Fin whale (*Balaenoptera physalus*) distribution modelling in the Nordic Seas & adjacent waters

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**Introduction**

Understanding cetacean distribution is essential to interpret impacts of environmental change on species ecology and ecosystem functioning. Studies on baleen whale distribution are comparably rare in polar regions, mainly due to financial or logistic constraints. Here we use species distribution models (SDMs) to predict habitat suitability for fin whales (*Balaenoptera physalus*) in Arctic waters. SDMs are helpful tools linking species occurrences to environmental variables (EVs) to predict potential distributions. The aim of this study was to identify suitable habitats for fin whales in the Nordic Seas and underlying EVs, as potential drivers of the species’ distribution, during summer.

**Material and Methods**

The study area encompasses the Nordic Seas, with a spatial extent from N60°-N81° and W45°-E55°.

**Observations**

- 2004 to 2018 (May to September)
- 10 RV Polarstern cruises in the Arctic Ocean
- Open-source data (iOBIS, GBIF)
- 1229 sightings (746 unique, 10 x 10 km grid cells)

**Environmental Variables**

- Selected based on ecological relevance
- 24 initial EVs, 14 final: e.g. aspect, bathymetry, chlorophyll a, slope and velocity
- Spatial blocks for models with and without duplicates, as estimated by spatialBlock function

**Results**

Both models show a similar predicted pattern, but habitat suitability seems to be rather extensive and not so clustered in the accessibility model.

**Discussion**

- A distance to shore of 10 km and 80 – 150 km to sea ice edge has the highest habitat suitability
- Fin whales favor a certain range of depth, suitability tends to increase as slope increases
- Little variation in SST is favored, while habitat suitability according to salinity 100 m was highest around 35

**Conclusions**

Potential applications of results:

- Designing marine protected areas / guiding seismic surveys
- Support the further use of opportunistic data to understand ecological drivers of species distribution
- Targeting / designing future surveys

SDMs are useful tools to model species distribution using opportunistic data:

- Development and evaluation of mitigation systems
- Monitoring of distributional shifts

**References**