

Earth Syst. Sci. Data Discuss., community comment CC1  
<https://doi.org/10.5194/essd-2021-388-CC1>, 2021  
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## Comment on **essd-2021-388**

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Community comment on "Beach-face slope dataset for Australia" by Kilian Vos et al.,  
Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-388-CC1>, 2021

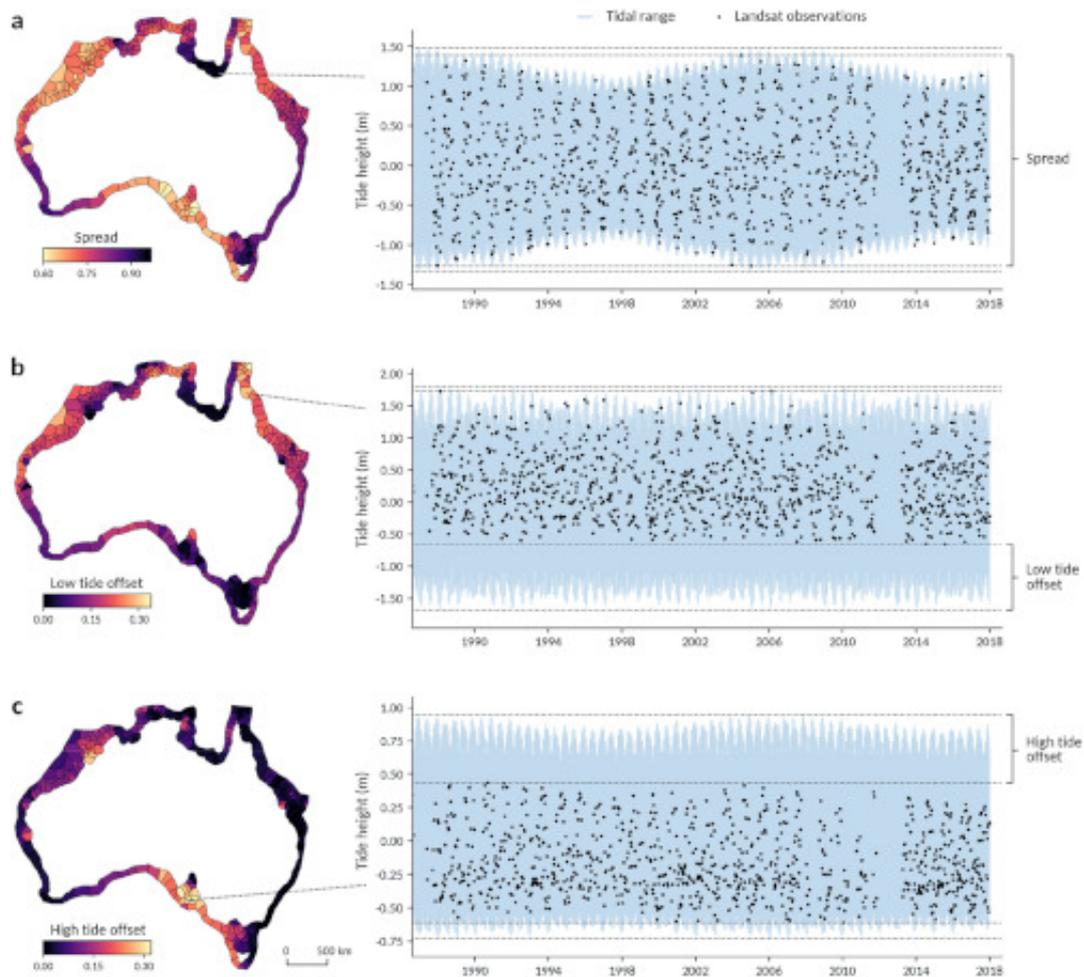
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The beach-face slope dataset for Australia described here is an incredible achievement - I commend the authors for an amazing dataset that will be a fantastic resource for coastal science in Australia. The pre-print is well-written and does an excellent job of explaining the scientific method behind the dataset. The data itself is well-documented and easy to use.

### Specific comments:

I particularly enjoyed the discussion/analysis of tidal aliasing and its influence on intertidal slope precision - this is a challenging (and often ignored) issue for any remote sensing studies dealing with monitoring coastal processes at regional- to global-scale with sun-synchronous sensors like Landsat or Sentinel-2.

Although the impact of biases in the overall percent of the tide range observed by sun-synchronous satellite sensors is well covered in the manuscript, I am interested in how the modelled beach face slopes described here are influenced by more specific biases in the proportions of highest or lowest tides that are observed by satellite sensors. We recently described these biases as the "high tide offset" and "low tide offset" (Figure 8B and 8C; <https://www.sciencedirect.com/science/article/pii/S0272771418308783#sec3.5>), and found they can vary significantly along the Australian coastline, with up to 30% of lowest or highest astronomical tides never imaged by Landsat. These biases are particularly problematic for continental-scale applications, as they make it difficult to compare tide-based outputs like-for-like between different locations.



My assumption was that the *CoastSat.slopes* process uses all available satellite-derived shorelines acquired across the full satellite-observed tide range to generate the slopes. If this is true, this would infer these biases would cause the derived beach slopes to represent different regions of the intertidal profile along the Australian coastline - e.g. slopes in locations where there is good coverage of the entire tidal range might represent MLWS to MHWS slope, but perhaps just MLWS to MSL in areas where high tides are poorly sampled. The pre-print however states that the beach face slopes consistently represent the "long-term average slope between MSL and Mean High Water Springs (MHWS)". Is there some correction taking place here to normalise slopes to that consistent MSL to MHWS portion of the intertidal profile?

If not, I would suggest that expanding the existing slope datasets metadata to include a description of these low and high tide biases (perhaps in the form of new fields documenting the lowest and highest tides observed in the satellite data vs. the local MLWS/MHWS or LAT/HAT) would be an extremely useful addition to the existing "% MSTR observed" field. This would provide downstream users with valuable additional context describing the portion of the intertidal profile used to derive the slopes, and enable users to evaluate the potential impacts of these biases on their given application.

### Technical corrections:

The GeoJSON output files currently use a `EPSG:3112 - GDA94 / Geoscience Australia Lambert - Projected` CRS; this is technically against the most recent version of GeoJSON spec (<https://geojson.org/>, <https://datatracker.ietf.org/doc/html/rfc7946#page-12>) which only supports geographic WGS 84 coordinates. This isn't necessarily a "must fix", but it may lead to some compatibility issues in downstream software.

The readme page here (<https://zenodo.org/record/5606217#.YbwgH2hByCo>) does not appear to document all fields in the beach and transect slope datasets - "% MSTR observed", "Mean Sprint Tidal Range [m]", and "Beach length [m]" at least would be good to include here.