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TITLE: Breaking the ice: the introduction of biofouling organisms to Antarctica on vessel hulls

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ABSTRACT:

Abstract Few reports exist that describe marine non?native species in the Southern Ocean and near?shore waters around the Antarctic continent. Nevertheless, Antarctica's isolated marine communities, which show high levels of endemism, may be vulnerable to invasion by anthropogenically introduced species from outside Antarctica via vessel hull biofouling. Hull surveys of the British Antarctic Survey's RRS James Clark Ross were undertaken between 2007 and 2014 at Rothera Research Station on the Antarctic Peninsula (Lat. 67°34'S; Long. 68°07'W) to investigate levels of biofouling. In each case, following transit through scouring sea?ice, over 99% of the vessel hull was free of macroscopic fouling communities. However, in some surveys microbial/algal biofilms, balanomorph barnacles and live individuals of the cosmopolitan pelagic barnacle, Conchoderma auritum were found in the vicinity of intake ports, demonstrating the potential for non?native species to be transported to Antarctica on vessel hulls. Increasing ship traffic volumes and declining duration of sea ice in waters to the north and west of the Antarctic Peninsula mean the region may be at increased risk of non?native species introductions. Locations at particular risk may include the waters around popular visitor sites, such as Goudier Island, Neko Harbour, Whalers Bay, Cuverville Island and Half Moon Island, and around northern peninsula research stations. Simple and cost?effective mitigation measures, such as intentionally moving transiting ships briefly through available offshore sea ice to scour off accessible biofouling communities, may substantially reduce hull?borne propagule pressure to the region. Better quantification of the risk of marine non?native species introductions posed by vessel hulls to both Arctic and Antarctic environments, as sea ice patterns and shipping traffic volumes change, will inform the development of appropriate regional and international management responses. 

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