



FOAM, the new benthic degradation model and its calibration in Mediterranean condition: an application to a fish farm

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A new numerical benthic degradative module FOAM (Finite Organic Accumulation Module) has been coupled with the advection-dispersion model POM-LAMP3D in order to improve the prediction of the potential impact of marine fish farms. Moreover real historic current-meter data are employed to force the hydrodynamic and dispersion simulations and recent measurements of settling velocity values specifically targeting Mediterranean fish species are considered.

FOAM uses the output of the other functional units of the modeling framework to calculate the organic load on the seabed. It considers the natural capability of the seafloor in absorbing part of the organic load. Different remineralization rates reflect the sediment stress levels and are used to compute the organic carbon concentration remaining on the seabed after degradation. Two sampling campaigns have been performed in a typical Mediterranean fish farm in the warm and cold season in 2006 in order to measure the benthic response to the organic load and the mineralization rates in the Mediterranean conditions. Organic degradation for both uneaten feed and faeces is evaluated by changing release modality (continuous and periodical) and by varying the settling velocities. The results show that in the Mediterranean conditions, the benthic response to the organic enrichment of the bottom depends on water temperature.

We find that the introduced modeling framework successfully improves capability predictions. It can therefore represent an important tool in decision making processes, for planning and monitoring purposes.