

Eavesdropping in the wild: What are porpoises and bats up to

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Echolocating animals use sound to scan their environment for information, to navigate and to forage. In the framework of the Lifewatch Observatory at the Flanders Marine Institute, two passive acoustic sensor networks are installed to detect echolocation calls as a proxy for presence. These sensor networks continuously monitor harbour porpoise (*Phocoena phocoena*, C-PODS) in the Belgian Part of the North Sea and bats (batcorder) along the Belgian coast line. Whilst the C-PODs are spaced across a coastal, midshore and offshore gradient, the batcorders are installed in IJzermond and Zwin, and one in Oostende. Both systems listen to the sound in the environment, yet only record the sound (batcorder) or sound characteristics (C-PODs) when the device is triggered for an echolocation call. Besides revealing an animal's presence, the features of a recorded echolocation call can also disclose the species and/or the behaviour types. Harbour porpoises produce very distinctive series of narrow band high frequency clicks (120-140 kHz, mode 132 kHz), called click trains. A very short interclick interval (< 10 ms) for example, indicates foraging behaviour. For bats, we can distinguish social, transit and foraging calls and sweeps. Depending on the distinctiveness of echolocation calls, taxonomic identification can go as far as the species level. After preprocessing with the sensor manufacturer's software, the data is transferred to the in house developed database and made available for all registered users through the LifeWatch data explorer. For both sensor networks, a collaboration with OD nature expands the network and facilitates the exchange of data and expertise. This collaboration enabled two Master thesis projects, investigating the seasonal distribution and feeding behaviour of harbour porpoises, as well as the correlation between aerial survey data and passive acoustic detections. The batcorder's preliminary results show the presence of at least eight species of which the common and Nathusius' pipistrelle (*Pipistrellus pipistrellus* and *Pipistrellus nathusii*) are the most abundant along the Belgian coast. Primarily of interest is the ecological role of estuaries and wetlands during the spring and autumn bat migrations. In conclusion, the aim of these passive acoustic sensor networks within the LifeWatch Observatory is to collect long term data series which provide high resolution information on presence/absence and secondly, observe the species' behaviour in specific habitats.

Keywords: passive acoustics; bats; harbour porpoise; echolocation