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**Using multi-angle reflections to enhance ecosystem
characterization**

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Improved knowledge about target tilt can be used to improve acoustic estimates of abundance and to gain insights into the behavioural patterns of exploited marine species. This is because tilt angle strongly affects backscatter, especially at high frequencies. In order to estimate tilt, a dual-transducer system for synchronous observation of marine organisms at two angles (0° and 90°) at 38 kHz was tested. Data was characterized via the "angle response"; the area backscatter from one transducer divided by the sum of both. This metric was computed for layers of small planktonic organisms as well as fish. While the angle response is almost negligible for small organisms at night and slightly in favour of the tilted transducer during day, there is a significant angle response from fish in layers. A theoretical model supports the idea that this effect is due swimbladder tilt. Backscatter from 13 schools of horse mackerel was also analyzed. Although no statistically significant difference was observed, the variability indicate that the angle response is highly dynamic and dependent on the actual behaviour of the school at time of observation. Further studies are planned to improve upon data collection as well as the theoretical aspects of interpretation.