



Fate modeling of selected pharmaceuticals and personal care products in aerated lagoons



Frédéric Cloutier¹, Ehsanul Hoque², Chris D. Metcalfe² and Peter A. Vanrolleghem¹

¹modelEAU, Département de génie civil et de génie des eaux, Université Laval, Québec (QC), Canada

²Water Quality Centre, Trent University, Peterborough (ON), Canada

Problem statement

Several studies are focusing on the removal of contaminants of emerging concern (CECs) in aerated lagoons, but none have included the modeling of their fate.

Objective

Develop a dynamic model to predict the fate and removal pathways of selected emerging contaminants in the Lakefield Sewage Lagoons in Peterborough, Ontario.

Conceptual approach

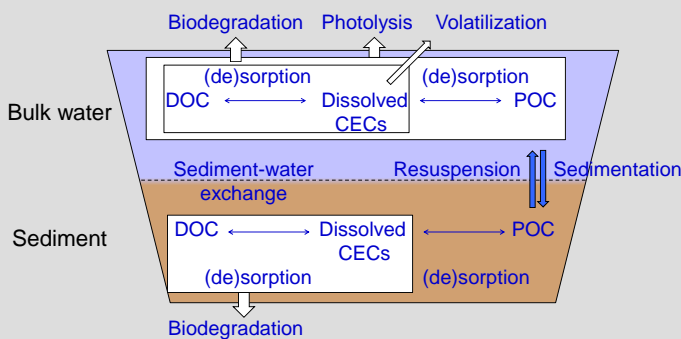


Figure 1. Schematic representation of the transformation processes in the bulk water and the sediment compartment and the mass transfer processes between them.

Modeling and results

Table 1. Importance of different fate processes on the removal of four CECs.

Fate processes →	Volatilization	Biodegradation	Sorption	Photolysis
Carbamazepine	-	-	+	-
Sulfamethoxazole	-	-	+	++
Triclosan	-	+	+	++
HHCb (Galaxolide)	+	+	++	+

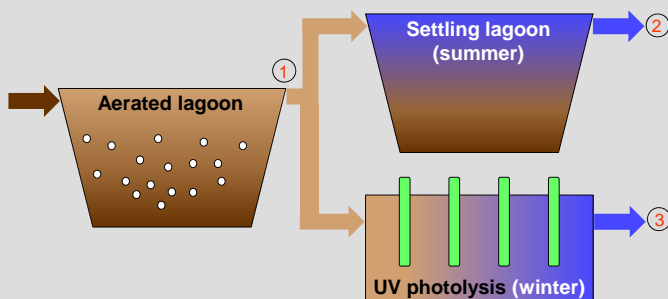


Figure 2. Schematic representation of the Lakefield Sewage Lagoons.

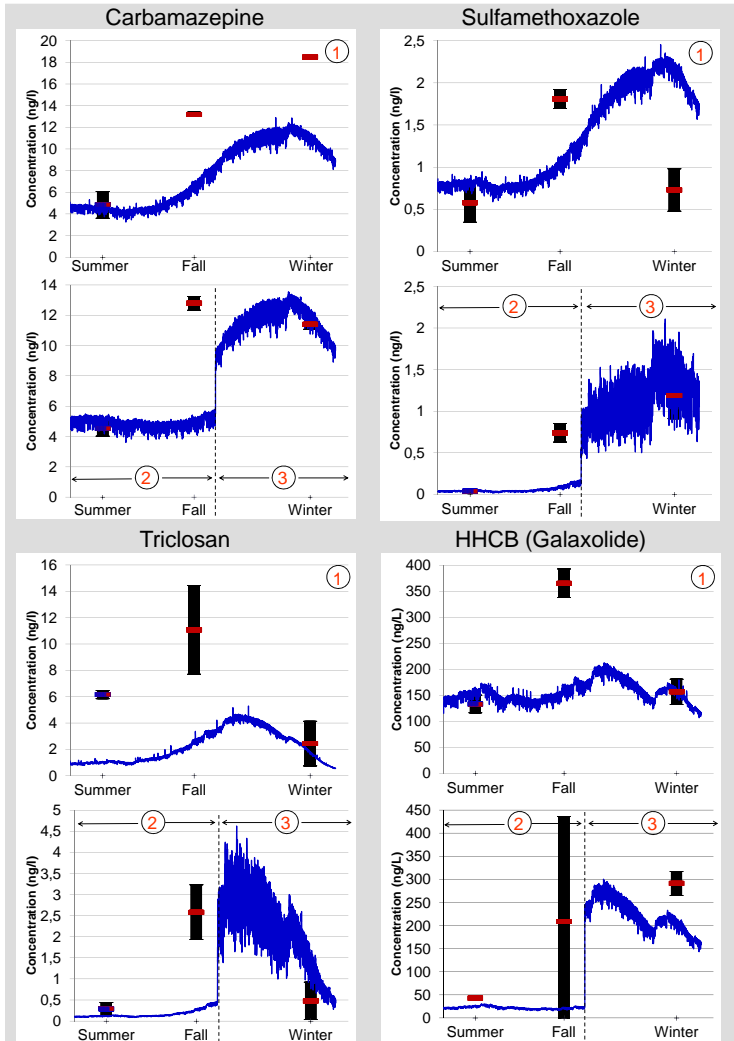


Figure 3. Modeled (blue) and measured (red) concentration of four CECs with confidence interval (black).

TAKE HOME MESSAGE

- A dynamic model describing the fate of contaminants of emerging concern in aerated lagoons was developed and successfully applied to describe three full-scale lagoon data sets with minimum parameter adjustments.

ACKNOWLEDGEMENT

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