Supporting Information for

Open-ocean convection process: a driver of the winter nutrient supply and the spring phytoplankton distribution in the Northwestern Mediterranean Sea

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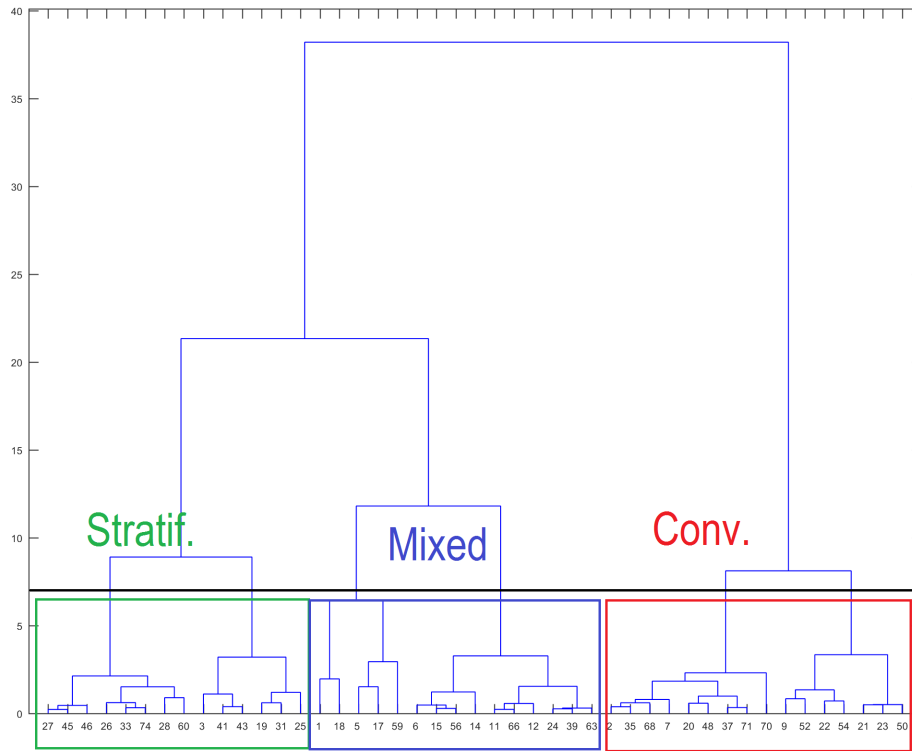
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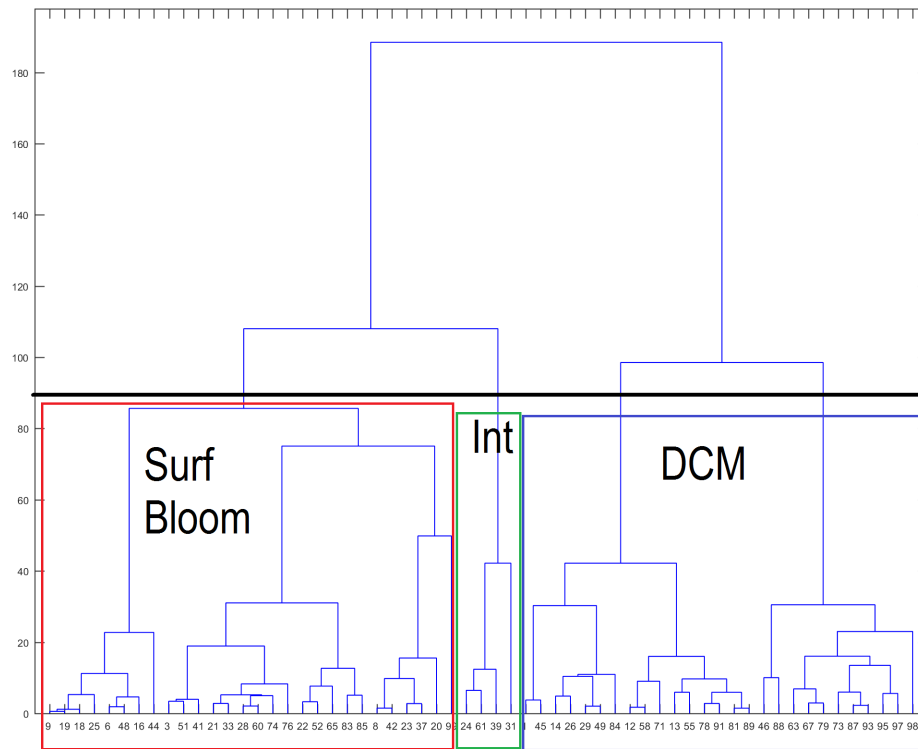
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Introduction

This supporting information provides the results of the statistical clustering realized with the winter (February 2013; Fig. S1) and spring (April 2013; Fig. S2) datasets, and the pairwise correlation matrix of the spring data (Table S1).

Figure S1. Hierarchical clustering of the winter stations (leg 1 DeWEX, February 2013)based on their nutrients characteristics along the water column. Squares represent the three resulting winter classes obtained by using the euclidian distance threshold of 15 : *Stratified* (green), *Mixed* (blue) and *Deep Convection* (red). The black line represents the euclidian distance threshold of 7 that delimits the sub-classes (from left to right) *Stratified 1, Stratified 2, Mixed Shelf, Mixed Open Sea, WMDW Deep Convection* and *Bottom Deep Convection*.

Figure S2. Hierarchical clustering of the spring stations (leg 2 DeWEX, April 2013) based on their fluorescence characteristics along the water column. Squares represent the three resulting spring classes obtained by using the euclidian distance threshold of 105 : *Surface Bloom* (red), *Intermediate* (green) and *DCM* (blue). The black line represents the euclidian distance threshold of 90 that delimits the 2 sub-classes *50-DCM* and *30-DCM* from the *DCM* class.

	zfluo. max	Fluo. at 10m	Integrated fluo.	Nitracline	Silicline	MLD001	MLD003
Fluo. at 10m	0.672***		0.807***	0.191	0.056	-0.158	-0.059
Integrated fluo.	0.623***	0.807***		0.180	0.106	-0.204	-0.11
Nitracline	-0.18	0.191	0.18		0.725***	0.466***	0.438***
Silicline	-0.232	0.056	0.106	0.725***		0.315*	0.219
MLD001	-0.322*	-0.158	-0.204	0.466***	0.315*		0.828***
MLD003	-0.236	-0.059	-0.11	0.438***	0.219	0.828***	
Ze	-0.078	0.080	0.059	0.405**	0.445***	0.184	0.172

Table S1. Spearman's rank pairwise correlation between variables of the Leg 2 (April 2013). Integrated fluo. for 0-100 m integrated fluorescence (in $mgChla.m^{-2}$), Fluo. max. for maximum of fluorescence (in $mgChl.m^{-3}$), $z_{fluo-max}$ for the depth of the fluorescence maximum (in m), nitracline (in m), silicline (in m), MLD for Mixed Layer Depth (in m), and z_e for euphotic depth (in m). Numbers are the correlation values r, and stars indicated significant p-values: * for p-value<0.05, ** for p-value<0.01, *** for p-value<0.001.