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Merging remotely sensed data, models and indicators for a sustainable development of coastal aquaculture in Algeria

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Finfish cage farming is an economically relevant activity, which exerts pressures on coastal systems and thus require a science-based management, based on the Ecosystem Approach, in order to be carry out in a sustainable way. Within MEDINA project (EU 282977), ocean color data and models were used for estimating indicators of pressures of aquaculture installations along the north African coast. These indicators can provide important support for decision makers in the allocation of new zones for aquaculture, by taking into account the suitability of an area for this activity and minimizing negative environmental effects, thus enhancing the social acceptability of aquaculture. The increase in the number of farms represents a strategic objective for the Algerian food production sector, which is currently being supported by different national initiatives. The case-study presented in this work was carried out in the Gulf of Bejaia. Water quality for aquaculture was first screened based on ocean color CDOM data (http://www.globcolour.info/). The SWAN model was subsequently used to propagate offshore wave data and to derive wave height statistics. On this basis, sub-areas of the Gulf were ranked, according their optimality in respect to cage resistance and fish welfare requirements. At the three best sites an integrated aquaculture impact assessment model was therefore applied: this tool allows one to obtain a detailed representation of fish growth and population dynamics inside the rearing cages, and to simulate the deposition of uneaten food and faeces on the sediment and the subsequent mineralization of organic matter. This integrated model was used to produce a set of indicators of the fish cages environmental interaction under different scenarios of forcings (water temperature, feeding, currents). These model-derived indicators could usefully contribute to the implementation of the ecosystem approach for the management of aquaculture activities, also required by the implementation of the UNEP/MAP ecological approach.