{rokbox title=|Study area :: Figure: Marián Peña (COB-IEO)| thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-nonlinear-ecological-processes-driving-the-distribution-of-marine-decapod-larvae-pena-et-al-2015-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-nonlinear-ecological-processes-driving-the-distribution-of-marine-decapod-larvae-pena-et-al-2015.jpg{/rokbox}

M. Peña, **A. Carbonell**, **A. Tor**, D. Alvarez-Berastegui, **R. Balbín**, A. dos Santos, **F. Alemany**, 2015.
Nonlinear ecological processes driving the distribution of marine decapod larvae
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Abstract: The complexity of the natural processes lead to many nonlinear interacting factors that influence the distribution and survival of marine pelagic species, particularly in their larval phase. The management of these ecosystems requires techniques that unveil those interactions by studying the system globally, including all relevant variables and combining both community and environmental data in a single step. Specifically, we apply an unsupervised neural network, the Self-Organising Map (SOM), to a combined dataset of environmental and decapod larvae community data from the Balearic sea, obtained in two years with contrasting environmental scenarios, as an Exploratory Data Analysis (EDA) technique that provides a global and more detailed view of both the environmental processes and their influence on the distribution of such planktonic community.

We examine the parental influence on the initial larval distribution by aggregating data by adult habitat, which also increments the signal to noise ratio (mean data patterns over noise due to outliers or measurement errors), and consider the distribution of larvae by development stage (as a proxy of age and hence of potential dispersion). The joined study of parental effect, drifting or concentration events determined by dynamical processes in the whole water column, and lifespan, draws the possible paths followed by larvae, and highlights the more influencing variables in their distribution. Investigation of the different aspects of dynamic height (absolute values, gradients or edges and correlations) clarified the effect of the oceanographic processes on decapods larvae.

Keywords: Nonlinear processes, Unsupervised neural networks, Self-Organising Maps, Decapod larvae, Balearic Sea, Dynamic height