

SEVENTH FRAMEWORK PROGRAMME THEME 7 Environment

Collaborative project (Large-scale Integrating Project)

Project no: 246 933

Project Acronym: EURO-BASIN

Project title: European Basin-scale Analysis, Synthesis and Integration

Deliverable 4.3. Analytical model on processes governing biomass & energy transfer through the marine ecosystem

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Due date of deliverable: Dec 2012

Actual submission date: Feb 2014

Organisation name of the lead contractor of this deliverable:

Start date of project: 31.12.2010 Duration: 48 months

Project Coordinator: Michael St John, DTU Aqua

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Theme 6 Environment

Dissemination Level		
PU	Public	
PP	Restricted to other programme participants (including the Commission)	X
RE	Restricted to a group specified by the consortium (including the Commission)	
CO	Confidential, only for members of the consortium (including the Commission)	

Deliverable 4.3 Analytical model on processes governing biomass & energy transfer and through the marine ecosystem

is a contribution to Task 4.6 in WP4

Responsible: SWANSEA (K.J. Flynn & A.Mitra), NERI (E.F. Møller)

Start month 1, end month 48

Executive Summary:

The deliverable is a revision of the traditional, long-held, description of the operation of the base of the marine planktonic foodweb. The traditional view, of a system driven by phytoplankton – microzooplankton – mesozooplankton – fish, with bacteria as remineralisers, is challenged by the realization that most of the phytoplankton and 1/3rd of the microzooplankton in the photic zone are mixotrophic protists. These organisms merge primary and secondary production within a common (single) cell form. This leads to changes in efficiency in production, of the operation of the microbial loop and biological carbon pump, and thence impacts on the entire food chain (mixotrophs are considered excellent feed for fish larvae, for example). This WP deliverable was part-supported through an external funding route (Leverhulme International Networks, UK) for a series of workshops. This WP then enabled the vision from those workshops to be enacted through the construction, testing and publication of models describing the proposed new paradigm in marine ecology. The primary output is an open access publication (Mitra et al. 2014). Outputs from this WP are of relevance for WPs 2 and 6 (biogeochemical aspects) as well as WP5 (fisheries), though the real importance will develop beyond the life of EuroBASIN.

Relevance to the project & potential policy impact:

This deliverable can potentially impact indirectly on policy making. The central tenet of this work identifies a potential major misunderstanding (arguably a flaw) in our understanding of the very basis of the marine planktonic foodweb. As this ultimately drives processes ranging from marine biogeochemistry to fisheries, there is then a clear linkage between the outputs of this WP and other components of EuroBASIN. Specifically this linkage is through WPs 2, 5 and 6.

Access to Data and/or model code (where relevant):

The publication reporting the output from this WP is open access –

Mitra A, Flynn KJ, Burkholder JM, Berge T, Calbet A, Raven JA, Granéli E, Hansen PJ, Stoecker DK, Thingstad F, Tillmann U, Våge S, Wilken S, Glibert PM, Zubkov MV (2014) The role of mixotrophic protists in the biological carbon pump. *Biogeosciences*, 11, 995–1005, doi:10.5194/bg-11-995-2014.