Autonomous sea gliders record sounds of fish emptying buoyancy bladders

March 28 2012, by Bob Yirka

Image courtesy of Kona Blue Water Farm

(PhysOrg.com) -- Researchers attempting to map the various types of fish living in the eastern Gulf of Mexico have been using an automated sea glider, which is a small autonomous submarine outfitted with a hydrophone. The sea glider zigs and zags its way around underwater at different depths recording noises from nearby fish. Recently the team came across some noises on the recordings that it wasn't able to identify right away. Resembling a cricket chirp, the team now believes, as they write in their paper published in *Marine Ecology Progress Series*, it's due to certain types of fish voiding their buoyancy bladders as they change depth.

Similar noises have been heard before. Two teams back in 2003 found

some herrings push gas out of their anuses; or in human terms, experience flatulence. But because of the different location and species of [fish](#) involved, the researchers working in the [Gulf of Mexico](#) believe a different part of the fish anatomy is involved in makings the noises they recorded. They believe that some fish such as menhaden and another type of herring make the sound as they push gas out of an organ used for buoyancy called a swim bladder. Such noises would resemble fish flatulence due to the same physiological process, namely expelling gas under pressure through a sphincter.

The recordings were made during a weeklong research mission along the west Florida shelf, performed by a preprogrammed sea glider, which allows for wide area study of large tracts of ocean. The sea glider moves along a predetermined path turning its recorder on and off every five minutes. Each snippet is just twenty five seconds long, long enough to capture the familiar sounds of such fish as red grouper and toadfish, and apparently, three instances of previously unknown sounds, which occurred, oddly enough, only at night and at different depths.

The researchers compared the location of the sea glider to known species that live in the location in which the three sounds were recorded to narrow down the list of possible sources for the noise, until ultimately concluding that there were just a few choices. And because those fish identified were known to void their swim bladders, the team believes such actions are the source of the noises they recorded.

ABSTRACT
Autonomous gliders are a relatively new technology for studying oceanography over large time and space scales. We integrated a

hydrophone into the aft cowling of a glider and used it in a 1 wk, shelf-scale deployment on the West Florida Shelf to detect and map fish sounds in the ocean over a large spatial scale. In addition to red grouper and toadfish sounds, at least 3 unknown biological sounds suspected to be produced by fish were identified through manual analysis of the acoustic files. The biogeography of these fishes was identified by mapping the occurrence of sounds along the glider track. Sounds produced by red grouper and toadfish were detected throughout the day predominately in bottom depths >40 m. Conversely, the 3 unknown biological sounds were detected exclusively at night over varying bottom depths. Glider technology provides a reliable and relatively inexpensive method to collect acoustic and environmental data over large spatial scales while maintaining a high rate of successful retrieval.