

Ocean acidification: a growing rate of eavesdropping in aquatic species

Germaine van der Sanden and Gerald Ganssen

Free University of Amsterdam, Faculty of Science, Earth and Climate, Amsterdam, Netherlands
(germaine.sanden@gmail.com)

The acidification of Earth's oceans due to anthropogenic carbon dioxide emissions is causing adverse effects on marine biodiversity and ecosystem function. A less anticipated consequence of an acidified ocean is the reduction in acoustic absorption at low frequency. Studies suggest a 70% increase in sound travel range by the year 2050. The ocean as acoustic sound medium and its chemical interior is subject to significant alterations as a result of human activity. Currently, it is still unclear whether the increased acoustic transparency will affect communication in marine species. This research is a first attempt to join different conceptual frameworks derived from multiple disciplines, in order to draw understanding on the coupling between the anthropogenic alteration of the ocean environment and the communication processes in aquatic species. The study results indicate a strong coupling between human-induced changes in the ocean's chemical fabric and the spatial communication dynamics in the ocean environment. The increase of the communication space can extend to a maximum of 40% by 2050 and to $\pm 70\%$ by the end of the century under the business-as-usual emission scenario. The extension of the vocal domain will result in a growing rate of eavesdropping due to the extensive overlap of the acoustic bubbles. The human species is becoming an increasingly dominant global geophysical force with the potential to alter the spatial communication dynamics of organism in the ocean.