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# Defining ecological and morphological traits of zooplankton based on imaging technology

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## Abstract

Historically, communities have been described using a taxonomic classification, based on phylogenetic relationships, and the diversity defined by a number of species in an ecosystem. To better understand the function of organisms within their communities, the trait-based approach takes into account morphological, physiological, behavioral and life history characteristics. However, in marine, (mainly pelagic) environment, a strong limitation to this approach is the requirement of in situ data related to feeding, growth and reproduction or survival. The development of novel imaging technology such as Remotely Underwater Vehicles (ROV), Underwater Vision Profiler (UVP) or cytometry, allows automatic, non-intrusive and quantitative observations of phytoplankton and zooplankton within a wide range of sizes. The acquisition of such a huge amount of information is an opportunity to increase our knowledge on understudied traits, such as morphological ones (bioluminescence, transparency, size) both at individual and communities levels. In this work, we will focus on those understudied morphological traits, based on samples from the circumpolar Tara Expeditions. Images of the planktonic samples can be described into a defined number of quantitative descriptors related to grey levels and shape of each individual. We will show how the trait-based perspective highlighted patterns over environmental gradients. Moreover, we will propose some new methodological tools to cross informations from imaging, omics and environmental datasets.

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