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Record of Feeding by Humpback Whales (*Megaptera novaeangliae*) in Tropical Waters off Brazil

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Humpback whales (*Megaptera novaeangliae*) occur in all major oceans of the world, where most populations typically migrate between high-latitude summer feeding areas and low-latitude wintering grounds (Mackintosh 1942, Clapham and Mead 1999). Historical and contemporary data indicate that a humpback whale population spends the winter breeding season (typically June–November; Martins *et al.* 2001) in waters over the continental shelf off the eastern coast of South America (5°–21°S; Williamson 1975, Zerbini *et al.* 2004, Andriolo *et al.* 2006). This population migrates through oceanic waters to summer subantarctic feeding destinations near South Georgia (~54°S, 36°W) and the South Sandwich Islands (~58°S, 26°W) in the Scotia Sea (Zerbini *et al.* 2006).

Humpback whale feeding behavior is highly seasonal, and its occurrence is extremely rare during the period of residency in low-latitude waters, when whales typically fast for extended periods (Mackintosh 1942, Chittleborough 1965). However, occasional winter feeding events have been reported in some populations (Baraff *et al.* 1991, Gendron and Urbán 1993, Swingle *et al.* 1993, Stockin and Burgess 2005). Here we report the first documented case of humpback whales feeding on a major wintering ground off Brazil.

The events reported here were opportunistically observed from an oil platform located at 19°35'02"S, 39°14'37"W, where the water depth was 67 m. On 8 August 2005, two humpback whales were observed feeding near the platform. Both individuals were estimated visually at approximately 10 m in length, suggesting they were juveniles. The animals were observed close to the platform for 37 min (between 1322 and 1359), and the observer started registering their behavior as soon as the animals were observed. During this period, they were observed swimming in a circular fashion and feeding near the surface at least six times (feeding behavior was documented by photographs and video). The whales were targeting schools of unidentified small forage fish, which were seen in the waters surrounding the oil platform. The whales pursued the fish schools, positioned themselves laterally below the surface and then opened their mouths in typical lunge-feeding behavior. Once the prey was ingested, the whales returned to a horizontal position to expel the water out of the mouth. Despite swimming in close proximity, the two individuals were not observed feeding in synchrony.

During these observations, whales were occasionally out of sight; thus, the number of feeding occurrences may have been underestimated. When in sight, surfacing frequency was high, with dive durations shorter than 1 min. Swift kicks of the tail were also seen, but did not always precede the feeding events; such behavior was also recorded in a feeding whale in the West Indies (Baraff *et al.* 1991), and has been frequently observed as an apparently intentional feeding strategy on feeding grounds in the Gulf of Maine (Weinrich *et al.* 1992).

Despite the fact that the platform was operational at the time, the whales approached it and stayed in the nearby area for at least 2 h (according to platform crew members). It is hard to say how frequent this behavior occurs near the platform, due to the fact that generally no specialized observer stays at the platform.

As here, other previously reported instances of feeding on a breeding ground also involved presumed juveniles (Baraff *et al.* 1991, Swingle *et al.* 1993), judged by the size of the individuals seen. However, maturity state cannot be confirmed from these visual observations. Stevick (1999) showed that Northern Hemisphere humpback whales can be mature at lengths of only 11 m. Whether tropical feeding occurs only in younger animals which have less incentive to participate in breeding activities is currently unknown. Juvenile humpback whales, which have thinner blubber layers than adults, may also be less prepared to withstand a prolonged fast where they live off of stored energy reserves, and that their smaller size makes it more likely that sporadic feeding on small prey patches will have a positive effect on their annual energy budget than in larger adults.

The humpback whales observed in this study exhibited the behavior that was similar to that in other documented cases of low-latitude feeding (Baraff *et al.* 1991, Swingle *et al.* 1993). Unlike in the Northern Hemisphere, feeding on fish is thought to be rare among Southern Hemisphere humpbacks, whose principal prey is euphausiids (Evans 1987). That austral populations occasionally prey on fish is suggested by our Brazilian observations, together with those of Stockin and Burgess (2005), who recorded opportunistic feeding of an adult humpback whale migrating along the coast of Australia.

We will likely never understand the mechanisms that initiate and inhibit hunger, and that are responsible for this apparently abnormal behavior in the tropics. However, in light of the energetic demands of a winter fast, it is not surprising that humpback whales occasionally utilize abundant prey resources that become available during their long residency in tropical waters.

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