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Forest structure and distribution of soil organic carbon in riparian forest soil affected by frequent floods (Quebec, Canada)

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Assess the soil organic carbon (SOC) and C stocks in riparian forest soils affected by floods are crucial to evaluate their concentration and distribution along hydrological gradients, and also to understand the recruitment rates and forests structure and composition. Flood frequency and duration may cause important variation in concentrations of organic matter and total organic carbon in soils and could have direct effects on C stocks in alluvial soils. There are also direct impacts on success of recruitment rates of tree species. In this research, we assessed variations and concentrations of SOC and C stocks in riparian soils collected along transects perpendicular to the riverbanks which cross through inundated and non-inundated zones. Across the different zones, total organic carbon and C stocks show marked difference in their concentration and spatial distribution and the lowest values are found in mineral soils affected by successive floods. We also examine the recruitment rates and the structure and composition of tree populations. The concentrations of SOC are significantly lower in active floodplains with average value of 2.89% compared to the non-inundated soils (5.09%). The proportion of C stocks calculated in soils (inundated vs. non-inundated) was also significantly different with average values of 41.8 and 77.44 t.ha⁻¹, respectively. Recruitment rates are lower for frequently flooded zones and tree diversity is slightly lower in these zones.

Recent Publications

1. Saint Laurent D, Berthelot J S and Gervais Beaulac V (2017) Habitat fragmentation and structure and composition of tree populations in agroforestry landscape (southern Quebec, Canada). *Agroforestry Systems* doi:10.1007/s10457-017-0099-0.
2. Saint Laurent D, Gervais Beaulac V, Paradis R, Arsenault Boucher L and Demers S (2017) Distribution of soil organic carbon in riparian forest soils affected by frequent floods (southern Quebec, Canada). *Forests* 8(4):124.
3. Paradis R and Saint Laurent D (2017) Spatial distribution of organic carbon and nitrogen in soils related to flood recurrence intervals and land use changes in southern Quebec, Canada. *Journal of Soil Science and Environmental Management* 8(2):25-36.
4. Saint Laurent D, Paradis R, Drouin A and Gervais Beaulac V (2016) Impacts of floods on organic carbon concentrations in alluvial soils along hydrological gradients using a digital elevation model (DEM). *Water* 8(208):1-17.
5. Berthelot J S, Saint Laurent D and Gervais Beaulac V (2015) A comparison of the composition and diversity of tree populations along a hydrological gradient in floodplains. *Forests Journal* 6:929-956.

Biography

Saint Laurent Diane has her research interests in the pedogenetic processes of alluvial soils, transport of contaminants, and impacts of climatic changes on the forest ecosystems. The river dynamics, the reconstruction of flooding and paleo-flooding from radiogenic indicators, bank erosion, floodplain flooding processes and assessment of sedimentary rates are also part of my concern research. The use of pedogenetic and ecological parameters, paleoenvironmental indicators (¹⁴C dating, lead-210, dendrochronology / dendrogeochemistry) and historical and ecological data are widely used to reconstruct the chronological framework of events and processes analyzed.

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