FishMod

Mathematical modeling for ecosystem approach to fisheries management in Vietnam

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Research context

In the last decades, **Vietnamese fisheries have developed intensively**. This sector is of course of primary importance for Vietnam from a socio-economical point of view. However, the consequences of fishing activity intensification can be very **harmful for the marine ecosystem** and can lead to severe reduction, or even depletion, of some fish stocks. To try keeping a sustainable development, a fishery management strategy has been approved for Vietnam in 2010. The goal was to reduce the coastal fishing pressure and to intensify offshore fishing. A strong limitation in this management strategy was to make decisions only based on single stock assessment. This latter does not take into consideration the numerous interactions between the different species at the ecosystem level.

The scientific community has undertaken the analysis of marine ecosystems through mathematical models for several decades. In 2008, the FAO (Food and Agriculture Organization of the United Nations), advocated the use of ecosystem modeling for an **ecosystem approach to fisheries management** (FAO, 2008).

Objectives

This project focuses on the **development of mathematical models for an ecosystem approach to fisheries management in Vietnam**. The general goal is to propose models that can be reliably used to develop an efficient fisheries management strategy. To this end, the following specific goals will be targeted:

- an **appropriate choice of ecosystem model complexity**, especially in terms of selected ecological groups, leading to a good trade-off between a realistic description of the different species interactions and the availability of measured data (biomasses, dietary composition, etc.);
- the **assessment of the predicted model output uncertainties** based on admissible output intervals and/or statistically representative solutions;
- dynamical model solutions enabling to predict the **time evolution of the marine ecosystem under different fisheries management scenarios**;
- the addition to the models of the **impact of ocean temperature changes on ecosystem evolution**;
- the **calibration and validation** of the models **with selected available data** and, as far as possible, **with additional local data**;
- the **assessment** of the model hypotheses, predicted results and analyses in terms of fisheries management **with Vietnamese academic experts** from the Institute of Aquaculture of Nha Trang University (Prof. Luong, South promoter).