

Platelet ice formation in Antarctica: its relevance in ice shelf dynamics, sea ice growth and ecology.

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Platelet ice formation in Antarctica is associated with super cooled water usually derived from the contact of warmer deep water with the base of ice shelves. Platelets normally have a discoid shape and range in diameter from a few mm to over 15cm. They form within the water column underneath or in front of ice shelves as well as under an existing fast or pack ice cover. Platelet ice aggregates under the ice shelf where with time, it forms marine ice, which amalgamates with the overlying floating ice shelf and thus has a considerable impact on the dynamics of these ice shelves. Green Icebergs, frequently observed in the Southern Ocean represent overturned remnants of calved ice shelves containing marine ice. Accumulations of ice platelets under sea ice add to the growth and thickness of the ice by congealing due to freezing from the top. They also aggregate loosely under fast or pack ice, contributing to the growth and thickness increment of sea ice as well as forming an important habitat for a highly productive and uniquely adapted microbial community comprising organisms, which appear to live exclusively in this habitat. This microbial community is one of the most productive sea ice communities and provides food and spawning sites for pelagic zooplankton species such as copepods and amphipods as well as Icefish *Pagothenia borchgrevinki* the Antarctic Silverfish *Pleuragramma antarcticum*, whose larvae are associated with the platelets in large numbers. It is considered an important source of food for the benthos on the coastal shelf, while Emperor penguins and Weddell seals often use fast ice strengthened by platelet ice to breed or haul out on. Although the extent of platelet ice formation is unknown, it is expected to occur around the continent wherever there are floating ice shelves or where supercooling of seawater occurs.