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Two dimensional sonar beam characteristics of single harbour porpoise (*Phocoena phocoena*) echolocation clicks measured with a 16 hydrophone array

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For the first time, the beam structure of single harbour porpoise echolocation clicks was simultaneously measured in both the vertical and horizontal plane. Echolocation clicks of a stationed animal and free-swimming animals catching fish were recorded with a "plus-shaped" array consisting of 16 hydrophones. The -3 dB beam width in the horizontal and vertical planes is in most cases similar to what has been previously measured by Au et al. (1999). However, individual clicks are sometimes broader or narrower than what has been previously reported. This may be caused by either voluntary control of the animal's beam width, or it may be a secondary effect of variations in intensity and air content within the sound production system.