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Principal spatial patterns and size of maps' portfolio - Octopus vulgaris off Mauritania from 1987 to 2017.

The main objective was to define the concept of maps portfolio and to show how it can be developed in real case studies. The secondary objective was to identify the main recurrent spatial patterns of octopus, a cornerstone stock of the Mauritanian ecosystem, during each spawning season, and to discuss their respective sizes.

Mauritania (1987-2017) *Octopus vulgaris*

For each spawning season, the principal spatial patterns were defined as a subset of the Empirical Orthogonal Maps (EOM) explaining at least 60% of the input variability, demonstrating strong spatial structure and, significantly correlated with abundance.

During the hot season, one single principal map explained half (48%) of the overall variability of the initial data. Its amplitude was strongly correlated with the abundance of octopus (correlation coefficient of 0.79 and p-value = 7.4e-07). During the cold season, the biogeography of octopus was more composite. Ten spatial patterns was needed to explain 62% of the initial variability. Five of these were correlated with abundance and had strong spatial structures. One particular map showed significant correlation with the upwelling index few months before and represented the spatial patters that was connected with this key environmental factor.

The concept of maps portfolio is developed, and notably their sizes, which are the effective number of spatial patterns amongst which octopus mainly composed its distribution. The size of portfolio is expected to be a proxy for the resilience of the systems. In case of large portfolio, one process governing biomass distribution can diminish without damaging the overall system compensated by other processes. Systems associated with small portfolio could be more fragile. A perspective of this work could be to quantify the sizes of numerous portfolio and to connect them to knowledge on the resilience of the system they characterize.