The role of sea ice microbial communities (SIMCO) in supporting krill energetics during their furcilia/juvenile stages is recognized. However, specific information relating SIMCO biomass with krill feeding, growth, survival and recruitment over winter seasons is lacking. We are presently evaluating the dynamic interactions between phytoplankton dynamics, sea ice seasonal advances, and SIMCO development in the autumn and into the winter periods through diagnostic modeling exercises. Using SSMI/AMSER-E and other sea ice remote sensing products we have evaluated past years of late and early ice formation (e.g. 2001 and 2002) in relation to phytoplankton biomass decline along the western Antarctic Peninsula. Model results indicate that when the timing of the ice advance allows for sea ice algal growth coupled with phytoplankton incorporation, winter SIMCO biomass can show order of magnitude differences. These variations are likely to have consequences for krill energetics and may shed light on the impact of future changes in annual sea ice production on winter survival of krill.