

Review

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

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General comments

Opportunistic passive acoustic recordings made over several weeks in May during two years were used to identify the presence of sei whales and describe their calls. The objective of the study to describe sei whale acoustic behavior for this region where sei whale calls have to date have been sighted but not acoustically characterized is very valuable to forward knowledge on the distribution and occurrence of this elusive whale species. However, there are several methodological aspects that are not sound enough to convince that the calls recorded have actually been produced by sei whales. The main issue that I see, is that at least three other baleen whale species that also occur in the region produce highly similar calls. These downswept calls are so similar between these species, that the possibility of (purely acoustically, i.e. without sighting information) attributing them to a specific species with certainty is heavily debated among experts. The sei whale downsweep described here falls within the 'acoustic ballpark' of these baleen whale downsweeps. Without further cues, i.e. the association to other calls, sightings, it cannot be concluded with certainty that these calls are actually produced by seises. Other issues that blur the results relate to the description of the acoustic specifications of the recording equipment which is not complete, the way acoustic measurements of the calls were conducted (selection of measurement points, consistency in measurements) and the potential effect of varying background noise conditions which may have affected the measurements leading to different outcomes between years. All in all, I suggest that the authors take aboard the suggestions and continue their measurements in the field to obtain more robust data and carry out acoustically sound analyses to further the knowledge status of sei whales in Patagonian waters.

Specific comments and Technical corrections

Abstract

P2, line 13: I don't agree with this statement given that there are many other whale species that are even less known. Least known baleen whale species could be, anyway, it is not a contest, so I would suggest to spend these words differently.

Line 13-15: Information on their distribution and their occurrence – given that it is such a rare species - (that can be deduced from the PAM data) are of greater relevance than regional vocal variation, in my opinion.

Line 17: *calls were identified to be sei whale downsweeps or calls were attributed to sei whales*

Introduction

P3, line 31: least known baleen whale species

Line 37-38: Kanda et al. 2006 investigated sei whale samples collected only in the Northern Hemisphere, so this is not the correct evidence for the statement that there is no clarified genetic separation between populations from different hemispheres.

P5, line 59: pelagic whaling

Line 93-95: Replace: „...cetaceans by recording their vocal signals. Passive acoustic data can then be used to characterize...”

Line 96: „poorly known (Prieto et al., 2011). To date, vocalizations have been described...”

P6, line 101-103: A description of the soundscape would encompass all biotic, abiotic and anthropophonic sound sources that occur in the area. Given that this study only describes the sei whale signatures, it is not a soundscape baseline. I also think it should be made clearer in the objectives of the study how passive acoustic recordings can add to knowledge about this population and species. What are the questions that you could answer once you know which sounds they produce? There is a lot of information provided in the paragraphs above on how their stock structure is so unclear, but these remain unconnected to what acoustics can add. This connection and clear stating of the objectives needs to be improved.

Methods

Line 109: Is this the actual name of the hydrophone? It sounds to me as if this is the iListen from Ocean Sonics, could this be? The frequency response does not go until 200kHz, is this correct?

Line 112: To what recording device were the hydrophones connected and what were the recording specs of these?

Line 115: Was the engine still running during this time?

P7, lines 121-123: There is a lot information missing here: How were these parameters measured? From the spectrogram? With which settings? Were these kept consistent, how? Were these done by hand or was the Raven tooling used? Why was the data first analysed with Audacity and the measurements done with Raven? What was the precision of the measurements (i.e. were the measurements repeated for a subset to see if the data could be reproduced and if so with which precision)?

Line 123: Can you visualize how the parameters were extracted from the spectrogram?

Results

P 9, line 129: How were you sure that these were sei whales? Was there a visual confirmation that sei whales were in the vicinity?

Line 133: How was high quality defined? How was a high signal to noise ratio defined, was it measured? Was there a snr threshold?

Line 134: Different naming of hydrophone then in methods

Line 135 and Fig 02: How did you distinguish from the frequency modulated signatures produced by other baleen whale species? Blue, fin and minke are all known to produce similar type calls. What characteristics distinguish the sei whale downsweeps from the sweeps produced by other species? I am highly sceptical that this is possible and if these are the only calls that were attributed the sei whales, there needs to be a clear elaboration added to the method section of the manuscript explaining the call characteristics that allowed attributing these to sei whales with certainty. Did you also look into associated calls (i.e. calls produced preceding and following these downsweeps)?

Discussion:

P 12, Line 154-157: This is not a very strong argument given that the calls recorded are also not that typical in acoustic structure. Baleen whale downsweeps have been estimated to still have a detection range in the orders of tens of kilometers, so do not necessarily have to be sighted to be heard. Especially given that the ship was on station during recording, the area that was 'acoustically surveyed' was not particularly large.

I suggest a more elaborate explanation of why the recorded calls are not produced by fins, blues or minke. This would be strongest if you also had downswept calls of these species in your recordings that you attributed to other species than sei.

Also for the community to be able to use your data and information to identify Chilean sei whales in their recordings, the description of the calls needs to be much more elaborate.

Line 157-165: This explanation and argumentation is not sufficient, blues, fins and minke also typically produce low frequency downswept calls as part of their vocal repertoire.

P13, line 177-179: Do you mean the call described here in this manuscript, or is there another record of sei whale calls from these waters?

Line 182: Replace: „During this study, no four-call series were recorded as have been recorded in...”

Line 188-191: Given these facts, how can you assume that the recorded calls are sei whales? For a study to first describe the calls produced by a species that can be so variable in its acoustic signature, there seems to be no solid basis for the assumption that the calls recorded are produced by sei whales. Also, you write that seis were sighted during the expedition? How did the sightings relate in space and time to the recordings? Were they recorded long before the sighting or within minutes?

P14, line 214-217: Did you also investigate to what extent the background noise conditions differed between the recording sessions and if this might have affected the quality of the recordings in one year and as a result may have affected the measurements? How do you explain the differences in characteristics in the recorded calls between years?