

Spatial and temporal variations in Diatoms from la Chaîne des Lacs urban watershed, Nord-Pas-de-Calais, France, in relation to water quality

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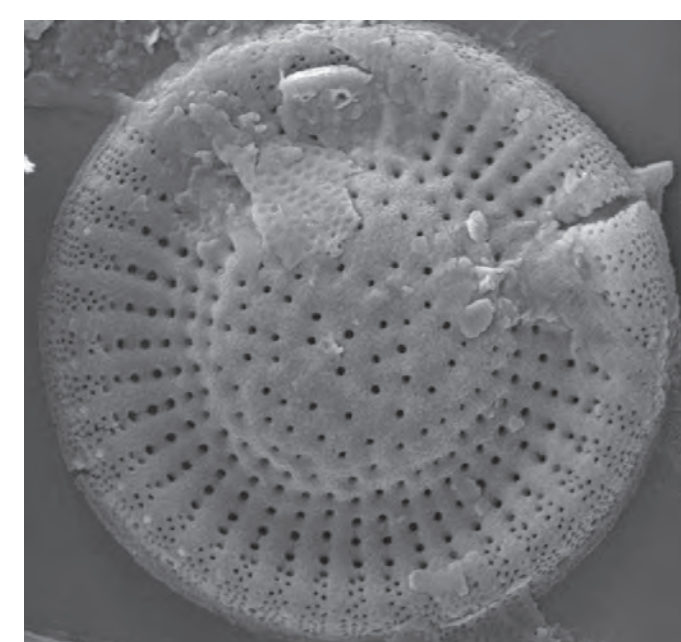
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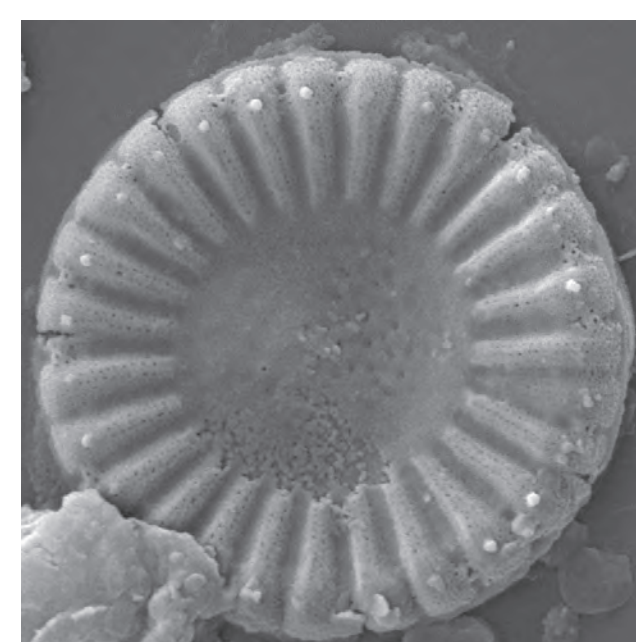
Map of sample localities. red squares = 2016 surface sediment and plankton samples, circles 2015 surface sediment. Green circles are richest in *Cocconeis*. Core location is near site 14.

II. Diatom flora:

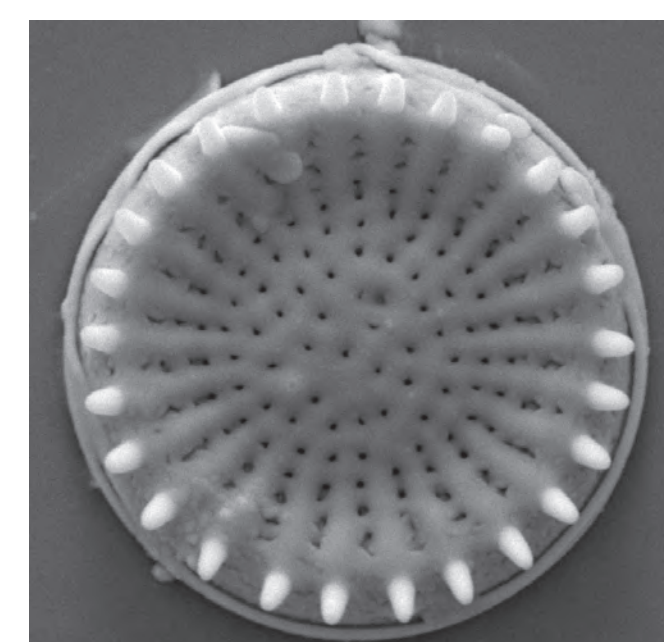
The bulk of the diatom assemblage in Lac du Hérón can be classified as both eutrophic and moderately metal tolerant, using modern national diatom indices developed and used by the French regional water agencies (Morin et al., 2012). Surface sediment samples within Lac du Hérón show large spatial variations in % *Cocconeis placentula* whose habitat is epiphytic growth (Kutzing 1844) especially on *Elodea* (Kravtsova et al., 2010). *Lemnicola hungarica*, associated with duckweed (Goldsborough, 1993) occurred in LH6 and site 4. Other variation is reflected in the phytoplankton composition both spatially, and interannually. *Aulacoseira muzzanensis* and *Cyclotellus dubius* showed greater abundance in the open water habitats in Lac du Hérón, whereas sites in la Chaîne des Lacs outside of Lac du Hérón had greater *Cyclotella meneghiniana*.



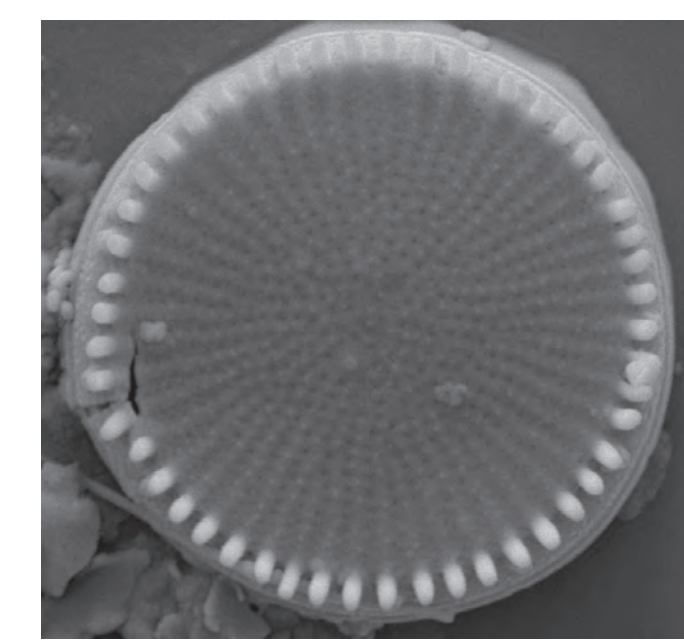
*Cyclostephanus
dubius*



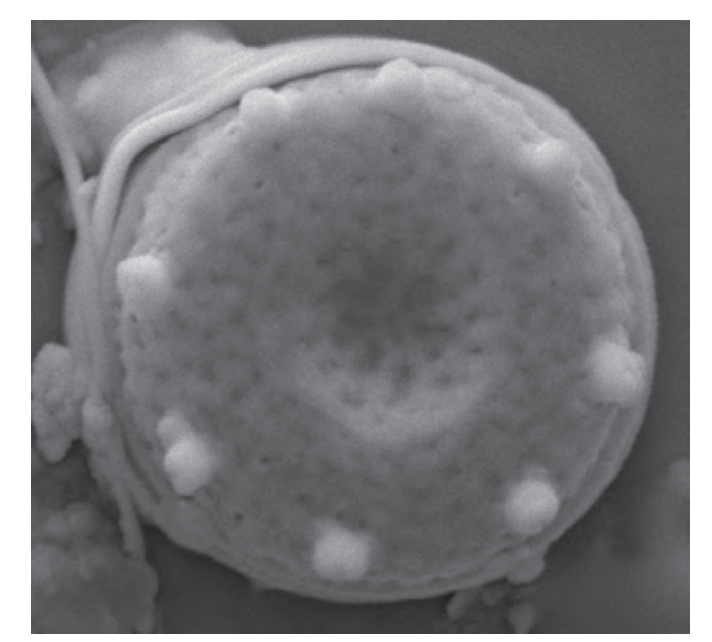
Cyclotella
meneghiniana



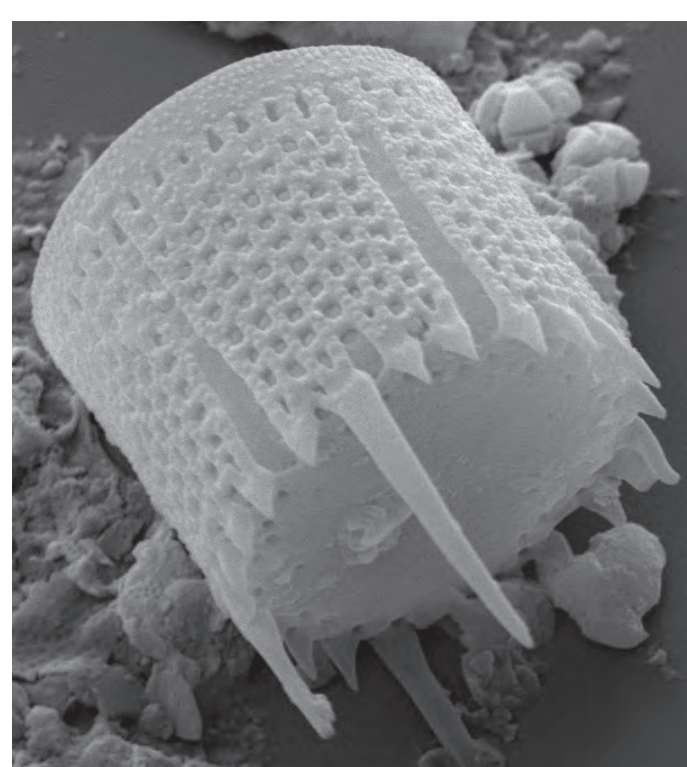
*Stephanodiscus
parvus*



*Cyclostephanus
invisitatus*



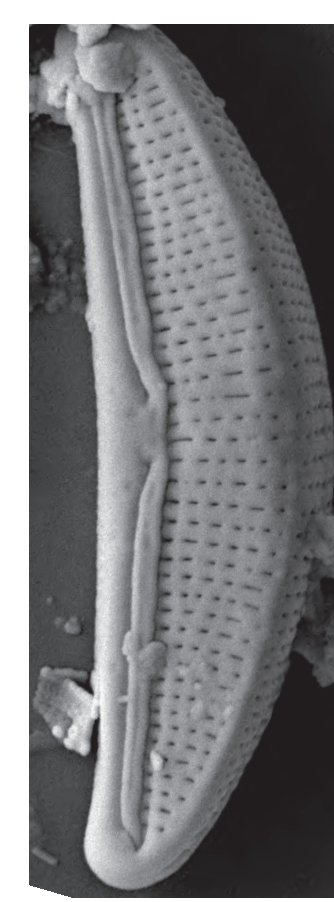
*Discostella
pseudostelligera*



Aulacoseira muzzanensis



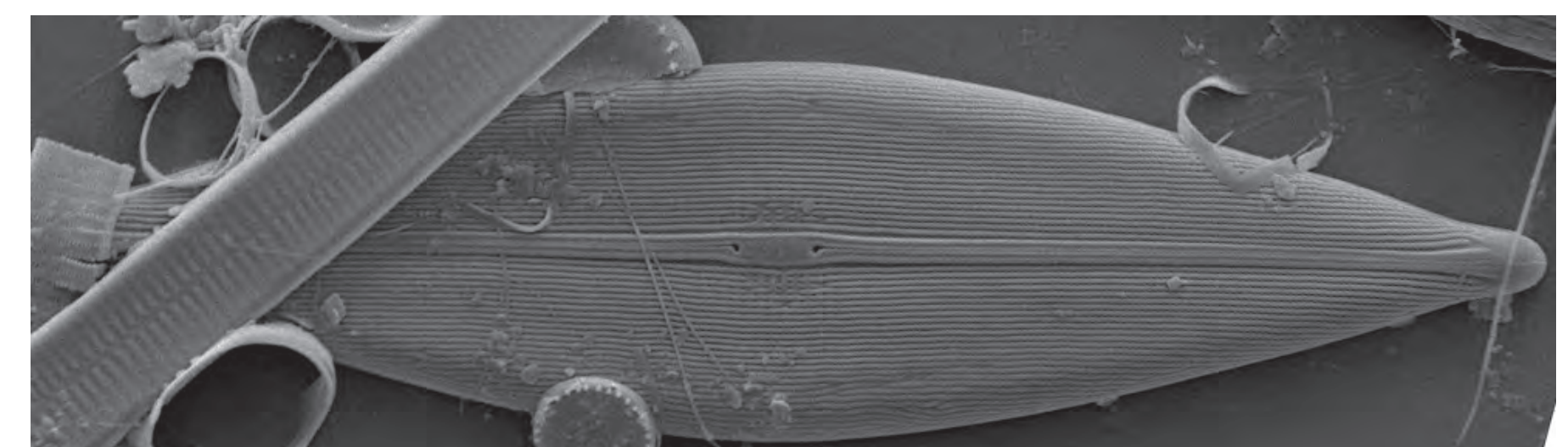
Gomphonema
augur



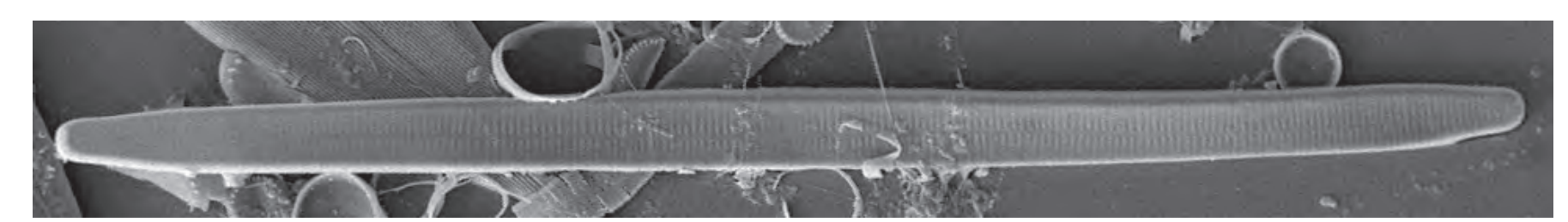
Halamphora
veneta



Cocconeis placentula



Craticula cuspidata



Ulnaria ulna

III. Spatial variations:

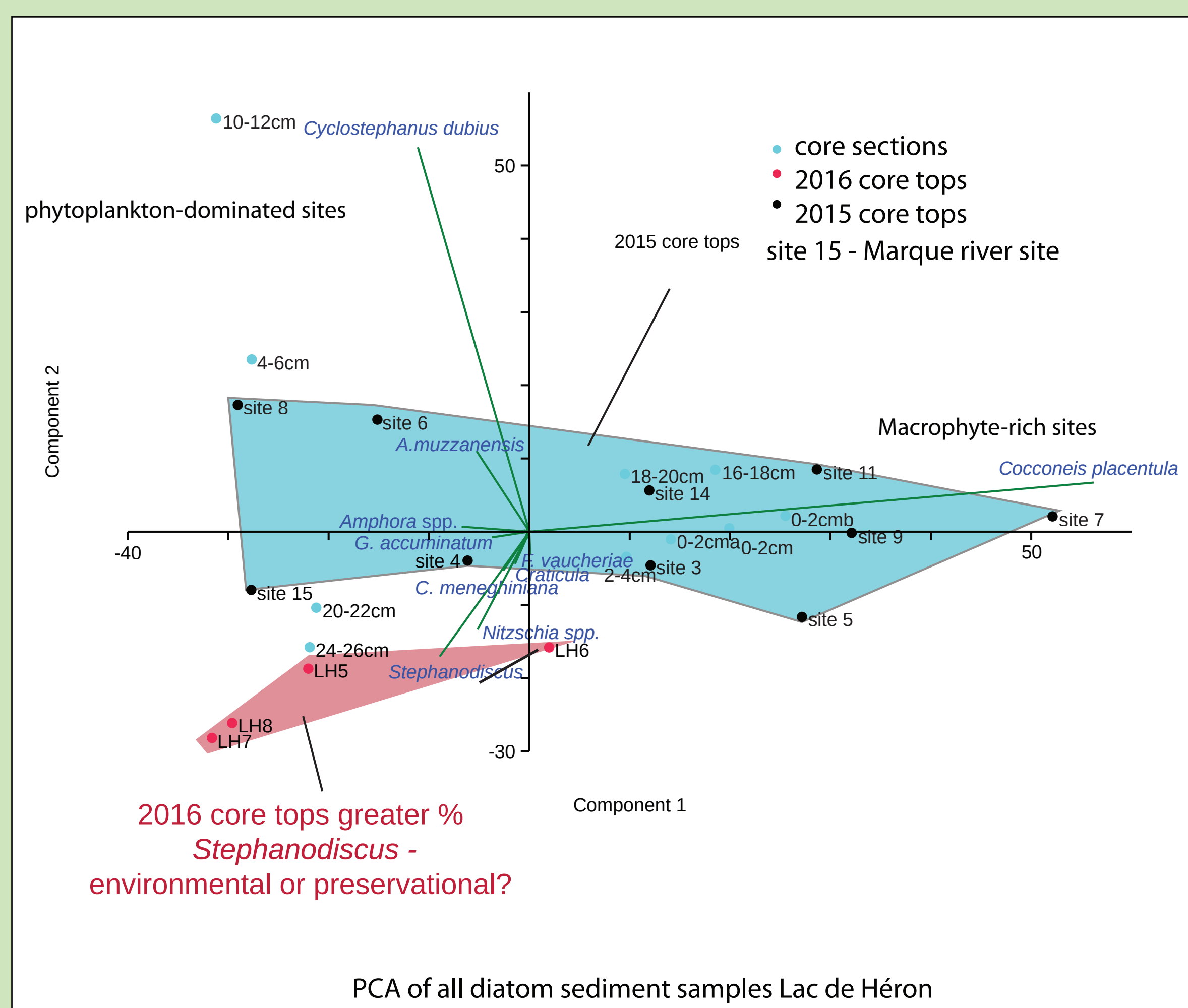
The following spatial variations are illustrated with PCA analysis:

1. With the exception of sites 6 and 8, all 2015 core tops from Lac du Hérón are rich in *Cocconeis* and plot on right side of component 1 axis.

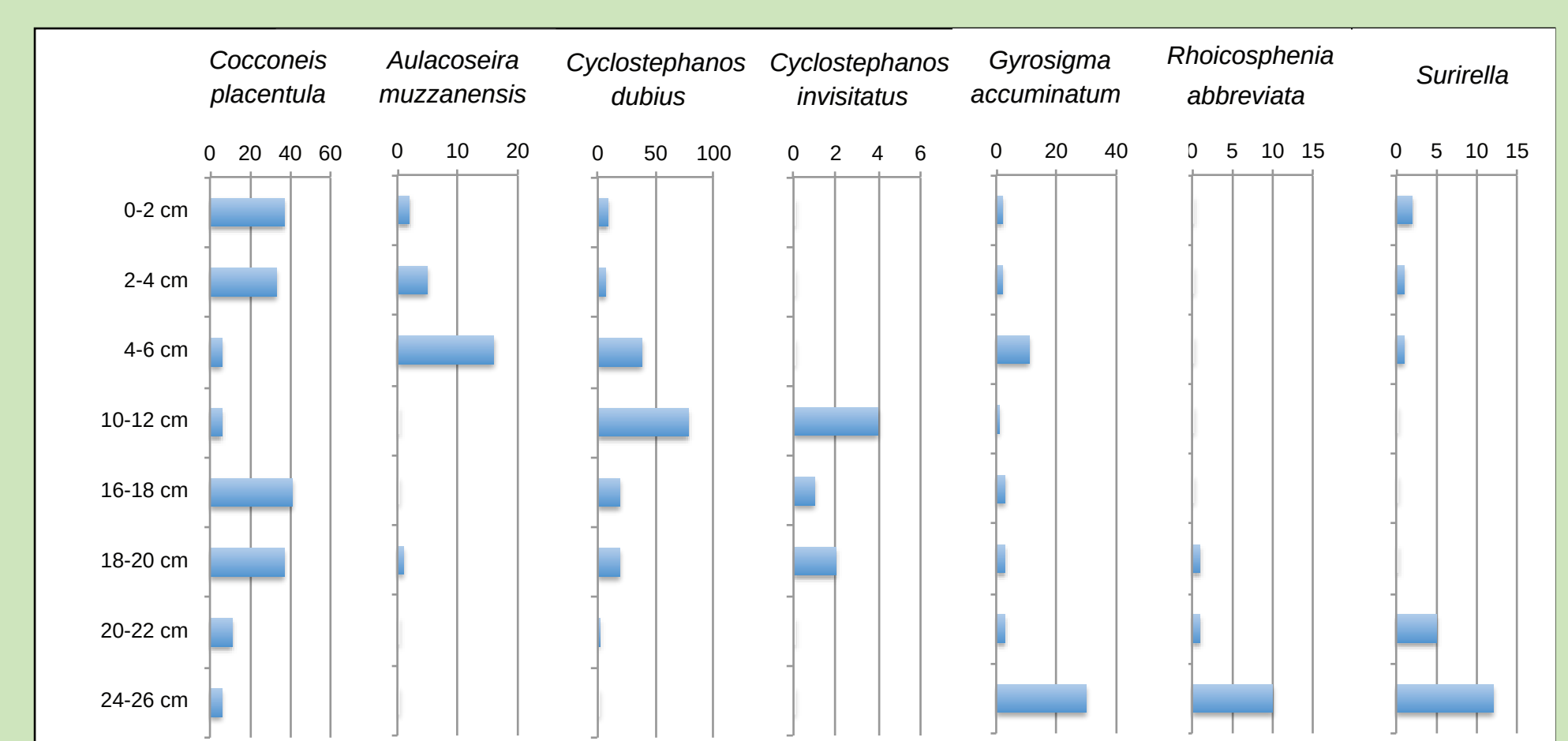
2. Site 4, isolated from main part of Lac du Héron, also has low *Cocconeis*.

3. Site 15 is distinct, from the Marque river to the east, with abundant *S. venter*, *Craticula*, *Nitzschia*, and *Amphora/Halamphora*.

4. There is an interesting temporal difference in core top samples. Those taken January 2015 have much lower abundances of the eutrophic *Stephanodiscus* than those taken in late March 2016, and may be either attributed to preservation of these small spring bloom taxa, or to interannual variations. (Compare LH5 vs. site 5)



IV. Down-core variation:



No age model could be generated for the core, however a progression is seen.

0-4 cm rich in *Cocconeis placentula* likely coincide with increased *Elodia* growth.

4-12 cm phytoplankton dominated interval, less macroalgae

16-20 cm prior cycle of increased macroalgae?
20-26 cm are rich in littoral periphyton, early establishment of reservoir?

Goldsborough, L.G., 1993. Diatom ecology in the phyllosphere of the common duckweed (*Lemna minor* L.) - *Hydrobiologia* 269/27: 463-471.

Kutzing, T.F., 1844. Die Kieselgeschalligen Bacillarien oder Diatomeen, 152 S. 30. Tafel. Nordhausen.

Krasavina, S., Izhiboldina, L.A., Mekhankova, I.V., Pomazkina, G.V. and Belykh, O.I., 2010. Naturalization of *Elodea canadensis* Mich. in Lake Baikal. Russian Journal of Biological Invasions, 1(3), pp.162-171.

Morin, S., Cordnier, A., Lavoie, I., Arini, A., Blanco, S., Duong, T.T., Torr  s, E., Bonet, B., and Corcoll, N., 2013. Consistency in Diatom Response to Metal-Contaminated Environments, in: H. Gausch et al. (eds.) *Emergent and Priority Pollutants in Rivers*. HbD Env Chem, 19: 117-146.