

Table S3: Seasonal Variations in Environmental Variables – Statistical Tests (ANOVA or Kruskal-Wallis), Significance Levels ($p < 0.001$ (*), $p < 0.01$ (**), $p < 0.05$ (*), $p \geq 0.05$ (NS)), and post-hoc comparisons (Tukey or Dunn).**

Variables	Test (ANOVA/KW)	Significance	Post-hoc tests (Tukey/Dunn)
Temperature	KW	***	autumn < summer; spring < summer; autumn > winter; spring > winter; summer > winter
Loire discharge	KW	***	autumn < spring; spring > summer; autumn < winter; summer < winter
Tidal	KW	NS	
DOU	KW	*	summer > winter
Granulometry	KW	NS	
NDVI	KW	*	spring < winter
NO ₂ ⁻	KW	*	spring > winter
N:P	KW	NS	
NH ₄ ⁺	KW	*	autumn > spring
Alcalinity	ANOVA	***	summer > autumn; winter < autumn; summer > spring; winter < spring; winter < summer
Si	KW	**	summer > winter
P	KW	*	summer > winter
Mn	KW	*	summer > winter
Li	KW	*	autumn > summer
Fe	KW	NS	
Ca	KW	***	spring < summer; summer > winter
Ba	KW	***	spring > winter; summer > winter
Porosity	KW	*	summer < spring; winter > summer