

Reply to comment on [essd-2023-230](https://doi.org/10.5194/essd-2023-230) (<https://doi.org/10.5194/essd-2023-230-RC1>) by an Anonymous Reviewer.

We extend our appreciation to the referee for the constructive feedback and insights pertaining to our research. We provide a point-by-point response (R) to the reviewers' questions (Q). :

Comment 1:

Q: Would you clarify the rectification process (transform the image from pixel coordinates u, v to world metric coordinates X, Y, Z) in the data processing section.

R: Thank you for your remarks. The principal aim of this manuscript was not to provide an exhaustive elucidation of the methodological intricacies of CoastSnap. Instead, emphasis was placed upon the practical application of the methodology. The rectification process, encompassing the conversion from the image coordinate system to the terrain coordinate system, is a firmly established mathematical procedure. This procedure was previously elucidated by Harley et al. in 2019 (<https://doi.org/10.1016/j.coastaleng.2019.04.003>) within "Section 2.2.1: Image Georectification." The aforementioned article was intended to set the basis and the comprehensive methodological framework of CoastSnap in its entirety. The inclusion of the methodology would unnecessarily lengthen the manuscript, as it would constitute a repetition of the article previously published by Harley et al. 2019. In the submitted version of our manuscript this procedure was summarized and the reference of the original work was added, specifically within lines 199-204 (Section 2.2.3 Data processing).

Reference: Harley, M. D., Kinsela, M. A., Sánchez-García, E., and Vos, K.: Shoreline change mapping using crowd-sourced smartphone images, Coast. Eng., 150, 175–189, <https://doi.org/10.1016/j.coastaleng.2019.04.003>, 2019.

Comment 2:

Q: The reviewer recommends calibrating your model with high-resolution temporal satellite images for at least two of the studied five coasts (one for the meso-tidal coasts and one for the micro-tidal coasts). It is favorable to do this calibration for the Cadiz site due to shortage of the data during most of the year.

R: We agree with the reviewer, but it is of notable significance to underscore that the calibration procedure has been meticulously contemplated to be executed through the utilization of GPS in-situ data, primarily owing to its discernibly elevated precision levels. It is imperative to underscore that the employment of satellite imagery for the purpose of coastline detection at sub-pixel level necessitates a preliminary calibration procedure, effectively leveraging in situ GPS data. Furthermore, it is imperative to acknowledge that engagement with satellite imagery characterized by exceedingly high resolutions would invariably entail a transition toward proprietary entities offering data for monetary compensation, a trajectory that significantly diverges from the fundamental objectives intrinsic to the CoastSnap open citizen science initiative.

Comment 3:

Q: There are several factors affecting the coastal shorelines should be take in consideration within the produced model (especially in the micro-tide shorelines) e.g. waves, winds, thunder rainfalls etc....

R: The referee's viewpoint aligns with our perspective. It is crucial to know the dynamic interplay of factors, including wave dynamics, wind effects, and related variables, which significantly

shape the shoreline's positioning. Moreover, it is essential to recognize that the acquisition of such data mandates the establishment of measurement networks at each geographical location, complete with specialized instrumentation or modelling and the requisite resources for maintenance and data analysis. It is imperative, however, to note that these measurement networks are not universally accessible across all monitoring scenarios.

The methodology used within this manuscript seeks to uphold cost-effectiveness and underscore its applicability in regions where direct access to specific in-situ beach monitoring data or knowledge in modelling software is limited or where financial constraints prevail. Consequently, within the confines of this study, a localized tidal offset unique to each CoastSnap station is implemented. This approach serves to refine elevation approximations for the shoreline, thereby advancing the precision of its XY coordinates. Such strategic deployment of this methodology remains steadfast, even in light of the inherent intricacies inherent to the underlying phenomena.

We have introduced several lines of clarification within Section 2.2.1, titled "Data collection" to expound upon the assumed corrections applied during the shoreline extraction process. The modifications to the text have been incorporated within lines 170 to 176 of the document, as follows:

"It is important to note that precisely resolving the complex interplay among various influential factors in shoreline elevation (e.g., bathymetry, significant wave height, wave period, wave direction, winds, run-up) requires the utilization of sophisticated models that rely on in-situ data. However, such data is often deficient, as is evident in the study areas under consideration. While this circumstance might introduce a degree of uncertainty, the computation of the vertical tidal offset employed in generating the provided dataset is inherently straightforward. This approach aligns with the corrective methodology proposed within the CoastSnap framework, and mitigates errors associated with the aforementioned factors in the estimation of shoreline elevation. (Harley et al., 2019)."

Comment 4:

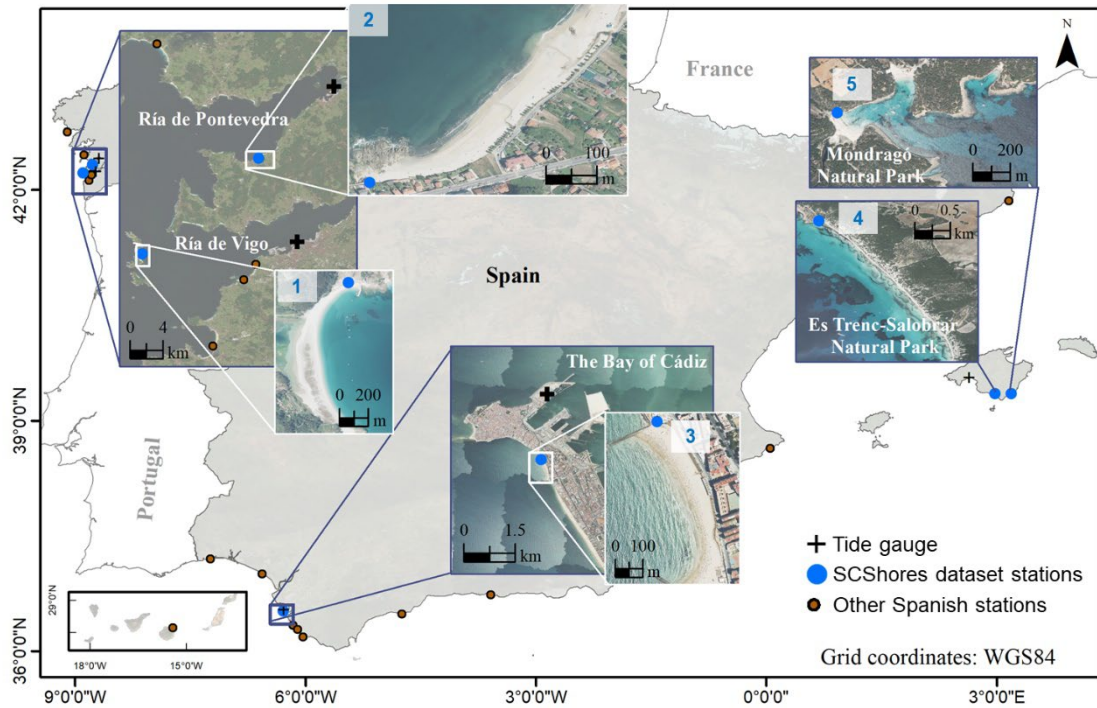
Q: With respect to the figures 1, 4 and 7; the reviewer recommends to enlarge the images in order to clarify its content.

R: Thank you for the comment, but the authors do not fully comprehend the meaning of "enlarge the images to clarify content." The images were created in accordance with the journal's specifications and submission guidelines. We have diligently prepared all figures at a resolution exceeding 300 dpi, with the intention of subsequently submitting them as individual files for the production phase, thus ensuring their superior quality. This measure is explicitly aimed at enabling potential enlargement, as per the specifications outlined by the ESSD journal, which dictates that figures should not exceed a width of 8 cm.

Nonetheless, new versions of the figures have been generated in an attempt to magnify the graphical content while seeking enhancement. We have included the versions that have been created for your reference, so that the reviewer can indicate which of these improvements aligns more closely with their request.

Options for Figure 1:

Version 1:



Version 2:

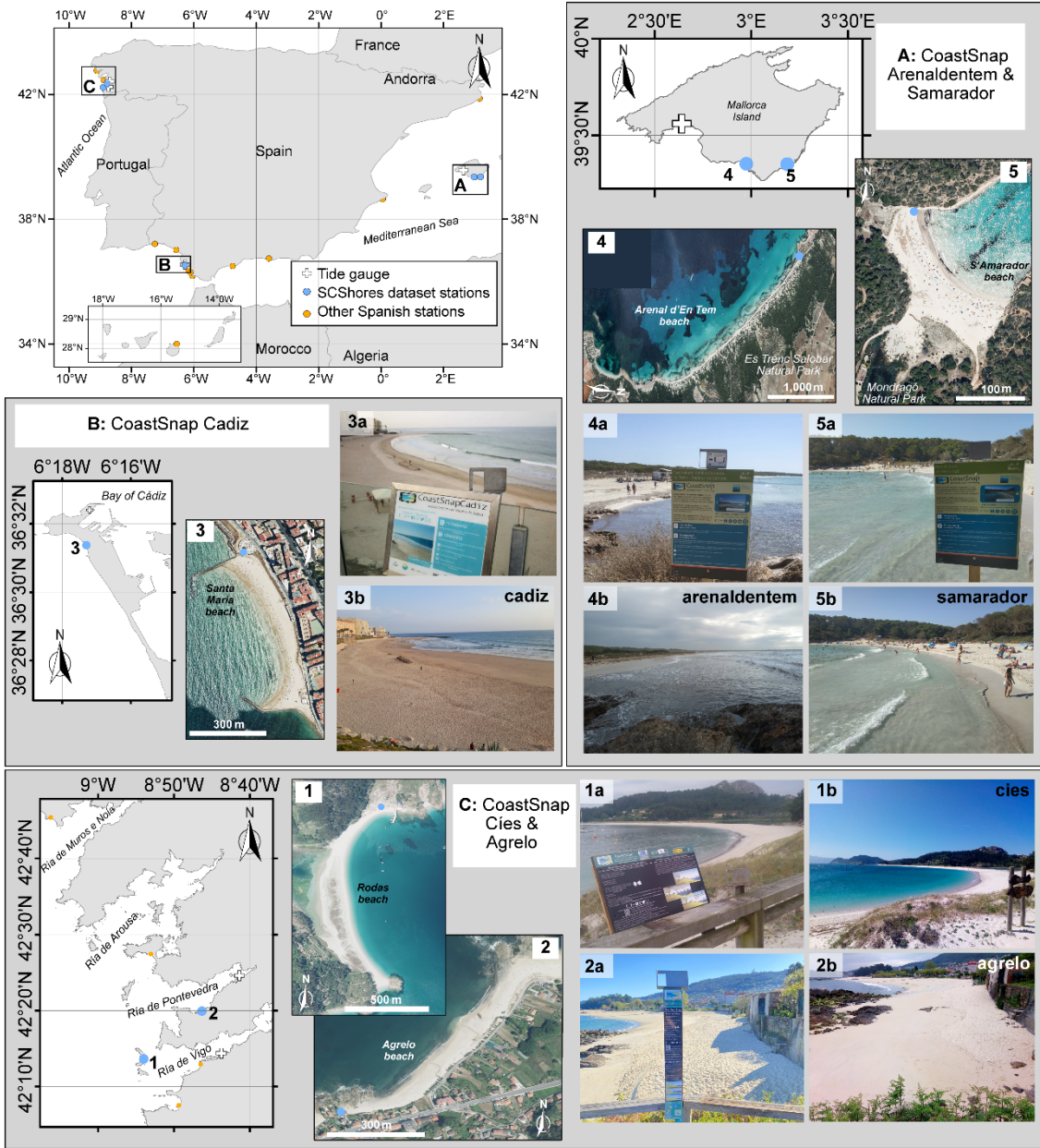


Figure 4:

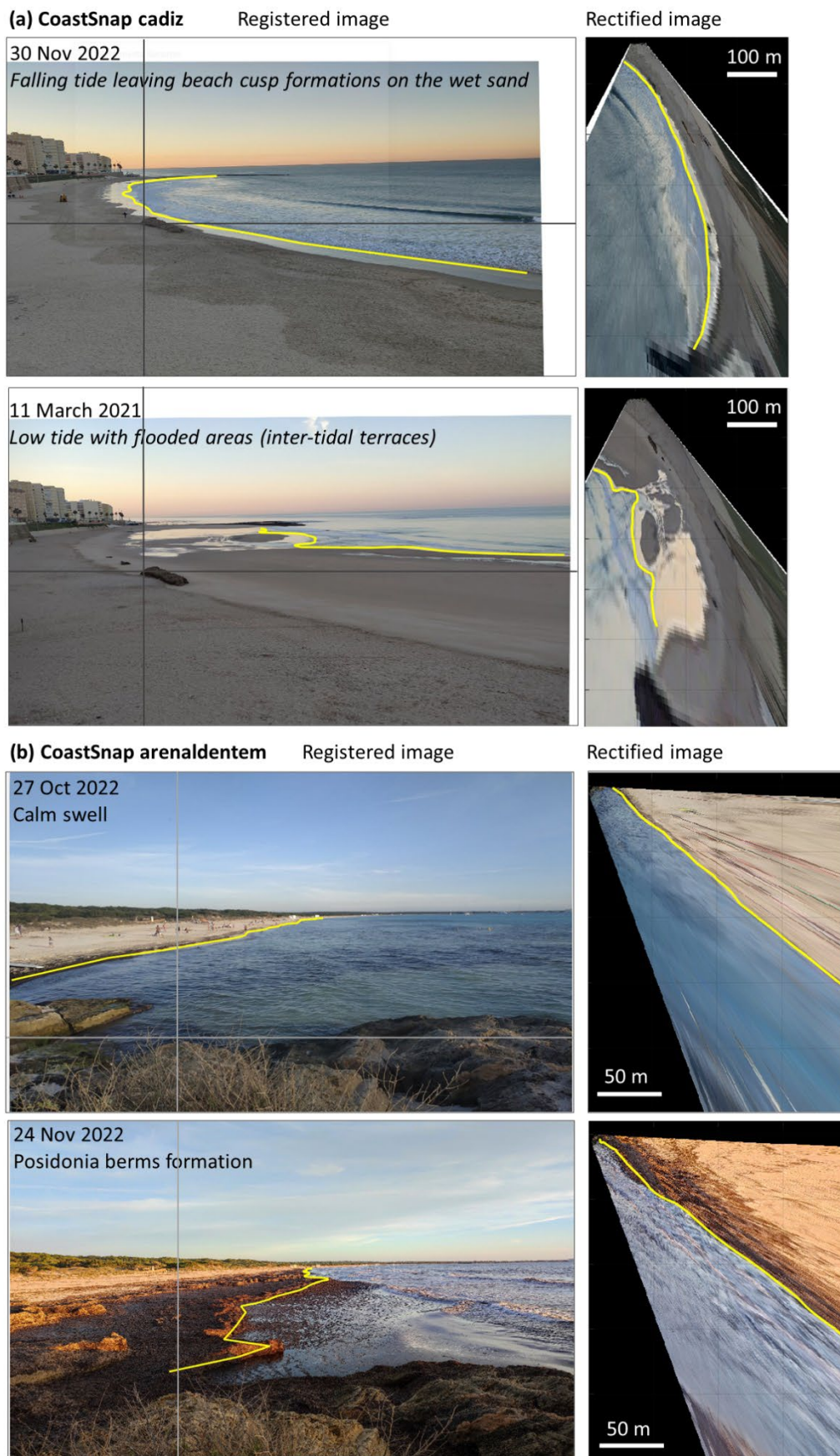


Figure 7:

