

Joint analysis of pulsation and peak frequency : a model for examining frequency decrease in pulsed blue whale song

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The peak frequencies (frequency band of most energy) in blue whale songs are known to be decreasing with time, worldwide and for all studied song types [1]. The cause of this pattern remains unknown. We analysed temporal trends in the frequency of the South East Pacific 2 (SEP2) blue whale song type using two decades of non-continuous recordings from four different locations in the tropical and south east Pacific.

Since this type of song has several amplitude-modulated parts, we analysed not only the peak frequency but also the frequency of the repetition of the pulses. Thanks to the high sample rate of some of our recordings, we performed autocorrelation on the signal, thus obtaining a very high accuracy on the pulse frequency. Our analysis shows a decrease in both peak frequency and pulsation frequency of this type of song, that is compared to other studies [4].

Along with this analysis, we present a new mathematical model of the song that questions the type of link between pulsation and peak frequency for this blue whale song type [2,3]. This model may be used to classify any song type which contains amplitude modulation and we discuss other blue whale songs in the context of these results.

Wav samples are available at : http://sabiiod.org/workspace/BombyxUTLN_ChanaralChili/

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