

International workshop. Cetacean echolocation and outer space neutrinos: ethology and physics for an interdisciplinary approach to underwater bioacoustics and astrophysical particles detection



Contribution ID: 79

Type: **Invited Lecture**

Overview of vocal parameters and hearing abilities in pinnipeds and cetaceans

Friday, 18 October 2013 11:00 (1 hour)

Sound is centrally important in the lives of marine mammals. We know they make sounds in social interactions and to find objects and their way around. We know they listen for conspecific animals to facilitate breeding, rearing, and other social dynamics. We also believe they listen to avoid predators and environmental sounds to facilitate spatial orientation. Among the 125+ species of marine mammals there is a tremendous diversity in sound production that mirrors the varied speciation and adaptations of these marine predators. The large baleen whales produce typically long-duration (seconds to tens of seconds) low frequency (tens of Hz to ~10 kHz) sounds that may be detected over tens to hundreds of miles and primarily facilitate social interactions. The related odontocete cetaceans (dolphins and porpoises) have a more varied sound communication strategy that includes both moderate duration (seconds), medium frequency (~5-20 kHz) whistles and other conspecific communication signals as well as transient, impulsive (milliseconds), high frequency (tens to over 100 kHz) echolocation clicks used for detecting prey objects and in precise spatial orientation. The pinnipeds (seals, sea lions, and walruses) produce moderate duration (seconds), typically low to moderate (tens of Hz to 10 kHz) sounds used in social interactions and spatial orientation. The pinnipeds and baleen whales lack the specialized high-frequency echolocation signals of odontocetes cetaceans, but rely nonetheless on sound production and communication in critical social and predator avoidance and navigation contexts. Each species group is known or expected to have sound detection capabilities that roughly (but not exactly) relate to frequency ranges of sound production systems. Passive detection of marine mammals with ocean observing systems offers innovative new ways of remotely sensing large areas of the oceans to better understand and conserve marine mammals by improving the spatial and temporal sampling of marine mammal presence and (increasingly) estimates of abundance.

Primary author: Dr SOUTHALL, Brandon (Southall Environmental Associates, Inc.)

Presenter: Dr SOUTHALL, Brandon (Southall Environmental Associates, Inc.)

Session Classification: Acoustic communication, vocal learning and cognition in marine mammals