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THE ANTARCTIC SEA ICE ECOSYSTEMS: COMPARATIVE ANALYSIS

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Sea ice biota production during the austral winter in the extensive Antarctic sea ice zone is recently considered as an important contribution to the phytoplankton production in the Southern Ocean where sea-ice covers more than 80% of its surface. It is important to know the contribution of different types of sea ice to biological production in both pelagic and coastal ecosystems.

Coastal ice. On the basis of round-year materials from the coastal zone of Admiralty Bay (King George Island, 1987-1988), it has been shown that sea ice algae biomass (in terms of chlorophyll a concentration), is 2-3 orders of magnitude higher than in the underlying sea water. Mean POC/chlorophyll a ratio is of 220 in the young-formed ice, 109 in the anchored ice and 23 in the fast ice. Maximum coastal chlorophyll a concentrations were up to 210 □g/l but POC concentrations were up to 6000 □g/l. Total list of diatoms identified in the coastal sea ice consists of 119 species. Only 6 diatoms are dominated by numbers during the winter period in the anchored ice: *Navicula gelida var. parvula, Nitzschia lecointei, N. prologatoides, N. barbieri, Fragilariopsis cylindrus* and *F. curta* reaching more 95% of the total list of identified diatoms. *Navicula gelida, Nitzschia lecointei, N. barbieri, Corethron criophilum, Fragilariopsis cylindrus* and *F. curta* were dominated in the fast ice (more 90% of the total list of species).

Pelagic ice. The values of chlorophyll a concentrations of the one-year sea ice from the western part of Weddell Sea (Ice Station Weddell, Feb-Jun 1992) were hundreds times higher than in the seawater below ice. High chlorophyll a concentrations, in the range 20-50 □g/l, testify to very intensive biological processes within the thickness of multi-year, one-year and young growing sea ice during the early austral winter in the pelagic system. 88 and 89 taxa of diatoms were identified, correspondingly, within the old and one-year ice interior in the western Weddell Sea, Feb-Jun 1992. Two diatoms were dominated by numbers during the winter period: large size *Fragilariopsis cylindrus* and *Archaeomonas areolata* (more 80% of the total algae list of species) in the old sea ice and *F. cylindrus* (more 90%) in the one-year ice). The infiltration community consists mostly of small-size cells of *Fragilariopsis cylindrus* reaching up to 90% of the total cell number. Diatoms: *Chaetoceros deflandrei, Ch. debilis* and *Ch. socialis* were dominant species during the late winter but *Corethron criophilum* and *Eucampia antarctica* dominated in the early spring bloom.

POC/chlorophyll a ratio shows very high correlation for the old- and one-year ice in the pelagic system (R2=0,94) as well as for the fast ice in the coastal region (R2=0,96). During the winter season both in coastal and pelagic ecosystems, a large amount of living and dead organic materials are released from the sea ice down to the underlying seawater providing food sources for invertebrates associated with ice-water interface such as copepods, fish larvae and krill. These results indicate that sea ice algae developing during the austral winter in the Antarctic sea ice zone should be considered as an important factor in Southern Ocean biological models.