Ecosystem impact of large-scale macroalgae cultivation - DTU Orbit (04/11/2019)

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Globally, the interest for macroalgae production for food, feed and biomolecules is increasing. Macroalgae production is also increasingly viewed as an instrument for accelerating ecosystem recovery from coastal eutrophication, as well as for climate mitigation. However, since the impact on the marine environment of large-scale macroalgal cultivation is relatively undocumented, the national authorities are reluctant in giving cultivation licences for production in larger scale and for periods longer than 5 years. The EcoMacro study aims to document the impact of large-scale macroalgae (Saccharina latissima) cultivation on physical, chemical and biological aspects of the marine environment. During a one-week intensive scientific cruise on-board the research vessel AURORA in early summer 2018, a thorough investigation of the marine environment surrounding two Danish macroalgae cultivation sites of 4 and 100 hectares, respectively, was carried out. In-situ parameters investigated were: Physical (hydrodynamics, light, temperature), chemical (salinity, nutrient concentrations, pH, alkalinity, cDOM, TOC, POM) and biological (pelagic chlorophyll a concentrations, macroalgae standing stock, biofouling, eDNA, benthic fauna) parameters. On-board the research vessel, also 24-hour mesocosm studies were performed, investigating in closed systems the dynamics of photosynthesis, respiration, nutrient exchange, and emission of climate gasses of young (one-year) and older (four-year) individuals of the cultivated S. latissima. The cruise was successful in collecting data as planned during the pre-harvest period with maximal biomass standing stock. The results of the cruise are being processed and analysed, and will be presented and discussed in the context of macroalgae production strategies and marine ecosystem management. Conclusions and recommendations for future research and management strategies will be presented.