and is relevant here.

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Lotfi Saidi, Jaouher Ben Ali, Farhat Fnaiech, Bi-spectrum based-EMD applied to the non-stationary vibration signals for bearing faults diagnosis, *ISA Transactions*, Volume 53, Issue 5, 2014, Pages 1650-1660, ISSN 0019-0578,

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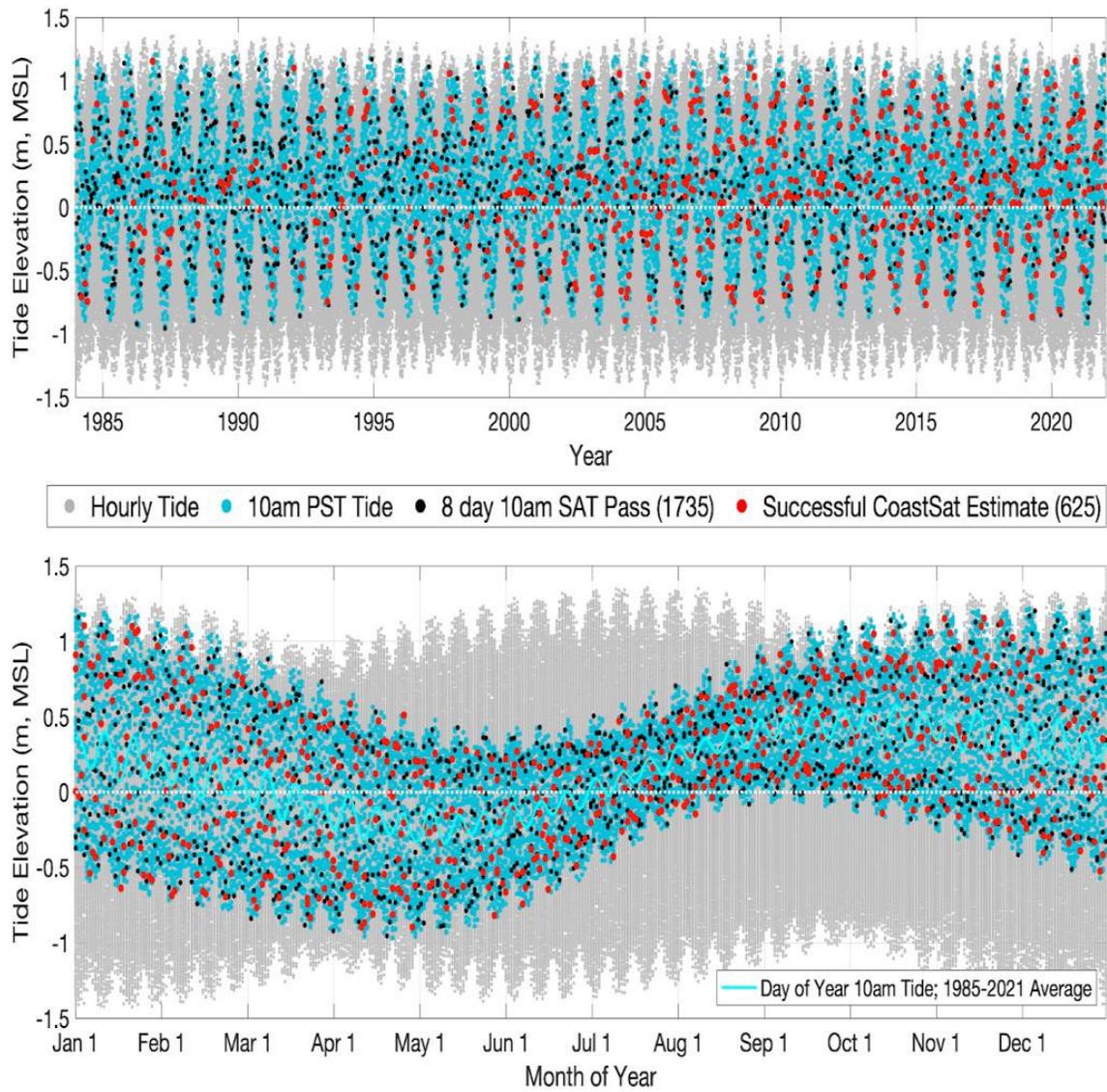


Fig1: Coastsat sampling (every 8 days at 1000 am PST) for a representative transect at Torrey Pines, Ca. The 1000 am tides are above MSL in the fall and below MSL in the spring creating a strong annual signal. With a planar beach (slope 0.04) and no elevation change over time, and no tidal correction, the Coastsat estimated horizontal shoreline location varies by 25m for 1m tidal elevation change. Note that about 1/3 of the 1735 overpasses yield successful shoreline estimates, so the actual sampling interval is often greater than 8 days.

San Diego tide gauge, Aliasing Test

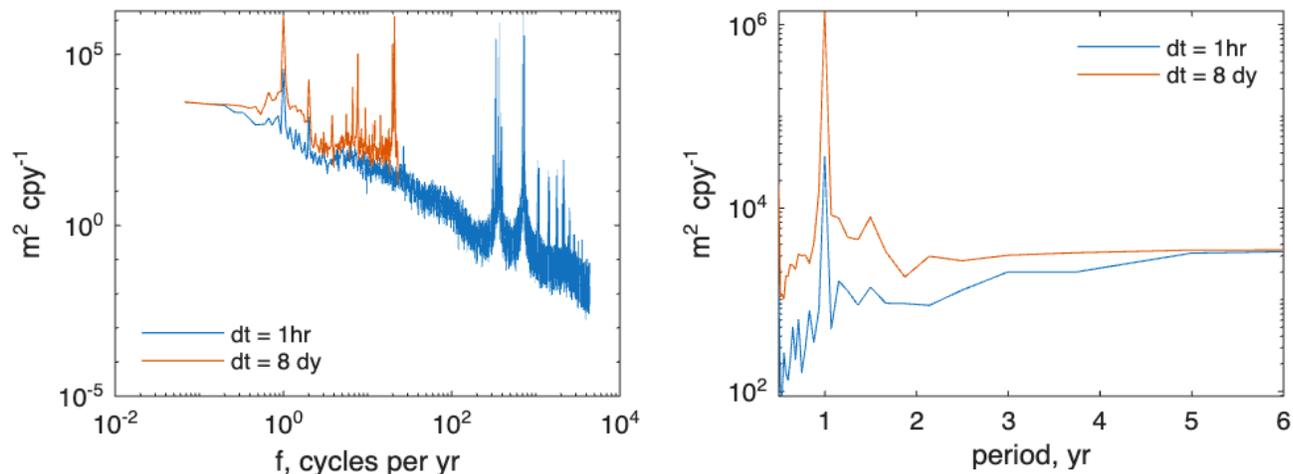


Fig 2: Spectra (average of over lapping 15 yrs blocks) vs (left) frequency and (right) period. Blue ($dt=1\text{hr}$) and red (CoastSat subsamples of nominally 8 days at 10am PDT). The aliased sampling redistributes tidal energy broadly over frequencies (from a few months to a few years) with some peaks. CoastSat tidal contamination could be coherent over large spatial scales, but aliasing details depend on the overpass time and local tides. The authors remark *"A dataset may contain noise without being unusable, provided that appropriate methodological precautions are taken."* The appropriate precaution and current best practice is to correct for tides.

