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## Comparing pressure and intensity units for in-air and underwater hearing thresholds

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### ABSTRACT

Hearing thresholds are usually reported in decibel units, which gives conveniently compressed numbers with biological implications. However, the decibel scale causes confusion when in-air thresholds are compared to underwater ones. Not only are the reference pressures of the in-air and underwater scales different, but the interpretation of the thresholds also depends on whether we assume the ear is detecting the integrated sound intensity or squared pressure (that is, if the acoustic impedance difference between the two media should be compensated for). Here, in-air and underwater hearing thresholds from the literature on toothed whales, seals, marine birds and turtles are compared, both using decibel scales and linear pressure and sound intensity units. The interpretation of how sensitive an animal is to sound in air and underwater critically depends on the choice of units used to report hearing thresholds. Therefore, great care must be taken choosing the adequate units in hearing studies.

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