14:31 - 14:35

843: Small cetaceans in Bintulu, East Malaysia in the shadow of coastal development

Anna Norliza Zulkifli Poh (Presenter) ; Cindy Peter; Andrew Alek Tuen; Jenny Ngeian Machau; Gianna Minton

The Bintulu-Similajau region of Sarawak, East Malaysia is experiencing rapid large-scale agricultural and industrial growth, including the conversion of coastal rainforest to oil palm plantations, the construction of a US$500 million deepwater port and a 7,000 hectare energy-intensive industrial park. However the distribution, abundance, and habitat use of cetaceans in the region, as well as the scale of their interactions with fisheries remains poorly understood. Photo-identification and line-transect surveys were conducted between June 2008 and September 2013, with an accumulated distance of 2,066 km and 131 hours of survey effort. Of the 163 cetacean sightings recorded throughout the study period, Irrawaddy dolphins (*Orcaella brevirostris*) and Indo-Pacific finless porpoises (*Neophocaena phocaenoides*) were the most frequently encountered species. Other cetacean species observed include Indo-Pacific humpback dolphins (*Sousa chinensis*) and bottlenose dolphins (*Tursiops* sp.). Encounter rates of Irrawaddy dolphins and finless porpoises showed no significant differences when compared across three seasons: February-April, June-July and August-September. Distribution patterns of Irrawaddy dolphins and finless porpoises highlight the critical importance of nearshore coastal habitats. Despite showing overlap in spatial distribution, Irrawaddy dolphins occurred in shallower waters closer to the shore and rivermouths than finless porpoises. Other environmental parameters influencing their distribution were temperature and turbidity. Boat-based direct observations of fishing activities and effort in the area indicate that gillnets were the most frequently encountered fishing gear. Commercial trawlers were also common in the area despite its close proximity to the Similajau National Park. Areas of cetacean-fisheries overlap were identified using grid cell analysis of fishing effort and cetacean encounter rates. These findings represent the need for continued monitoring to assess the impact of rapid coastal development on the population.

1044: Spatio-temporal patterns in Antarctic minke whale (Balaenoptera bonaerensis) vocal behaviour in the Weddell Sea

Diego Filun (Presenter) ; Ilse Van Opzeeland

Antarctic minke whales (*Baleanoptera bonaerensis*) occur in open as well as ice-covered waters throughout the Southern Ocean. Their low visual detectability and ice-associated habitat makes the species difficult to study using traditional visual methods. The recent identification of Antarctic minke whale vocalizations now allows the use of passive acoustic monitoring to investigate year-round spatio-temporal patterns in occurrence in ice-covered areas. Here we present preliminary results on Antarctic minke whale occurrence patterns based on a multi-year passive acoustic data set from 6 locations throughout the Atlantic sector of the Southern Ocean. Analyses were based on daily presence of the bio-duck call, which is characterized by its repetitive nature, consisting of regular down-sweeped pulses with most energy located in the 50-300 Hz band. Antarctic minke whales were present at all six Antarctic recording locations from June to December, with highest presence occurring between August and November (>80% of days with bioduck calls present). At the southernmost recording locations, the bioduck call was present up to ten months of the year. Substantial inter-annual variation in the seasonal on- and offset period of vocal activity was observed at the different recording positions, possibly corresponding to variation in local ice conditions.

536: Validation of acceleration-based body density and energy expenditure estimates of diving harp seals in a semi-natural facility

Erik Martin Biuw (Presenter) ; Mario Acquarone; Lars Folkow; Erling Nordøy; Marie-Anne Blanchet; Ippei Suzuki; Kagari Aoki; Andreas Fahlman; Katsufumi Sato; Ryan Dillon; Michael A. Fedak; Patrick J. O. Miller

High-resolution data loggers are increasingly popular for providing behavioural and physiological information from free-ranging marine mammals. While such information holds promise for better understanding costs and benefits of different at-sea migration and foraging strategies, the high data volumes collected makes transmission via limited bandwidth systems such as Argos or GSM systems problematic. Bandwidth constraints can be overcome by pre-processing and analyzing data onboard to create simple indices prior to transmission, but such approaches demand careful validation studies under controlled conditions. We developed a 18m deep semi-natural facility within an aquaculture sea pen, where seals can swim within a 3D water body but where surface access is restricted to a respirometry dome for continuous collection of oxygen consumption data. We equipped trained harp seals (*Pagophilus groenlandicus*) with dataloggers to collect depth, acceleration and swim speed data, while simultaneously measuring their energy expenditure using the rate of oxygen consumption. By carrying out experiments under controlled conditions over periods of several hours, we could describe correlations between body movements/activity and energy expenditure over a range of timescales and lags. This facility also allowed us to test existing models for predicting body density (measure of lipid store) from acceleration data from seals diving within a 3D water volume. The known body composition (measured using isotopically labelled water) and corresponding body density was modified by adding floatation blocks, weights or neutrally buoyant blocks. This allowed us to test predictions of energy expenditure and optimal swimming behavior from existing theoretical models. Energy expenditure increased predictably as total body density increased or decreased, with a minimum at neutral buoyancy. When validated against isotope-based values, body density could be accurately estimated using existing models developed for other seal species. These results show great promise for implementing onboard algorithms for long-term monitoring of energy budgets from free-ranging marine mammals.

547: Alternative approach for sectioning beaked whale teeth for ageing

Aleta A. Hohn (Presenter) ; Natalia Dellabianca

Beaked whales are one of the least known groups of cetaceans and very little information is available on age for most species in this family. The paucity of age data is due to the availability of specimens and also a reluctance to allow the destructive sampling required to age these rare teeth. We examined teeth from four species of ziphiids that inhabit subantarctic waters to evaluate whether sections taken on a plane that was not mid-longitudinal would produce counts of cemental growth layer groups (GLGs) comparable to sections taken on the traditional mid-longitudinal plane. We evaluated teeth from Cuvier's beaked whale *Ziphius cavirostris* (n=12), Layard's beaked whale *Mesoplodon layardii* (n=8), Gray's beaked whale *M. grayi* (n=6) and Shepherd's beaked whale *Tasmacetus shepherdi* (n=2) of different ontogenetic classes from the R. Natalie P. Goodall collection, held at the Museo Acatushún de Aves y Mamiferos Marinos Australes, Tierra del Fuego, Argentina. Teeth were initially cut on a low-speed saw into sections using pre-defined planes, one mid-longitudinal and 1-2 at different tangents at the edge of the tooth. At all selected locations, a 2-3mm thick section was cut, decalcified, and stained. Teeth from most specimens showed a clear layering pattern. GLGs in dentine were generally visible and similar to delphinids, but dentine became irregular at a relatively young age precluding use for age estimation. GLGs in cement varied among species but generally were distinct. In at least two species, *M. grayi* and *M. layardii*, it does appear that, from cemental GLGs, sections taken tangential to the mid-longitudinal plane can produce age estimates similar to mid-longitudinal sections. Finding a less destructive approach to sectioning teeth may facilitate ageing for beaked whale species.