E2E EcoModel Summer School – A Retrospective

Christina Frisk[1], Benjamin Kürten[2] & Susa Niiranen[3]

[1] National Institute of Aquatic Resources, DTU, Kavalergården, 2920 Charlottenlund, Denmark

[2] School of Marine Science and Technology, Newcastle University, Newcastle upon Tyne, NE1 7 RU, United Kingdom, EUR-OCEANS PhD student

[3] Finnish Institute of Marine Research, P.O. Box 2, 00560 Helsinki, Finland

An interdisciplinary group of 22 young scientists from eleven countries, within the European Union as well as from Turkey, China, Ukraine, USA and Russia, gathered from August 11th to 16th for an intensive training course in end-to-end ecosystem modeling.

The venue for the course, themed 'E2E Ecomodel – Analysis of End-to-End Food Webs and Biogeochemical Cycles' (http://www.imber.info/E2E_EcoModel_home.html) was set at Middle East Technical University (METU) in Ankara (Turkey) and was sponsored by IMBER and EurOceans. The aim of the training was to provide students with the knowledge and skills to increase their understanding of global change and its impacts on marine biogeochemical cycles and end to end food webs, and to introduce students to new methods, techniques and models available for understanding the combined effects of physical and biological forcings on marine biogeochemical cycles and ecosystems. The program for the week included a series of lectures and hands-on modeling exercises and also included individual contributions from the participants with poster and oral presentations, as well as a final plenary discussion on climate change.

Several topics were presented by the lecturers, and debated in plenum. The themes covered fundamental concepts of biogeochemical cycles and ecophysiology, to mesoscale processes. In addition, a more general background of ecosystem modeling was provided, highlighting the following key issues: Which are the important processes? At which scales does one need to resolve the model and coping with model complexity? What kind of questions can various models help one to understand and hopefully answer? The significance of proper model validation was also stressed and different validation techniques were discussed. Since ecosystems are never steady systems but always striving and evolving for optimal states for the inhabiting species, discussions of the necessity of plasticity and adaptation to anthropogenic and environmental forcing were further a general topic of the week.

References to advances in end-to-end food web modeling were given on the lectures throughout the week and subsequently the hands-on exercises provided a good opportunity for us to get familiar with today's well established ecosystem models. The first session used a classical prey-predator model which revealed the importance of understanding the principal processes on model stability and output. Further we used ERSEM (1D setup developed at Plymouth Marine Laboratory (PML)) as one example of a complex ecosystem model. Here tests were made e.g. on

the importance of the food web assumptions in the model, ecological parameters of involved species/functional groups, as well as the model stability and sensitivity to for instance the initial conditions and forcing functions, including the effect of anticipated changed conditions according to climate changes on lower end ecosystem processes.

The group debate on climate change was based on the two documentaries: Al Gore (2006) ‘An Inconvenient Truth’ and Martin Durkin (2007) ‘The Great Global Warning Swindle’. It resulted in an interesting and lively discussion on the differences in perception on the climate change question, and whether anthropogenic or natural impacts are most important in today’s environment.

In essence, the week in Ankara left all participants with a much broader knowledge, demands, and understanding of the multidisciplinary tasks required to model an ecosystem; including pros, cons and severe pitfalls! The summer school further gave us a great opportunity to discuss our own research with the lecturers and meet other students with similar scientific interests inspiring further collaboration.

We would like to thank all involved parties for an inspiring course!

Fig. 1: Lecturers and participants at the E2E EcoModel training course at METU, Ankara.