

The AMICO-BIO project: integrating Operational Coastal Oceanography with a 3D Coupled Physical-Biogeochemical Modelling Approach

C. Pinazo¹, O. N. Ross¹, F. Diaz¹, A.M. Doglioli¹, F. D'Ortenzio², J-C Dutay³, C. Estournel⁴, P. Forget¹, V. Garnier⁵, P. Garreau⁵, M. Gehlen³, E. Gutknecht⁶, M. Herrmann⁷, M. Kersale⁸, F. Kessouri⁴, C. Lathuilière⁹, L. Marie⁵, P. Marsaleix⁴, C. Perruche⁶, A. Petrenko¹, G. Reffray⁶, M. Sourisseau⁵, V. Taillandier², I. Taupier-Letage¹, P. Testor¹⁰, B. Thouvenin⁵, C. Ulses⁴ and G. Eldin⁷

¹*Aix-Marseille Université; UM110 CNRS, IRD, Université de Toulon, Mediterranean Institute of Oceanography, OSU Institut Pythéas, Marseille, France*

²*Université Pierre et Marie Curie, UMR 7093 CNRS, Laboratoire d'Océanographie de Villefranche-sur-mer, France*

³*Laboratoire des Sciences du Climat et de l'Environnement, UMR 8212, CNRS, CEA, UVSQ, Institut Pierre Simon Laplace, Gif-sur-Yvette, France*

⁴*Laboratoire d'Aérodynamique, UMR 5560 CNRS, Université Paul Sabatier, Observatoire Midi-Pyrénées, Toulouse, France*

⁵*Laboratoire de Physique Hydrodynamique et Sédimentaire, IFREMER, Brest, France*

⁶*MERCATOR Ocean, Ramonville St Agne, France*

⁷*Laboratoire d'Etudes en Géophysique et Océanographie Spatiales, UMR 5566 CNRS, IRD, CNES, Université Paul Sabatier, Observatoire Midi-Pyrénées, Toulouse, France*

⁸*Laboratoire de Physique des Océans, UMR 6523 CNRS, IFREMER, IRD, Université de Bretagne Occidentale, Brest, France.*

⁹*Service Hydrographique et Océanographique de la Marine, Brest, France*

¹⁰*Laboratoire d'Océanographie et du Climat, Expérimentations et Approches Numériques, UMR 7159 CNRS, IRD, MNHM, Université Pierre et Marie Curie, Paris,, France*

The AMICO-BIO [1] project is an interdisciplinary Copernicus project, co-funded by the French Ministry of the Environment, the CNRS-INSU and LEFE-GMMC. It is focused on the French Atlantic and Mediterranean seaboard, in particular the Bay of Biscay and Gulf of Lions. The project investigates the consequences of different implementations of open boundary conditions (OBCs) on 3D biogeochemical regional ocean models, while making use of publicly available remote-sensing and *in situ* data products.

The main goal of AMICO-BIO is to facilitate the downscaling from global to coastal ocean numerical models, thereby improving the data exchange between different model configurations, especially at the shelf boundary. To date, regional models remain largely unconnected with global models. AMICO-BIO will bridge this gap by forcing the biogeochemistry of the open boundaries in regional models with the output from the operational global-scale models by MERCATOR. One of the inherent difficulties in coupling global with regional-scale models is related to the different model dynamics in global versus regional models which often leads to poor results at the boundaries. This problem can be so severe, that in order to avoid it, many coastal modellers currently use a Neumann condition, or they deploy their coastal model at the global scale in order to avoid incompatibility problems, with an excessive increase of computational time. AMICO-BIO aims to provide a major advancement in this area of research by examining the various ways in which the forcing obtained from global scale models can be applied to the open boundaries of regional models. Several operational teams, such as MERCATOR, are stakeholders in this project and the results will directly benefit their work.