

## ***Interactive comment on “Discovering sounds in Patagonia, characterizing sei whale (*Balaenoptera borealis*) downsweeps in the south-eastern Pacific Ocean” by Sonia Español-Jiménez et al.***

### **Anonymous Referee #2**

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Manuscript: Discovering sounds in Patagonia, characterizing sei whale (*Balaenoptera borealis*) downsweeps in the south-eastern Pacific Ocean.

Authors: Español-Jiménez et al.

General Comments: This study summarizes the results of passive acoustic data collected in the region of the Golfo de Penas in 2016 and 2017, part of the same area in which an incredible mass stranding of sei whales occurred in 2015. As no data have been available on the acoustic occurrence and characteristics of sei whale vocalizations from this region, this study has the potential to provide useful, new information. However, currently the manuscript is lacking essential detail, and needs to be carefully

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reconsidered by the authors. There are two broad issues with the current presentation of the data. First, the authors need to provide further justification as to the assignment of these calls to sei whales. As has been pointed out in previous publications (i.e. Rankin and Barlow 2007), most balaenopterid whales produce low-frequency downsweeps, and some of them are very similar. Where the authors of the current study have concluded that the downsweeps recorded in their region have higher frequencies and longer durations than those published from other ocean basins, it becomes necessary to even more carefully evaluate species assignment. In particular, the authors should evaluate their results in comparison to blue whales, which are also known to occur in the coastal region of southern Chile, and address how they are able to distinguish the downsweeps of these two species. Part of this should include whether vocalizations of other species were also acoustically detected in the same dataset. Second, the authors need to provide more detail on their data collection and analysis protocols, which are only cursorily summarized in the current manuscript, and take care not to draw conclusions that their analyses do not support. For example, they present no analysis of the diel patterns in call occurrence, but then discuss their observation of nighttime calling behavior. Similarly, they present no visual sightings data, but then mention sightings in the discussion. Discussions such as these need to be grounded in an appropriate presentation of the data first. With a bit more work, this study could provide a useful contribution to the literature.

Specific comments are given below:

Introduction: Line 31: I think you might mean to say “least known” rather than “least unknown”. Either way, there are other species that are arguably at least as poorly studied; Bryde’s whales come to mind. You might simply say that they are poorly known.

Lines 37-38: A recent study published in Conservation Genetics (Huijser et al 2018) addresses population structure of sei whales between the North Atlantic and North Pacific.

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Line 40: This is a misinterpretation of the data discussed in Donovan 1991. He mentioned that eight “concentrations” of whales had been identified in the North Atlantic, but that these did not necessarily represent different stocks. In fact the IWC recognizes 3 management units in the North Atlantic, though actual stock delineation is unclear.

Line 49: There is a general inappropriate use of apostrophes throughout the paper. In this example, this sentence should begin with: “Population boundaries” not “Population’s boundaries”. In other instances, for example on line 42, the text should read “sei whale sightings”, not “sei whale’s sightings”. Line 75, there should be no apostrophe in “strandings”. Please check for this and correct throughout the manuscript.

Methods: Much more detail needs to be included in the methods; in its current form, this section is completely lacking a large body of necessary information.

Line 109: what is an “HF 200kHz hydrophone”? Is this a hydrophone model?

Line 114: The hydrophone deployment method is a little unclear. Was the hydrophone suspended for up to 5 days over the side of the vessel? How many recording stations were conducted? What were the positions (lat/longs)? What was the sampling rate? How were the data recorded? Are these archival recorders, or were you using a computer, a recording deck, etc, and if so, what equipment was included?

Lines 119-123: This section is completely lacking in any detail on the analyses. How were the sounds reviewed? Using spectrograms? What page size, what FFT? How were signals from sei whales distinguished from other species, such as blue whales (which also produce similar low-frequency downsweeps)? How were measurements conducted? Issues with measurements such as low and high frequency that are strongly affected by spectrogram parameters and SNR have been recognized in the literature; Raven and other software packages (i.e. Ishmael) offer a set of more “robust” analyses; these need to be used as well. It appears that two software packages were used (Audacity and Raven). What was each one used for?

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Results: Line 128: It is difficult to understand the recording scheme; the math as currently presented does not add up. 16 days of recording would be 384 hours, not 136. Were the recordings duty cycled? In the methods, you describe that the hydrophones were deployed from 2-5 days at a time, so it would seem that you'd have many more hours of recording over 16 days and 19 days. Please clarify this both in the methods section and here.

Line 133: What SNR was used to determine quality?

Figure 1: Which whale tail corresponds to which year? Also, the area where putative sei whales were detected appear very close to recording sites where they were not detected. Is there any explanation for why this might be?

Discussion: Overall, there is no discussion of one of the main outcomes of this study – that despite the number of sites sampled, putative sei whales were only detected very rarely, and only in two locations. Why might this be? Could this have to do with the sampling scheme (ie duration of sampling at each site) or noise conditions (ie masking of signals)? How does this conform to your expectation?

Line 157: No information on visual survey data collection was given to support this statement. Were visual surveys conducted during this expedition? If so, and if that information is to be used as supporting evidence, then details on data collection methodology and results need to be presented.

Line 160: Johnson et al (2010) did not describe sei whale calls. Their report only shows two example spectrograms from recordings during different periods and/or places, and the report cited actually concluded that no sei whale calls were recorded during that period at that site. This citation should be removed from the manuscript.

Line 196-217: With a sample of only 41 calls, it is doubtful that you have enough data to assess diel trends. However, if you would like to attempt this, you need to quantify your recording effort by diel period, and present the results accordingly. As it stands,

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there is no foundation for this section of the discussion.

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