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Erratum: Hybrid millidecade spectra: A practical format for exchange of long-term ambient sound data [JASA Express Lett. 1(1), 011203 (2021)]

S. Bruce Martin,[1,a)] Briand J. Gaudet,[1] Holger Klinck,[2,b)] Peter J. Dugan,[2] Jennifer L. Miksis-Olds,[3,c)] David K. Mellinger,[4,d)] David A. Mann,[5] Olaf Boebel,[6,e)] Colleen C. Wilson,[1] Dimitri W. Ponirakis,[2] and Hilary Moors-Murphy[7,f)]

[1]*JASCO Applied Sciences, 32 Troop Avenue, Suite 202, Dartmouth, Nova Scotia, B3B 1Z1, Canada*
[2]*Center for Conservation Bioacoustics, Cornell Lab of Ornithology, Cornell University, Ithaca, New York 14850, USA*
[3]*Center for Acoustics Research and Education, University of New Hampshire, Durham, New Hampshire 03824, USA*
[4]*Cooperative Institute for Marine Resources Studies, Oregon State University and National Oceanic and Atmospheric Administration Pacific Marine Environmental Laboratory, Newport, Oregon 97365, USA*
[5]*Loggerhead Instruments, Sarasota, Florida 34238, USA*
[6]*Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung, Bremerhaven, Germany*
[7]*Department of Fisheries and Oceans Canada, Bedford Institute of Oceanography, Dartmouth, Nova Scotia B2Y 4A2, Canada*

bruce.martin@jasco.com, briand.guadet@jasco.com, holger.klinck@cornell.edu, pjd78@cornell.edu, J.MiksisOlds@unh.edu, David.Mellinger@oregonstate.edu, dmann@loggerhead.com, olaf.boebel@awi.de, colleen.wilson@jasco.com, dwp22@cornell.edu, hilary.moors-murphy@dfo-mpo.gc.ca

Abstract: In the original paper [JASA Express Lett. **1**(1), 011203 (2021)], a method for processing, storing, and sharing high-bandwidth, passive acoustic spectral data that optimizes data volume while maintaining reasonable data resolution was proposed. The format was a hybrid that uses 1-Hz resolution up to 455 Hz and millidecade frequency bands above 455 Hz. The choice of 455 Hz was based on a method of computing the edge frequencies of millidecade bands that is not compatible with summing millidecades to decidecades. This has been corrected. The new transition frequency is the first frequency with a millidecade with greater than 1 Hz, 435 Hz.

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1. Computing millidecade edge frequencies

Equation (1) of the original paper (Martin *et al.*, 2021) defined the center frequency for the *i*th millidecade (f_{c_i}) as

$$f_{c\_i} = f_0 \cdot 10^{i/1000}\,(\mathrm{Hz}), \tag{1}$$

where f_0 is a reference frequency and the band index i counts up or down from the reference. This was based on the definition of decidecades. However, as identified in IEC 61260-1 (International Electrotechnical Commission, 2014), for resolutions finer than decidecades with an even number of center frequencies, the center frequencies need to be offset by one half of a band in order for the bands to sum to one decidecade. The updated Eq. (1) is

$$f_{c\_x} = f_r \cdot \mathrm{G}^{(2x-1)/2\mathrm{b}}\,(\mathrm{Hz}), \tag{2}$$

where x is the band index number, reference frequency f_r is 1000 Hz, G is $10^{0.3}$, and b is 0.3 times the number of bands per decade (i.e., 1000). As shown in the updated Table 1, the updated edge frequencies are now aligned with those of the decidecades so that the millidecades may be summed to generate the standard decidecades. In consequence, (a) the transition of hybrid millidecades from bands exactly 1 Hz wide to bands calculated according to Eq. (2) now occurs at 435 Hz

[a)]Author to whom correspondence should be addressed, ORCID: 0000-0002-6681-9129.
[b)]Also at: Marine Mammal Institute, Department of Fisheries and Wildlife, Oregon State University, Newport, OR 97365, USA, ORCID: 0000-0003-1078-7268.
[c)]ORCID: 0000-0003-1784-6849.
[d)]ORCID: 0000-0002-5228-0513.
[e)]ORCID: 0000-0002-2259-0035.
[f)]ORCID: 0000-0001-7360-3716.

Table 1. Selected millidecade band center frequencies and edges shown to 5-digit precision. The bands indicated by boldface italics show that edges of the revised millidecade frequencies are also edge frequencies for decidecades.

Band start frequency (Hz)	Band center frequency (Hz)	Band end frequency (Hz)
0	0	0.5
0.5	1	1.5
1.5	2	2.5
2.5	3	3.5
432.5	433	433.5
433.5	434	434.51
434.51	435.01	435.51
435.51	436.01	436.52
436.52	437.02	437.52
889.20	890.22	***891.25***
891.25	892.28	893.31
893.31	894.33	895.36
995.40	996.55	997.70
997.70	998.85	1000.0
1000.0	1001.2	1002.3

rather than the former 455 Hz (see Table 1); (b) the decidecade band center frequencies become edge frequencies of millidecade bands. As stated in the original manuscript, the bands should be referred to unambiguously by their center frequency.

This change affects neither the visual presentation of the example data nor the results.

An updated version of getBandTables.m is provided in the supplementary material.[1]

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References and links

[1]See supplementary material at https://www.scitation.org/doi/suppl/10.1121/10.0005818 for MATLAB software that implements the computation of hybrid millidecade band tables, and uses the millidecade band tables along with a spectrum to compute the band power spectral densities or sound pressure levels.

International Electrotechnical Commission (**2014**). "IEC 61260-1:2014 Electroacoustics—Octave-band and fractional-octave-band filters—Part 1: Specifications," p. 88, https://www.iso.org/standard/62406.html.

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