

ACOUSTICS2008/109**The interaction of emitted pulses and echoes in a whale's biosonar:
a partial contribution to biosonar automatic gain control**Alexander Supin^a, Paul Nachtigall^b and Marlee Breese^b^aInstitute of Ecology and Evolution, 33 Leninsky Prospect, 119071 Moscow, Russian Federation^bUniversity of Hawaii, Hawaii Institute of Marine Biology, P.O. Box 1106, Kailua, HI 96734, USA

In a false killer whale *Pseudorca crassidens*, echo perception thresholds were measured using a go/no-go psychophysical paradigm and one-up-one-down staircase procedure. Electronically synthesized echoes were triggered by whale-emitted echolocation pulses, and the echo amplitudes were presented proportional to the triggering biosonar pulse amplitudes, thus imitating the basic feature of real target echoes. Echo thresholds were measured in terms of attenuation relative to the source level of the biosonar pulses. The echo threshold dependence on echo delay was investigated. With increasing echo delay, the threshold echo attenuation decreased from -49.3 dB at 2 ms to -79.5 dB at 16 ms, with a regression slope of -31.5 dB per delay decade. At delays longer than 16 ms, the threshold remained nearly constant around -80.4 dB. This echo threshold dependence on delay is interpreted as a release from forward masking by the preceding emitted pulse. This release may well compensate for the echo level decrease with distance which is from 20 to 40 dB per distance decade, depending on target properties. This compensation may keep the echo sensation level independent of, or little dependent on, target distance. Supported by Office of Naval Research (USA), Ministry of Science and Education (Russian Federation).