Analyses of the links between species and functional diversity: the effects of methodological choices to assess functional diversity

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While coastal ecosystems experience increasing pressures due to human activities and climate change, measurement of functional diversity based on the biological traits analysis (BTA) is increasingly used as a tool to assess ecosystem functioning and its responses to disturbance. A review of more than 80 papers published since 2003 highlights large differences in the methodology used to measure functional diversity, for instance in terms of the number of traits used, ranging from 3 to 25, the identity of the traits, the nature of the raw data (abundance vs. biomass). Using two different datasets on benthic macrofauna in the English Channel (i.e. a time-series of samples collected yearly from 1977 to 2016, and a spatial survey of 72 stations sampled once in 2016), we analysed how some methodological choices affect the measures of functional diversity, its spatial or temporal changes, and the links with species diversity. The local diversity was calculated from different diversity indices while multivariate methods were applied to describe β-diversity. A peculiar attention is given on the effects of two methodological choices: (1) the selection of biomass data rather than more commonly used abundance data, and (2) the differentiation between response traits and effect traits.

Key words: Traits, Functional diversity, Methodology, Benthos

Short description: Effects of methodological choices on the measures of the links between functional diversity and species diversity