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Reply on RC1

Carlos Corela et al.

Author comment on "The effect of deep ocean currents on ocean- bottom seismometers records" by Carlos Corela et al., Nat. Hazards Earth Syst. Sci. Discuss.,
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Concerning the title of the manuscript instead of having "The OBS noise due to deep ocean currents" the new title is "The OBS noise due to deep ocean currents and sediments" to join to the discussion the OBS-sediments coupling resonance frequency. The main issue of this manuscript is the noise caused by the currents in the OBSs structures, however, the OBS in SW Iberia are deployed on sediments. The section 3 was restructure and increased with 3.3 Noise Levels on the NT OBS04 and LX OBS01.

"I think you provide clear evidence that the new instrument designed at IDL has a much better performance regarding the noise impact of bottom and tidal currents. You should better focus on this aspect throughout the manuscript."

The new OBS is only mention with the main purpose to show the absent of harmonics tremors when we don't have mechanical object strumming at the currents flow.

"The manuscript needs in parts some restructuring. I would move several paragraphs to other chapters, e.g., lines 135-145 reads to me more like Introduction but not Data and Methods."

I have moved the subject from Data and Methods (135-145) to the introduction.

"Also the model of Voet et al. (2020), which seems to be a fundamental base for the study should be explained in more detail. You take the amplitude of the noise in certain frequency/period bands as a proxy for current speed. I do not fully get that yet from the manuscript. Also, you should indicate later in the manuscript that you always interpret the proxy but not directly measured current speeds!"

I add a new figure (Figure S1 in the supplement) and more explanation regarding the Voet et al., (2020).

I made clearer the sentence that the amplitude records between 20-60s are the proxy to the current speed. I focus the fact that we don't have current meters at the seafloor.

"You discuss the influence on permanent geostrophic and tidal components of bottom currents. However, you never introduce the existing knowledge of currents in the study region. At least a map and short introduction to existing knowlegde on bottom (and tidal)

currents is necessary as a base for your interpretations."

I have introducing the current knowledge of the tides in SW Iberia. The kelvin wave propagates from south to North and the tides has elliptic paths. The permanent low-frequency flow current arrives from NW to SE (from generic maps – gulf stream) but here, in SW Iberia, I don't find any authors with this subject on the deep ocean.

"Could you a bit more elaborate on the differences between NT OBS 01 and NT OBS03, with respect to their different locations (topography, bottom current regime)."

I give my interpretation of what I see in the OBS01 and OBS03 data records according to explain in Voet et al., (2020). According to what I see in OBS, I made a new figure explaining the tidal and low-frequency current flows. However, our intention is to focus on the OBS records and not in the oceanography subject.

"The instrument-sediment coupling was not at all explained and discussed but appears in the conclusions. Either extend that topic or leave it out."

I choose to extend that topic. In the introduction I add this subject.

"I miss a short statement about potential effects caused by the use of different types of seismometers."

I wrote about the potential effects of using different sensors and different configurations (in the OBS structure or small package disconnected from OBS structure).

"Use abbreviations only, if you really need them. And if you use abbreviations all should be explained within the manuscript text and within the figure captions, separately."

Done. I gave more attention to abbreviation and wrote the project NEAREST (Integrated observations from NEAR shore sources of Tsunamis: towards an early warning system) and DEPAS (German instrument pool for amphibian seismology).

"How do you know about the noise frequencies caused by the antennas? Why the noise is not excited by the radio and flash light beacons?"

The noise frequencies caused by the antennas was study with flow simulation software and simulated on the running tank. If the noise was excited by the radio and flash light beacons something was needed to excite them, and the only possible mechanism was the OBS-sediment coupling resonant system. However, from Figure 9, the radio antenna resonance starts earlier than the OBS-sediment system.

"What are "flow patterns" to you? (e.g., line 175)"

The flow pattern was used to identified the same response of the instrument at different spring tides and neap tides.

"What is "energetic phenomenon"? (Line 221)"

The term energetic phenomenon was used to represents the von karman vortex process observed on OBS04. However, the term was corrected for increase amplitude and frequency.

"How the flow gets turbulent? Is it the complete flow that gets turbulent, or do just the OBS components cause turbulences at a certain flow speed?"

When the current flow, that impacts the OBS structure, is under a certain speed, the flow is laminar and the response of the instrument has a lower amplitude. After a certain speed (the threshold speed) the flow that impacts the OBS is observed in the rear part as a turbulent flow, different for the several components of the OBS, like rope, flag and radio antenna and the OBS structure himself, and the observed amplitude start to increase, from 60 to 20s, when the speed increase. Likewise, when the speed decreases the amplitude start to decrease, from 20s to 60s, and when the flow became laminar the amplitude of the signal between 20 and 60s decrease and return to its natural state. I explain this clearer in the review manuscript.

"Why do you use different color scales throughout the manuscript?"

All the figures have been corrected and we use the same color scale throughout the manuscript.

"Be consistent in using terms like "band" or "domain". (e.g., line 266)"

The term domain disappeared from the document and the term band was adopted.

We add one Figure S1 to the supplement file to show the balance between the tidal flow and low-frequency flow to help understand the mechanism that suppose exist in seafloor.

We add more 18 Figures to illustrate the spring, neap and string tide of NT OBS03.

We add one more Figure S40 to show an example of NT OBS12 that doesn't show any evidence of tilt noise and harmonic tremor.