

DOELDE

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ABSTRACTS



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Diving Deep: 3D Tracking of Cuvier's Beaked Whale Diving Behavior in Southern California using Fixed Hydrophone Arrays

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Cuvier's beaked whales (*Ziphius cavirostris*) are a deep-diving cetacean species known to forage in the submarine canyons of the Southern California Bight. Although this species is a top predator in deep-sea ecosystems, much is yet to be learned about their social and foraging strategies due to their elusive behavior and extensive time spent foraging in the deep sea. In this analysis, time-difference-of-arrival (TDOA) localization is used to track the position of Cuvier's beaked whales from echolocation clicks recorded on seafloor-mounted hydrophone arrays. This approach yielded over 2000 tracks of diving Cuvier's beaked whales from several years of acoustic data recordings collected at four long-term acoustic monitoring sites between 2018 and 2023. These tracks were used to estimate swim speed, track distance, and area covered during deep foraging dives, as well as distance from the seafloor, group size, and distance between simultaneously diving individuals. These metrics revealed distinct diving behaviors and spatial use trends driven by bathymetric features specific to each of the recording sites, notably a preference for canyon walls and deeper canyon pockets. Group size during observed simultaneous diving ranged from 2 to 9 whales with most encounters between 2 and 4 whales, although there was diel, seasonal, and spatial variability in this feature. During several of these encounters, individuals exhibited behaviors that appeared highly coordinated. This long-term acoustic monitoring effort and TDOA localization approach yielded an extensive tracking dataset which gives valuable insight into the behavior at depth of Cuvier's beaked whales in the Southern California Bight.