



## Winter/spring or summer? Upwelling driven spawning in the Canary Current Ecosystem validated through generalized additive models

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### Abstract

Reproduction of fish species is dependent on species specific environmental conditions in the Canary Current Large Marine Ecosystem (CCLME). Especially upwelling intensity is suggested to impact spawning time and location. Upwelling intensity drastically decreases from winter/spring to summer in the Senegalese - Mauritanian coastal area, the southern part of the CCLME. While in winter - spring trade winds from the high pressure system of the Azores induce a permanent upwelling, in summer monsoon winds induce a northward warm Guinean water influx in the Senegalese - Mauritanian coastal area weakening upwelling intensity. Larval fish distribution patterns obtained from three research cruises (FRV Thalassa and FRV Walther Herwig III in winter/spring 2014 and 2015 as well as FRV Walther Herwig III in summer 2014) reveal their relationship to different upwelling intensities according to an upwelling index based on sea surface temperature between 22.5° - 13°N latitude. Generalized additive models (GAMs) were used to model larval fish abundance data with environmental factors like upwelling index, sea surface temperature, sea surface salinity, bottom depth and location (longitude + latitude). GAMs validated observations from species like round sardinella (*Sardinella aurita*) and white-spotted lantern fish (*Diaphus rafinesquii*) avoiding winter and spring to spawn in the Western Sahara - Banc d'Arguin region, where cold and strong upwelling conditions prevail.

**Keywords:** CCLME, spawning, larval fish distribution, GAM, *Sardinella aurita*, *Diaphus rafinesquii*.



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