Dear authors,
thank you for the revised version of your manuscript, in which you have addressed almost all of the previous referee's and my comments. I consider the outcome to be a much improved manuscript. One of the previous reviewers looked at it again and has a few final comments that I would like you to address before final acceptance.
Best regards,
Dirk Scherler

Dear editor,

Thank you for the support to publish this work. We are pleased that the modifications addressed the majority of the previous comments and concerns. We hope the following modifications address the few final comments.

Best regards,

Oswald Malcles, on behalf of the authors

---

Answer to the reviewer:

Dear Dr. Romano Clementucci,
Thank you for the new review of our paper. We are pleased that our work based on your review and the ones of A.D. Wickert provide satisfactory improvement. We hope the following modifications will address your lasts comments in a positive way.

Best regards,

Oswald Malcles, on behalf of the authors

Reviewer (Romano Clementucci):

The paper has improved significantly and seems to approach the final submission stage. However, I noticed that my initial comments regarding dynamic topography and the role of mantle processes in the long-term uplift of the Armorican Massif were not addressed. This was a major point in my initial review. While I understand the workload involved, I believe it would be informative to add at least a sentence or, ideally, better references to support this aspect. The only reference I found in the Introduction is quite general and pertains to the African Superplume. Could you provide more relevant references and include a few sentences discussing this process in either the Introduction or the Geological Setting section?

We do not know of studies addressing specifically Quaternary dynamic topography in the Armorican Massif or western France, but we know include three references that study potential dynamic topography for Western Europe in the Neogene period:
- To start, we added in the introduction an explicit mention of regional dynamic topography and a reference discussing its possible effects in northwestern Europe (Pedersen et al., 2016).
- We did not change the geological and geomorphological setting because this section focuses on observations and estimations of uplift without mentions of any potential driving mechanism.

- We rewrote the last part of the discussion in Section 6.2 to better described potential dynamic topography and mantle flow contribution: "Thus, within the uncertainties associated with the eustatic sea level estimations, erosion-driven uplift can explain the uplifted Upper Pleistocene marine terraces around the Armorican Peninsula, without a need for additional geodynamic processes. No study has specifically addressed the Armorican Peninsula, but some have associated the observed Neogene – Quaternary uplift in northwestern Europe with the Quaternary glaciation cycles (Westaway et al., 2002), Cenozoic orogeny (Pedoja et al., 2018), or dynamic topography due to large-scale mantle flow (Cloetingh, 2007; Carminati et al., 2009; Pedersen et al., 2016); the latter potentially resulting in very broad wavelength (100s – 1000 km) uplift rates up to a few 10s of $m.Ma^{-1}$, similar to or slightly faster than those due to regional erosion rates. While our results do not rule out the role of dynamic topography (or other geodynamic process) in driving Neogene – Quaternary uplift of the Armorican Massif and intraplate northwestern Europe, they indicate that, because slow erosion is a continuous process for onshore areas, its associated isostatic response and induced uplift rates must be considered when studying these potential additional processes."

Few last adjustments from my side:
Here I reported my previous comment and author answer to ensure continuity:
Reviewer comment:
L306-307: It is more likely that these sediments have been deposited in the last 125 thousand years rather than over the past 2.5 million years. Are there seismic lines that show the most recent transgressive and regressive deposits on the shelf? Over the past 2.5 million years, there have been many fluctuations in sea level and several phases of erosion (both subaqueous and aerial) on the shelf. If the deposits are Quaternary, the sedimentation rates should be between 1 and 5 meters per 125 thousand years, resulting in up to 40 meters per million years.

Reviewer floow-up:
I agree with the authors and understand the assumptions. However, as stated, if deposition had occurred only in the last 7-6 ka (HST), the resulting rates would be even higher. This explanation is not clearly stated in the paper. I strongly recommend adding a note clarifying that the considered estimates used to inform the model represent minimum values.

Authors:
Given the available data, the finite sediment thickness is a few meters to a few tens of meters and is interpreted as the total sedimentary record over the Quaternary by our Ifremer colleagues (cf. acknowledgments). We base our models on this interpretation. However, the alternative (shorter period and faster rates) could indeed be considered as the time constraints are limited. We modified the text and added a caveat sentence to mention this point as a source of uncertainty in our analysis: "These sedimentation rates, representing minimum values based on their Quaternary deposition timing, are too low (one order of magnitude smaller than land denudation rates) and too localized to produce significant effects on land (subsidence rates of 0–2 m·Ma-1, Fig. 7). However, constraints on their deposition timing and sequence are limited and these sedimentation zones could be associated with more recent highstands, thus with faster sedimentation rates. This remains a source of uncertainty in our models, especially for uplift rates along the coast near high-sedimentation areas (Fig. 4)."

Lines 530 to 537- It is incosistent to state that high erodibility promote fast erosion rates post 2 Ma and on the next sentence state that high erosion and relief are due to low erodibility..
Erodibility should not directly control erosion; usually and follow the theory, the erodibility should set the channel steepness and relief and they should adjust to each other without impacting erosion (E =

ksn x K, if we consider a linear form). So, if K increase, ksn (or relief) would decrease, and viceversa. If there are high relief and lower erodibility that s does not imply differences in erosion rates.

A possible way to have lower erosion (without variation in Uplift) may be having stronger rock and lower erodibility, but not the opposite.. Instead of discussing erodibility, erosion, and relief in this way, I suggest focusing on the process of surface denudation in highly erodible marine sequences, as this would provide a clearer and more robust discussion.

Suggested revision: “the east-west difference in denudation rates, without spatial variation in uplift rates, can be explained by spatial variability in erosional efficiency of Red Sands. All the selected catchments are characterized by the similar bedrock and rainfall rates (?; references), but the presence of high erodible Faluns formation in the western catchments during the Quaternary, may have produced a low-relief landscape. Therefore, the difference in topographic relief might have been produced by the quick erosion of young marine deposits since 2 Ma, producing a low-relief landscape on the western region.

Agreed, our explanation of this point was not clear. We simplified the discussion and used your proposed formulation.

I am looking forward to see the manuscript accepted and published
Cheers,
Romano Clementucci