**NEW CUTTING-EDGE EO TOOLS TO DELIVER SYNOPTIC INSIGHT ON “BLUE CARBON” ECOSYSTEMS**

Coastal vegetated habitats, such as kelp forests, eelgrass meadows and rockweed beds are some of the most productive ecosystems on Earth. They provide us with many essential ecosystem services, for example food provision, water quality control, disaster resilience, tourism and at the same time, these ecosystems are important natural sinks for carbon. Recent evidence suggests that submerged aquatic vegetation (SAV) are among the most efficient ecosystems when it comes to carbon uptake and long-term storage, which is referred to as blue carbon. Moreover, the health of aquatic vegetation is a key indicator of the ecological status and environmental state of ocean and estuarine waters. With increasing climate pressures and human impacts related to eutrophication, overfishing and habitat fragmentation, the coverage and health of these coastal habitats have rapidly declined.

Due to the essential ecosystem functions coastal vegetated habitats are providing, up-to-date knowledge about their abundance and growth dynamics is critical to assess the impacts of management and conservation efforts, monitor overall marine health and not least blue carbon strategies, and the construction of blue carbon budgets. However, the highly fragmented nature of SAV in both time (in some locations changes occur within days and in others over weeks or months) and place (organised into many different heterogenous patches of individual communities) makes monitoring and mapping a challenging, time consuming and labour-intensive task.

By exploiting the full capacity of Earth Observation (EO) and AI technology, DHI has developed an innovative tool to monitor the extent and dynamics of SAV at scale, and in a cost-efficient and timely manner. Back in 2018, DHI first illustrated the scalability of the tool by delivering the first-ever nationwide overview of the spatial distribution of shallow-water SAV in Denmark (<https://marine-vegetation.satlas.dk/>), applying a combination of Copernicus Sentinel-2 satellite data, novel machine learning techniques and advanced data processing.

Building on this robust and scalable approach, and in collaboration with Swedish regional and national authorities, the entire methodological workflow has been wrapped into an easy-to-use, cloud-based web application. The tool allows non EO specialists to apply the advanced machine learning algorithms, and the latest Sentinel-2 satellite data, to conduct scalable and detailed SAV classification, on demand. With this novel tool, users can now execute the entire mapping process, from the selection of suitable imagery to the final classification, in just a few clicks. By allowing a user, with local knowledge and insight into the specific biological conditions, to conduct the analysis directly in a web browser, an optimised result is ensured, by integrating subject specific domain knowledge with a technical backbone.

With a proven and well tested concept in place, the SAV mapping tool is now ready for application worldwide as an integrated, scalable and flexible solution to map and monitor Blue Carbon ecosystems to support more effective and data-driven decision making and management efforts, thus reinforcing our ability to meet conservation and environmental objectives and safeguard our coastal ecosystems which are key for both climate mitigation and adaptation strategies

For more information about the SAV mapping tool visit <https://www.dhi-gras.com/projects/sav_se/>