

THE STRAIT OF GIBRALTAR AS A FEEDING GROUND FOR SPERM WHALE  
(*PHYSETER MACROCEPHALUS*).

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The Oceanography of strait of Gibraltar is characterised by a surface inflow of Atlantic water to the Mediterranean sea and a deep outflow of Mediterranean waters. Sperm whales have been sighted in the Strait of Gibraltar, from whale watching platforms and since 2001, from the CIRCE research ship Elsa. A total of 394 sightings were recorded with a great majority of lone individuals: 1551 pictures of both flukes and dorsal fins. 21 individuals have been photo-identified. Recaptures of individuals range from 0 to 24 times. To investigate the diving behaviour of the animals in the Strait we used a vertical array of 4 hydrophones in May 2003. From these recorded signals, we wanted to calculate sperm whale depth. However high level of shipping noise and strong currents reduced the efficiency of this system: the hydrophone array was never vertical and noise had a masking effect. A method to track the sperm whale dive using only one hydrophone has been developed. The instantaneous energy, estimated from the signal wavelet transform, enables an automatic detection of sperm whale clicks corrupted by noise. No threshold is necessary. The additional detection of echoes from the sea bottom and from the sea surface of each sperm whale click then facilitates, by measuring delays, an estimation of the depth and the range of the sperm whale. Such localization also estimates the depth of the hydrophone. The localization of clicking sperm whales is then possible using a single hydrophone at an unknown depth and a GPS receiver. The animals sampled were found to be diving at depths comprised of between 600 and 800 meters. These results suggest (1) that sperm whales use the strait of Gibraltar as a feeding place and (2) that they forage mainly on prey associated with the deep outflow Mediterranean water.