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Unusual hunting and feeding behaviour of polar bears on Spitsbergen

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ABSTRACT. Prolonged chasing of an adult reindeer (*Rangifer tarandus*) by a polar bear (*Ursus maritimus*) was observed both on land and in the sea, in Magdalenefjorden, northwest Spitsbergen. Polar bears were also observed catching black guillemot (*Cepphus grylle*) in the sea in northwest Spitsbergen and feeding on chicks in the arctic tern (*Sterna paradisea*) colony in Hornsund, southwest Spitsbergen. While feeding on seabird species is unsurprising, the prolonged chasing of adult reindeer is unusual for polar bear hunting behaviour. The few documented cases of polar bear hunting reindeer consist of either surprising and killing resting/sleeping prey or stalking and a short rapid chase of the reindeer. Our observations describe new feeding habits of polar bears that may be in response to decreasing seal availability due to shrinking sea-ice cover in the Arctic.

Introduction

Ringed seals (*Pusa hispida*), and to a lesser degree bearded seals (*Erignathus barbatus*) constitute a staple food of polar bears (*Ursus maritimus*) (Smith 1980; Stirling and McEwan 1975). Decreased sea ice reduces the ability of polar bears to obtain food, as they depend on sea ice as a platform from which they hunt for prey (Stirling and others 1999; Amstrup 2003). Hunting in the water by polar bears is observed sporadically but is considered ineffective (Furnell and Oolooyuk 1980; Stirling 1974; Stempniewicz 2006). During summer in several regions of the Arctic polar bears are forced onto land due to complete or partial melting of the sea ice. While polar bears are well adapted to fast through these periods (Watts and Hansen 1987), there are limitations to their capacity to remain on land without suffering declines in body condition (Molnár and others 2010). Terrestrial food sources are a minor component of their diet (Lunn and Stirling 1985; Ramsay and Hobson 1991). However, there are a few records of polar bear predation on reindeer (*Rangifer tarandus*) and muskoxen (*Ovibos moschatus*) (Ovsyanikov 1996; Derocher and others 2000; Brook and Richardson 2002) and of cannibalism (Stone and Derocher 2007). Polar bears have been also observed to feed opportunistically on geese, ptarmigans (*Lagopus* spp.) and seabirds (Russell 1975; Abraham and others 1977; Stempniewicz 1993, 2006; Donaldson and others 1995; Smith and Hill 1996).

In this paper we describe our observation of a polar bear chasing reindeer on land and in the sea, hunting black guillemot (*Cepphus grylle*) in Magdalenefjorden, northwest Spitsbergen and feeding on the arctic tern chicks (*Sterna paradisea*) at a nesting colony in Hornsund, southwest Spitsbergen.

Description of observations

Reindeer pursuit

At 11:00 pm local time on 25 July 2011 we noticed an adult female reindeer with a yearling calf being chased by a subadult polar bear (3–4 years old). They crossed a moraine, below the site from which we were observing the chase, and ran through the camp located on the beach (Fig. 1). The calf triggered a flare when it jumped over the tripwire warning system that surrounded our camp. The detonation apparently caused the bear to stop, while the reindeer ran away. The bear returned within 400–500 m to the small patch of tundra, from whence it had started chasing the two reindeer. A few minutes later we noticed the same bear stalking and chasing an adult male reindeer. This reindeer alternated between running up and down the mountain slope for approximately 10 minutes to escape the bear (point 1, Fig. 1). It eventually ran down the slope to a seaside bluff that was 2–3 m high, and then jumped into the water and landed several meters from the coast (point 2).

The bear followed the reindeer into the water and the two animals swam toward the opposite shore of the fjord. After ~ 700 m the reindeer turned right and swam parallel to the shore. The entire swim portion of the chase lasted ~25 minutes and covered ~1.6 km (point 3). During the swim the distance between the reindeer and polar bear remained 30–50 m (Fig. 2). The path of the reindeer and polar bear brought both animals to shore about 800 m from where they had entered the water (point 4). The reindeer continued fleeing on the stony beach. Several seconds later the bear leapt out from the sea and, not bothering to shake off the water in its fur, followed the reindeer for ~ 400 m (1.5 minutes). The reindeer continued across the next moraine, turned up the valley and disappeared from our sight. When the bear lost sight of the reindeer it slowed its pursuit and started to track it by sniffing the ground in the direction that the reindeer had run. While crossing a snow field the bear wallowed in the snow to remove the water in its fur (point 5). Then, it continued tracking the reindeer up the valley. At 0:20 am on 26 July 2011 it disappeared from our sight (point 6), and at 2:40 am we observed the bear passing the camp again.

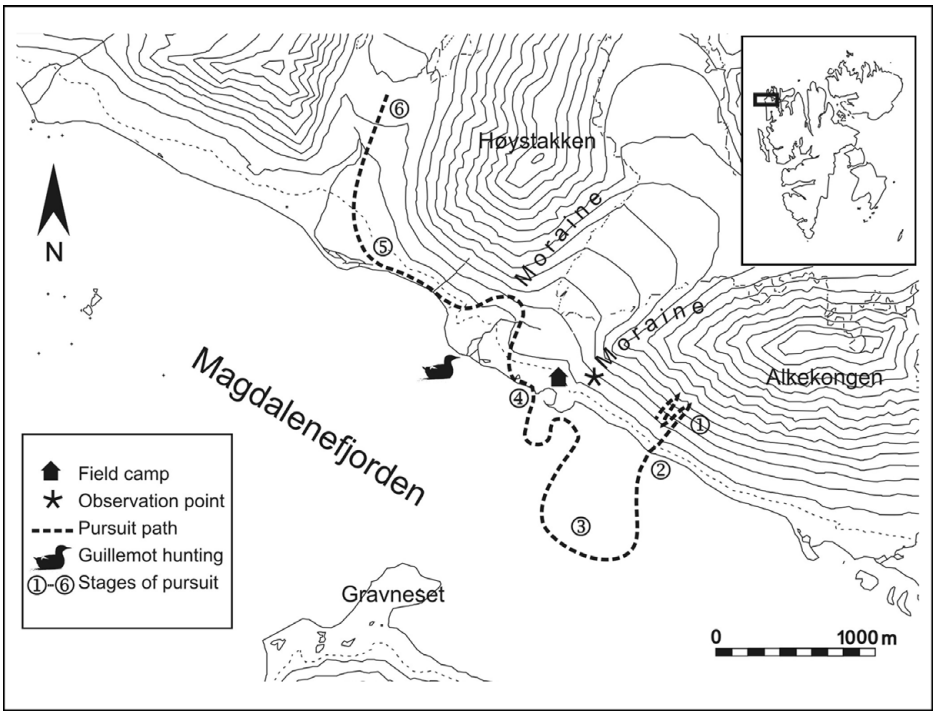

Fig. 1. Map of the observation area in Magdalenefjorden. Dashed line with numbers (1–6) shows successive stages of the terrestrial and marine parts of the pursuit path.

Fig. 2. Polar bear chasing adult male reindeer in the Magdalenefjorden (photo by Dorota Kidawa).

On 26 July at 10:20 pm we observed another chase, this one entirely on land. We observed an adult male reindeer crossing the moraine and running quickly along the seacoast. After several seconds a polar bear, apparently chasing the reindeer, appeared. The reindeer ran up a mountain slope, and the bear, on reaching this steep slope, slowed down, stopped chasing the reindeer, and then returned to the edge of the water and paced along the seacoast. The chase covered ~ 700 m.

Predation on birds

On 1 and 4 August 2009 a subadult polar bear was noticed in the vicinity of the Polish Polar Station in Hornsund, southwest Spitsbergen. The bear was observed feeding for 1–2 h in a small arctic tern colony. The bear walked within the colony and caught nestlings (2–3 weeks old), which either attempted to hide or escape. Despite the parents' persistently attacking the predator to defend the chicks, the polar bear caught and consumed at least 12 nestlings. Another time, on 19 July 2011 a polar bear walking along the coast in Magdalenefjorden was observed from ~500 m away. The bear entered the water and swam ~ 50 m towards a flock of ~ 10 black guillemots. On approaching the flock the bear dived several times covering ~10 m long distances under the water. After ~ 10 minutes of stalking, the bear caught one guillemot and was observed by telescope at the water's surface holding it in its paws while eating it.

Discussion

Polar bears use different hunting techniques. The most common involve waiting at a seal breathing hole, breaking into subnivian lairs to catch adult seals and pups inside, and stalking a seal from a distance. Polar bears can also approach prey using an underwater stalk to approach as close as possible, making use of wind direction and configuration of the terrain. If the bear can approach close enough it will attempt to seize the prey. This is a common technique used for hunting seals basking on ice floes (Stirling 1974; Smith 1980). Hunting for resting/sleeping reindeer seems to be a slightly modified version of the stalking behaviour described above (Derocher and others 2004). If the reindeer attempts to flee, the bear charges and then gives up if unsuccessful (Brook and Richardson 2002). The long–lasting pursuit of a healthy adult reindeer that we describe is a novel polar bear hunting behaviour.

Polar bears prefer seals to other prey (Stirling and McEwan 1975; Best 1982). Despite this, preying on reindeer during the summer could be beneficial to a polar bear stranded on land. However, polar bears are relatively inefficient walkers (Hurst and others 1982), hence, we can expect that there is a significant energy cost involved in chasing reindeers, which are adapted

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to move at high speeds to outrun predators. Because of the high cost of locomotion, chasing reindeer should be beneficial only over short distances (Lunn and Stirling 1985; Derocher and others 2000; Brook and Richardson 2002). Moreover, polar bears are susceptible to hyperthermia during any longer effort, especially in warm weather (Best 1982; Hurst and others 1982). Healthy adult reindeer, based on our observations, also appear to swim at least as fast as polar bears. Thus, the likelihood of a polar bear catching a healthy, adult reindeer seems to be low. However, a recent study by Iversen (2011) found a frequency of 9.2% of reindeer remnants in polar bear excrement on Spitsbergen and suggests that reindeer is a regular food item from either actively hunted animals or from scavenged remains. The observed hunting attempts involved immature individuals that may have higher energy demands than adults during the summer to reduce weight loss because they are less successful at hunting and protecting their kills, and are actively growing. Therefore, subadults may be more eager to explore new food sources and try different hunting techniques than adults (Derocher and others 1993).

Exploring the arctic tern colony by polar bears and feeding on nestlings does not require any special skills because tern colonies are accessible and eggs and chicks easy to catch. It generally does not differ from the more frequently observed feeding in goose colonies (for example Abraham and others 1977; Smith and Hill 1996), except for the energetic returns of different size preys. Hunting in auk (Alcidae) colonies requires either risky climbing onto the cliff shelves in case of guillemots (Donaldson and others 1995) or time and energy consuming removal of boulders covering the nests in case of little auks (*Alle alle*) (Stempniewicz 1993). Polar bears also prey on birds on the water by swimming toward them, diving and catching them from below (Russell 1975). Our observation of successful catching of black guillemot confirms such abilities of polar bear. This hunting behaviour could be a slightly modified technique of underwater stalking seals resting on the ice floes.

Our observations of polar bears suggest increasing exploration of terrestrial food sources. In the 1970s, reindeer carcasses were observed uneaten for extended periods (L. Stempniewicz, personal observation, July, 1974) but today they are usually detected and consumed by bears quickly. This may be interpreted as a response to reduced seal availability as a result of shrinking of the sea–ice range in the Arctic (Smith and Lydersen 1992; Stirling and Smith 2004). Furthermore, the increased number of the polar bear population, since their complete protection from harvesting in the early 1970s in Svalbard (Derocher 2005), may also force the predator to use different terrestrial food sources.

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Antarctican Society centennial medallion

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The Antarctican Society, based in the United States, has produced a medallion (Fig. 1) in recognition of the centennial of the discovery of the South Pole by Roald Amundsen and Captain Robert Falcon Scott, in 1911 and 1912, respectively. This item is representative of both expeditions.

The Antarctican Society was formed in 1960 as a not-for-profit educational society by those with interests and experience in Antarctica. A newsletter resulted, published at irregular intervals, and continues to this day.

The centerpiece of the medallion is a replica of a snowflake, and the core is an historic scene from the South Pole itself, the Norwegian tent with four of Amundsen's party standing nearby. The hexagonal rim around the scene includes the names Amundsen and Scott and their arrival dates at the South Pole. The medallion was created by sculptor Jack Chase of Jericho, Vermont, and glaciologist Tony Gow, recipient of the Seligman Crystal, selected one of Wilson A. Bentley's (1931) photomicrographs of snowflakes for this model. Chase used laser cutting techniques to produce the stainless steel medallion.

The centennial medallion was produced in two forms, one with a pin on the back for fastening onto a coat, and the other with an 18-inch necklace for wearing around the neck. The medallion pictured has an actual width of 1.75 inches (4.5 cm). Further information about the medallion is available from the Antarctican Society, Box 325, Port Clyde, Maine 04855 U.S.A. (www.antarctican.org).

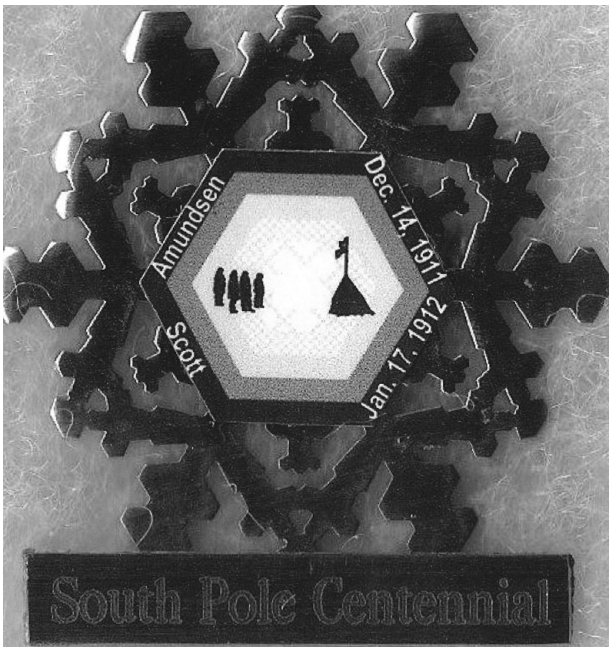

Fig. 1. South Pole centennial medallion.

Nothofagus trees stranded on the Antarctic Peninsula

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ABSTRACT. The occurrence of two basal sections of southern beech trees (*Nothofagus* sp.) embedded in raised cobble beaches and exposed by receding icefields at widely separated locations on islands off the western coast of the Antarctic Peninsula is reported. These are the most southerly records of naturally occurring driftwood. Both are of Fuegian or southern Patagonian origin but whether they arrived at their destinations directly from the north or by circumnavigating the Southern Ocean eastwards is uncertain. While their stranding probably occurred several centuries ago this can only be speculated.

The occurrence of driftwood trees or parts of trees, without any signs of anthropogenic association, that is cutting and/or dressing, in southern polar regions has been documented by Lewis Smith (1985 and references therein). That account related particularly to stranded tree trunks or branches on sub-Antarctic South Georgia (53°58'–54°53'S, 38°01'–35°47'W), and maritime Antarctic islands in the South Sandwich Islands