

## False killer whales mimic MFA sonar

Mid-frequency sonar transmissions have been linked to unusual strandings of beaked whales and other species. The conditions and series of events that lead to such strandings are poorly understood, and controlled exposure experiments can help elucidate the behavioural responses of whales to sonar. In September 2008 in the Tongue of the Ocean, Bahamas, a D-tagged false killer whale (*Pseudorca crassidens*) underwent controlled exposure to mid-frequency sonar-like sounds (MFA) and pseudo-random noise in the same frequency band (30 1.4-second transmissions of each signal at increasing source power, with 25 seconds between transmissions and about 27 minutes between MFA and noise exposures). Peak exposure levels on the tag ranged from about 115-160 dB re 1  $\mu$ Pa. During the exposures, the tag recorded whistles produced by the tagged animal and nearby conspecifics, which occurred during the MFA exposure but not the noise exposure. To test the hypothesis that the false killer whales responded to MFA exposure by producing whistles mimicking the MFA sound, we determined whistle start times, durations, and contours, relating those features to time within the exposure (expressed as seconds since the last MFA transmission). Our results support the mimicry hypothesis: whistle rates within each 25-second inter-exposure period peaked shortly after the MFA transmission, with the mean time delay between transmission and whistles significantly shorter than expected by chance (nonparametric rotation test,  $p < 0.037$ ,  $n = 457$  whistles). Moreover, whistle flatness ratio was higher and mean whistle frequency was closer to that of the mean MFA signal in the first 5 seconds following MFA transmissions, while whistle duration showed no significant pattern (rotation tests,  $p < 0.01$ ,  $0.00001$ ,  $0.79$ ,  $n = 297$  whistles). Hypothesised functions of vocal mimicry in animals are varied, including the development of varied repertoires and the use of learned calls to indicate identity or group membership. The alarm and distress calls of some birds also mimic their predators. Thus, the apparent imitation of MFA sounds by false killer whales could indicate either opportunistic imitation, an affiliative response, or a predator-avoidance type response.