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Taxonomical, size structure and genetic responses of cladoceran communities in subalpine lakes to 150 years of human perturbations

Benjamin Alric, Fabien Arnaud, Vincent Berthon, Jean Philippe Jenny, Cécile Pignol, Jean-Louis Reyss, Marie-Elodie Perga

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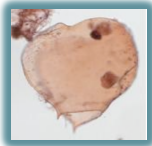
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Taxonomical, size structure and genetic responses of Cladoceran communities in subalpine lakes to 150 years of human perturbations



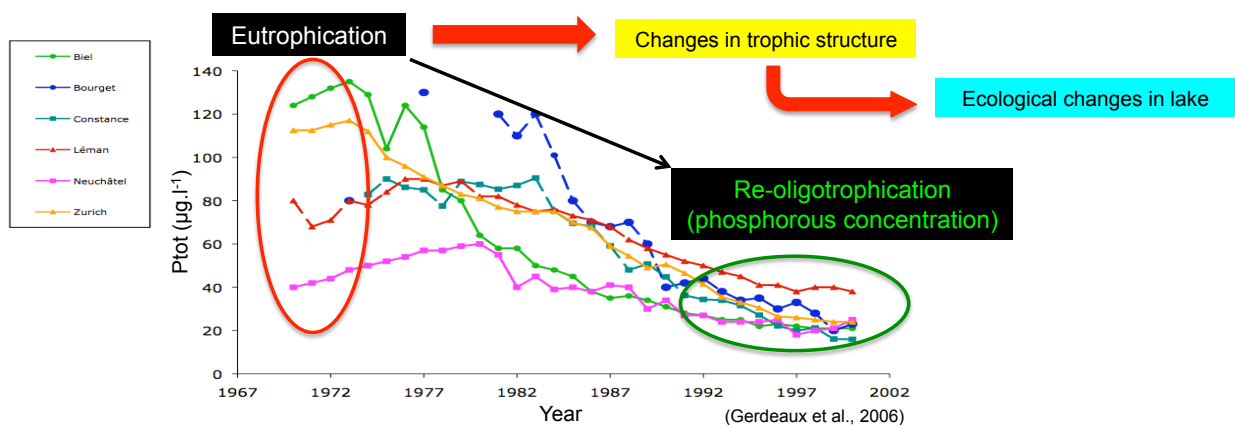
Benjamin Alric¹, Fabien Arnaud², Vincent Berthon¹,
Jean-Philippe Jenny², Cécile Pignol², Jean-Louis Reyss³,
Marie-Elodie Perga¹

¹INRA UMR CARRTEL, Thonon-les-Bains, France

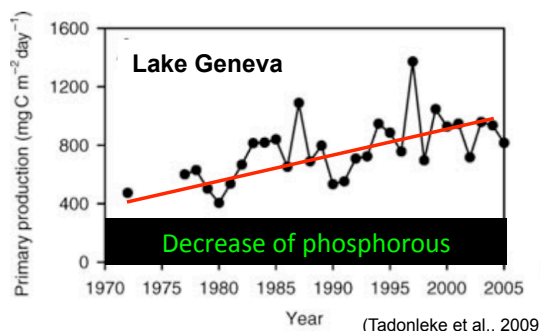
²CNRS-UMR 5204 EDYTEM, Université de Savoie, France

³Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, France

Understanding community trajectories in a context of multiple perturbations



Unexpected trajectory of biological communities



Phosphorous is not the only driver

- + local scale: fisheries management
- + global scale: climatic change

➔ Towards a paleo-ecological approach

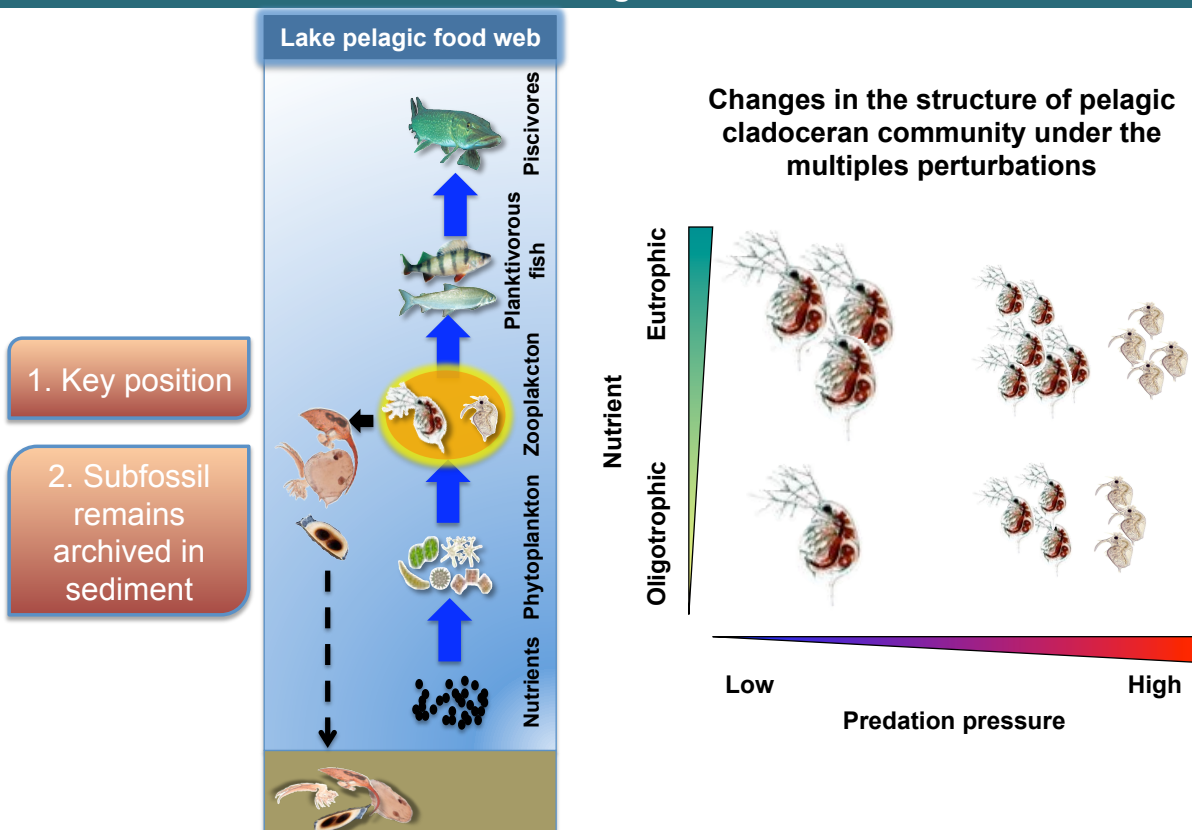
Objectives

What is the role of human-made changes (changes in nutrient level and fish communities in a context of climate change) on the trajectory of biological communities over the last 150 years in three French deep subalpine lakes?

1. What is the trajectory of biological communities?

2. What is the contribution of both 'bottom-up', 'top-down' and climatic changes in structuring of biological communities?

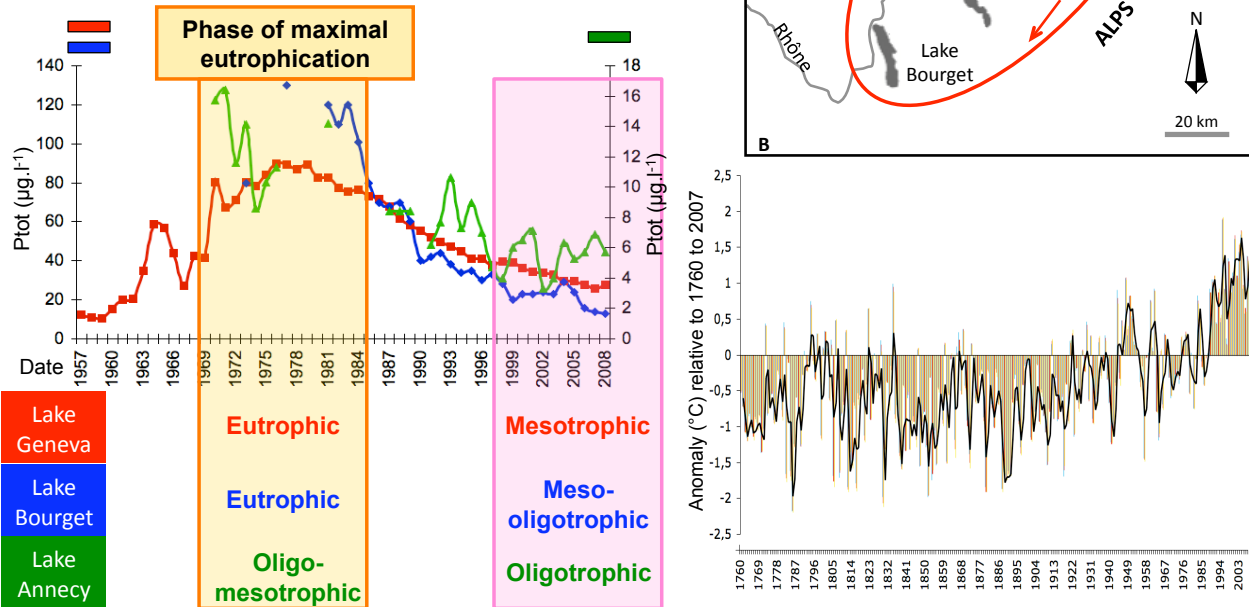
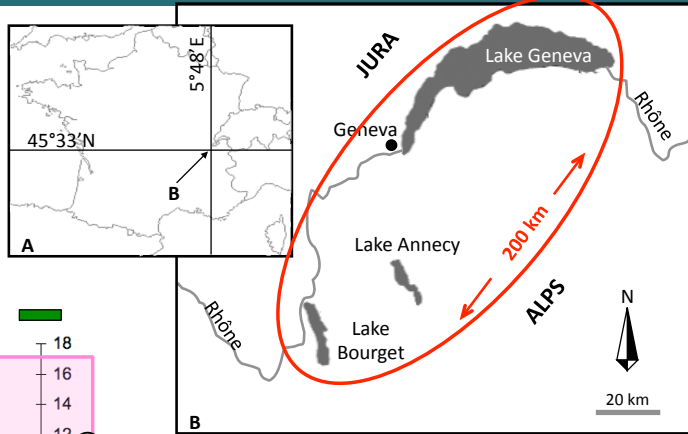
Cladoceran and their subfossil remains as an integrator of pelagic food web over the long term



Study sites

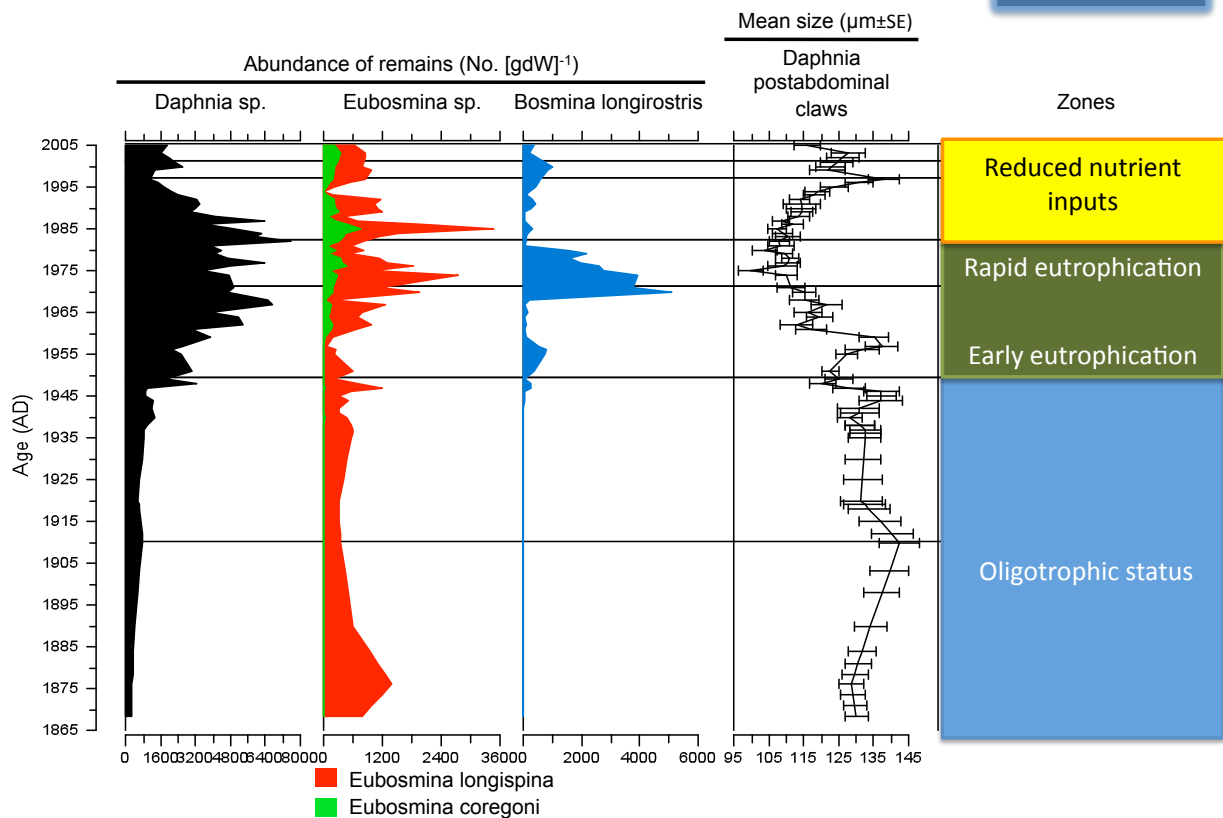
Characteristics of lakes:

- Same eco-climatic context
- Fish community similar
- Eutrophication → different intensity between the lakes

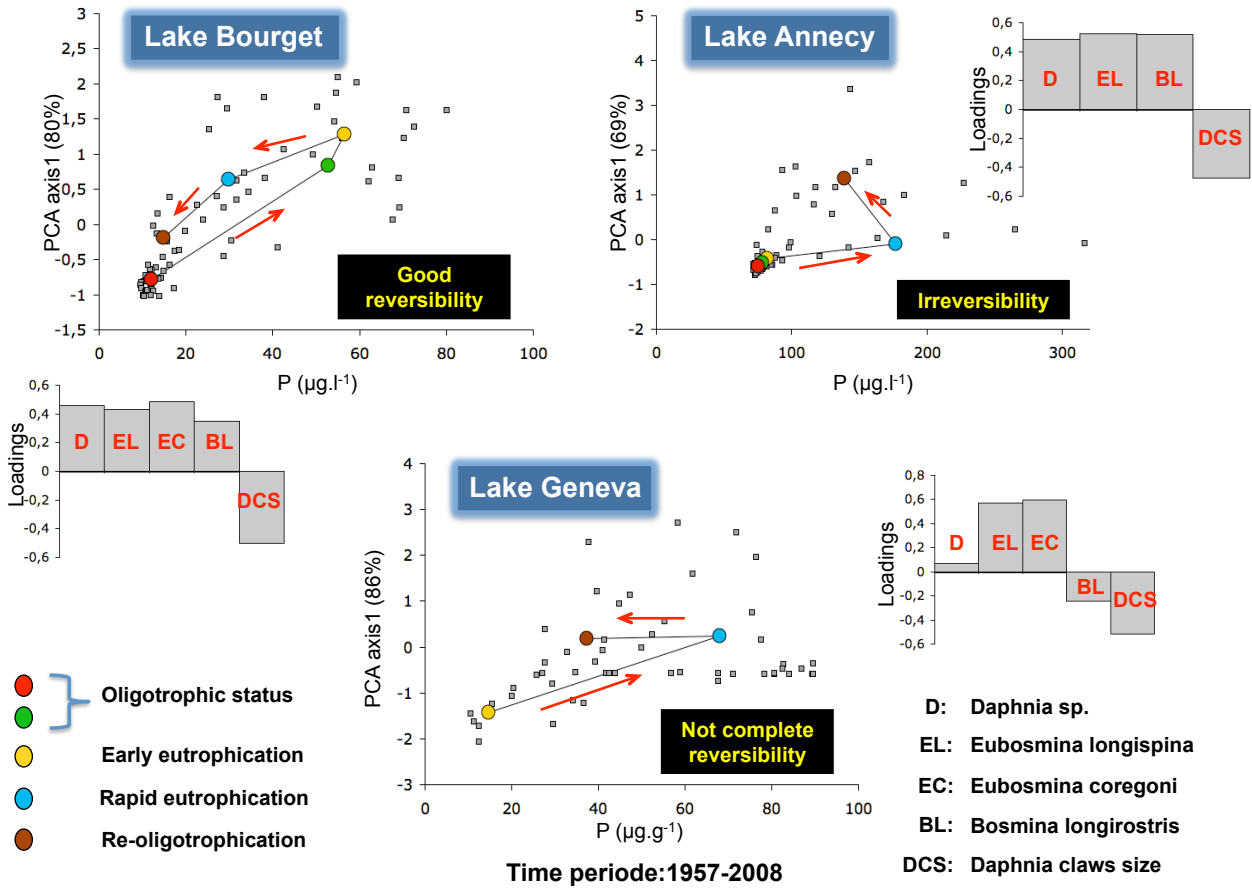


1. What is the trajectory of the pelagic cladoceran community

Lake Bourget



1. What is the trajectory of the pelagic cladoceran community



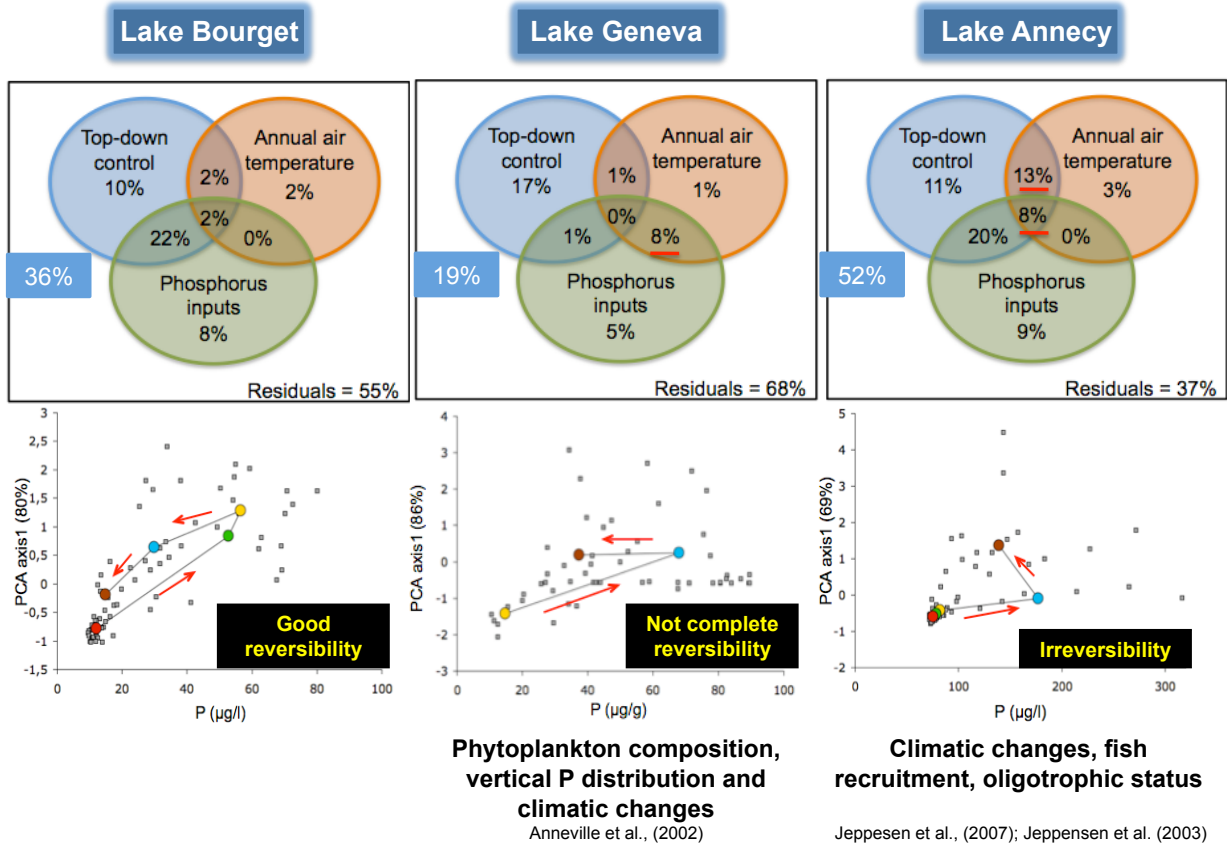
2. What is the contribution of 'bottom-up', 'top-down' and climatic changes in structuring the cladoceran community

Quantifying the relative effects of external forcing variables (VPA):

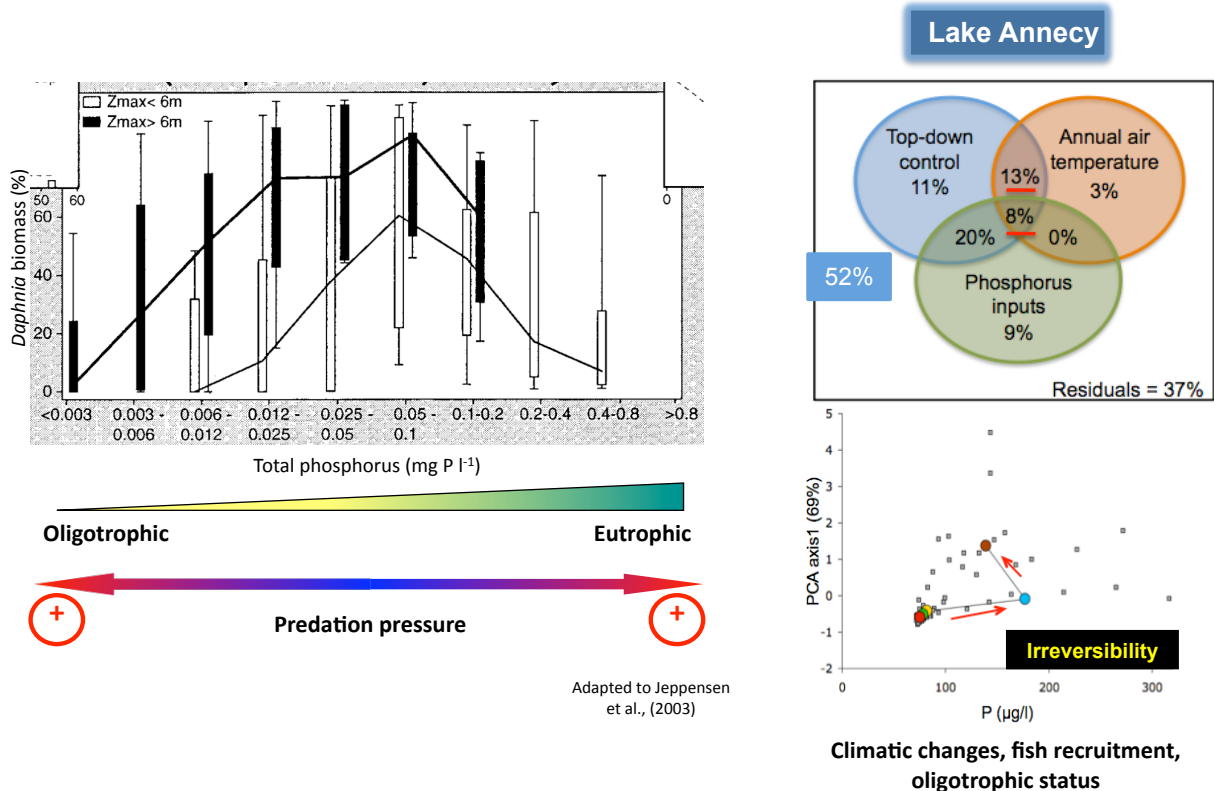
	Lake Annecy	Lake Bourget	Lake Geneva
'Top-down'	Daphnia claw size	Daphnia claw size	Daphnia claw size
'Bottom-up'	Phosphorous (Core)	Diatom-phosphorous transfer function (Wunsam & Schmidt, 1995)	Phosphorous (Water column) (1957-2008)
Climate	1. Annual air temperature (HISTALP)		
	2. River discharge	no major effects	no changes in precipitations (meteorological data)
	3. River inputs	no major effects	no changes in river OM inputs (pyrolyse rock-eval)

Size-selective predation hypothesis (Brook & Dodson, 1965)

2. What is the contribution of 'bottom-up', 'top-down' and climatic changes in structuring the cladoceran community



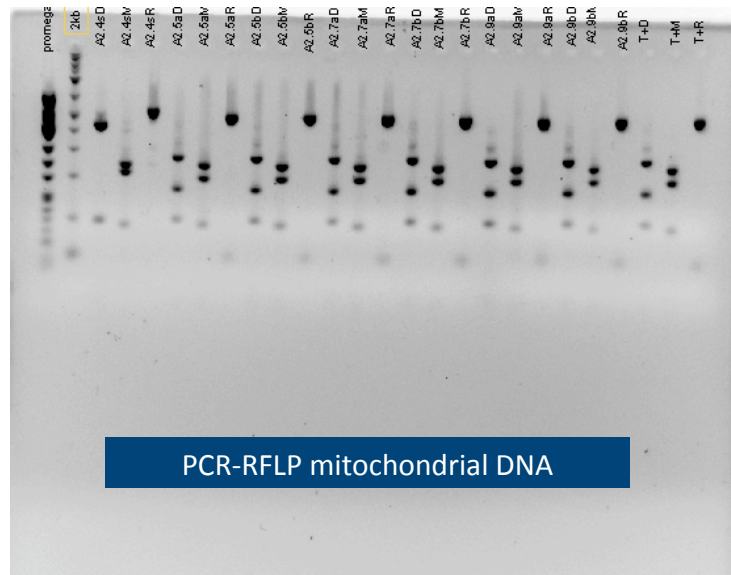
2. What is the contribution of 'bottom-up', 'top-down' and climatic changes in structuring the cladoceran community



Conclusion & perspectives

The trajectory of cladoceran community was driven by a site-specific combination of local and global interacting perturbations.

Are changes in genetic architecture of cladoceran communities contribute to the irreversibility of their trajectories?



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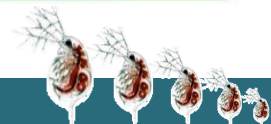
Communauté intersyndicale pour l'assainissement du Lac du Bourget

Commission internationale pour la protection des eaux du Léman.

Fundings



Thank you for your attention



Nutrient inputs

