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# Microalgae blooms in the Channel - Watershed impact on toxic phytoplankton development

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## Résumé

The Eastern Channel French coast, between Normandie and Picardie, is under the influence of the unbalanced nutrients brought by the Seine plume, which trigger some coastal eutrophication. Two phytoplanktonic toxic events (ASP) that occurred between 2004 and 2011-2012 in the eastern Channel impinged on the scallop fishery in the Bay of Seine and induced the partial or total closure of the fisheries. During these events, the species *Pseudo-nitzschia australis* was systematically observed in the water samples. The presence of the ASP toxin (domoic acid) is concomitant to a nitrogen excess with regards to the silicium or the phosphorus. Moreover, experiments show the relation between siliceous deficiency and domoic acid production. Human activities (agricultural and urban) in this region have a direct effect on the functioning of the coastal marine ecosystem. Indeed, the nitrogen excess is potentially accountable for marine eutrophication. Chemical fertilizers are the principal source of nitrogen in the ecosystem. Nevertheless, it is possible to reduce these nitrogen fluxes by reorganizing the agricultural-food chain and limiting over-fertilization. During two workshops of participative science called "atelier du futur", different scenarios of modifications/evolution of agricultural practices were built with all the users of the watershed and of the coastal sea. The coupling of a watershed model and a marine ecosystem model enables a better understanding of the scenarios impact on the eutrophication levels and toxic production in the sea.

**Mots-Clés:** toxic microalgae, Pseudo, nitzschia, watersheds, nutrient loads, scenarios, marine ecosystem, modelling, participative science.

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