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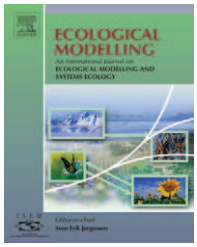

Preliminary trophic model of the Antarctic Peninsula Ecosystem (Sub-area CCAMLR 48.1)

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ABSTRACT

Species, biomasses, production rates, distribution and other aspects of the community structure have been studied in the Antarctic Ecosystem; however there are no integrated models that explain mass transfer at the spatial mesoscale.

Even though the Antarctic Ecosystem as a whole has been identified as a functional unit, subsystems could be identified and characterized, among which, the Antarctic Peninsula stands out for its particular geography, oceanography and trophic web.

The aim of this work is to construct a mass balanced model describing the main trophic interactions of this community. The model is built using the software Ecopath with Ecosim 5.0, which yields a representation of the trophic web and estimations of global ecosystem properties.

Phytoplankton, zooplankton and krill accounted for most of the mass flow. Flows to the trophic level II (TL II; detritivores and herbivores) were attributed to zooplanktonic and benthic organisms mainly. Flows to the TL III were explained by fish, birds (flying birds and penguins), *Balaenoptera acutorostrata* and baleen whales. Flows to the TL IV were dominated by some fish, birds (flying birds and penguins) and mammals. Finally, in TL VI, the flows were dominated by *Orcinus orca*. *O. orca* was the top predator in the ecosystem with a TL of 4.88, followed by *Physeter catodon* (4.63) and *Hydrurga leptonyx* (4.62). Krill was found at the intermediate TL (2.33). Resulting ecosystem indexes (e.g. total transfer efficiency, connectance index, etc.) were consistent and characteristic of ecosystems of high temporal and spatial variability.

The model gives a comprehensive description of the food web dominated by phytoplankton–krill–top predators chain, and complemented with alternative food pathways (e.g. through *Electrona antarctica*), which together gives an enhanced complexity to the system. Despite the limitations of the model in data gaps, particularly for winter season, grouping of functional groups, steady state assumptions, etc., it improves the description of the trophic structure and ecosystem functioning of the Antarctic Peninsula and highlights gaps in knowledge.

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