

How Representative are Low Resolution Sea Ice Concentration Products of Conditions at Coastal Sites along the Central Western Antarctic Peninsula?

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ABSTRACT

Macroalgal forests exist along the northern portion of the western Antarctic Peninsula (WAP). However, few studies have documented its distribution farther south in the central WAP. In 2019, macroalgal cover was determined at 14 coastal sites located along a latitudinal gradient (64°-69° S) through quantitative analysis of diver-collected video from replicated vertical transects collected at depths between 40 m and 5 m. A strong negative correlation was documented between total macroalgal cover and all the sea ice concentrations evaluated (National Ice Center Charts, AMSR-E and AMSR-2 and the National Snow and Ice Data Center Sea Ice Index). However, these remote-sensing derived sea ice concentrations are captured at large spatial scales relative to the scale of the sampling sites (~100 meters across). To investigate how representative these sea concentrations are of conditions at the studied shallow water coastal sites, sea ice concentrations from Landsat (30 m) and MODIS (1000 m) were computed for buffers ranging from 100 m to 10,000 m around each site and then compared to concentrations from the larger footprint products. In general, the larger footprint sensors indicated lower sea ice concentrations than Landsat or MODIS. However, the observed differences at individual sites were typically consistent across buffer sizes. This indicates that while the sites had higher sea ice concentrations than retrieved from the lower resolution products, the higher concentrations appear to be consistent across spatial scales from 100s to 1000s of meters.

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