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MAPPINGCARBON: Mapping the carbon stocks of kelp forests in the Snowhill Islands and & Weddell Sea

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ABSTRACT

This project will provide the first estimates of the carbon stocks and subsequently the climate mitigation potential of kelp forests on the Antarctic Peninsula. The objectives will be to estimate the standing carbon stocks of macroalgal forests (kelp forests) in the waters of the Snowhill Islands and & Weddell Sea. The project will incorporate; 1) mapping of kelp forest ecosystem distribution using drones (UAV's) and remote sensing products, 2) estimates of kelp carbon stocks by evaluating standing stock biomass using sediment cores, remotely operated vehicles (ROVs) and novel machine learning approaches; and 3) estimates of the incorporation of macroalgal carbon using stable isotope analysis. Using remotely operated vehicles (drones and submersibles) would provide new and important scientific knowledge of the kelp forests and foodwebs of this important region on the Antarctic Peninsula. The use of Artificial Intelligence (AI) methods will not only provide high resolution, accurate assessments of kelp community structure (e.g., species composition and biomass), but could also be used to assess animal populations (e.g., whales, seals, penguins) that are notoriously difficult to censor using traditional methods. The CSIRO team is also extremely interested in scientific outreach and communicating the importance of marine ecosystems in Antarctica. The study will lead to the production of several high impact factor journal publications, and other promotional and extension outputs. The CSIRO team has previously been involved in the production of documentary/training videos (e.g., IORA hub training series on YouTube) and podcasts, and there would be a desire to document and promote the finds of the present study (including showcasing the support provided by Ponant).