Long-Term Trends in Ambient and Anthropogenic Noise in the Central and Western Pacific Ocean

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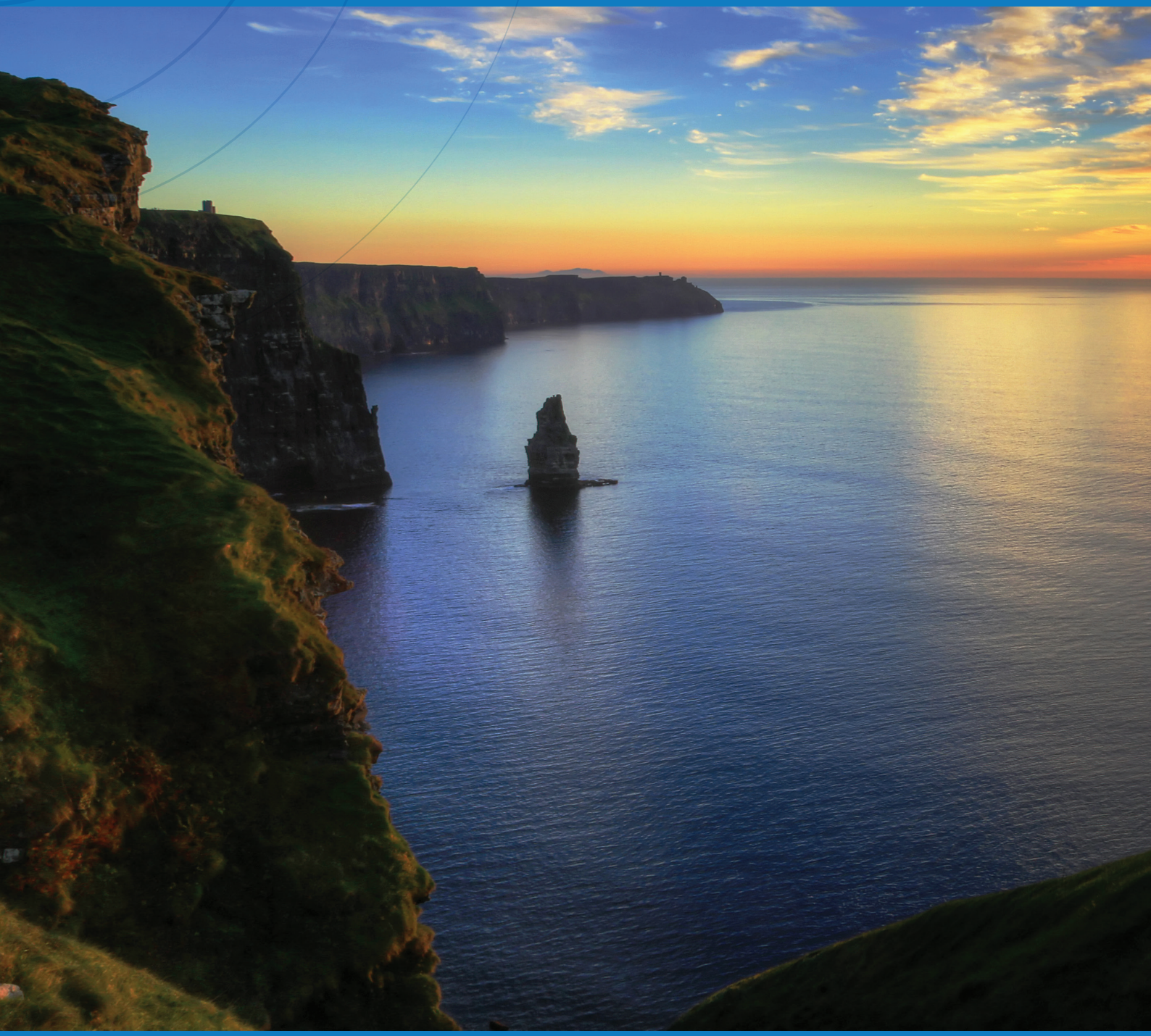
Multiyear studies of the changes in ambient noise are uncommon, yet they can provide information on the amount of natural variability in the noise that animals are exposed to as well as an idea of changing noise-level trends. To investigate some of these long-term trends in low-frequency (<1,000-Hz) ocean ambient noise, passive acoustic data were collected using high-frequency acoustic recording packages at two locations in the tropical Pacific Ocean. One site was recording in the central Pacific off Kona on the Big Island of Hawai'i from 2007 to 2015 and the other in the western Pacific near Saipan from 2011 to 2015. In addition, detailed occurrences of two types of transient anthropogenic noise events, nearby boat passages and midfrequency active (MFA) sonar transmissions, were identified at these locations from a period from 2010/2011 to 2012/2013. Characteristics of those anthropogenic sounds including duration, frequency, received levels, and sound exposure levels were measured. Both sites exhibited relatively low levels of ambient noise characteristic of distant shipping (<100 Hz) compared with levels generally reported for the North Pacific. Ambient noise attributable to shipping was generally lowest during the early years of recording at Saipan and increased after mid-2013. At Kona, there was a large level in variability in this part of the noise spectrum but no clear interannual trend. This is likely explained by the fact that most of the low-frequency noise was from nearby boats and was not a result of distant shipping noise. Ambient noise at Kona also had a seasonally variable contribution by various baleen whales. Humpback whales were a particularly prominent component of the soundscape during the winter, with an indication of a change in spectral features of the song over the recording period. Broadband shipping noise, indicative of nearby ships, was found at both sites year-round, but the total number of hours with ships increased over the period of the study. There was a clear diel trend of increased boat activity during daylight hours. The MFA sonar was also detected at both sites. At Kona, MFA sonar occurred intermittently through most of the recording period. The MFA sonar off Saipan was mostly concentrated to a period from Summer 2012 to the Winter 2013. As areas with relatively persistent low level and local sources of anthropogenic noise, these locations may be good places for the study of the impact of these sounds on marine mammals as well as on other marine life.

CONFERENCE PROGRAM & ABSTRACTS



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