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SÉMINAIRE

Integrating multiple stressor effects

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The lack of ecological realism in current prospective environmental risk assessment (ERA) is widely recognised as a limitation in this field. As organisms are living in a multistressed environment, involving both chemical and environmental stressors, it is worth understanding how these combined stressors will affect the organisms and subsequently the populations. A way forward to include more ecological relevance in ERAs is the use of environmental scenarios that will represent key differences in environmental factors such as the food availability, the temperature variability, the predation, etc. and in exposure factors. All these factors will influence the capability of an organism to grow and reproduce as well as its resilience to additional stressors. As growth and reproduction are driven by an organisms' energy balance, Dynamic Energy Budget models are particularly well suited to integrate toxicant and environmental stressors. Indeed, the DEB theory analyses the fluxes of energy within an organism, how stressors can impact these fluxes, and how this will affect the organism's life history traits. This mechanistic description of an organism can then be used as a building block of a population model. It is therefore of interest to analyse the effect of a mixture of ecological and chemical stressors on the bioenergetic fluxes of organisms. The outcome of such an integrated analysis will lead to complex and multi-scaled results that can be challenging to graphically depict. A potential solution that is simple enough to understand, yet incorporates sufficient detail to make informed decisions is the use of prevalence plots. Improving the ecological relevance of ERAs via the use of prevalence plots provides a risk-based approach that combines risk assessment and risk management in a meaningful way. This framework presents a truly mechanistic alternative to the threshold approach currently employed in chemical risk assessment