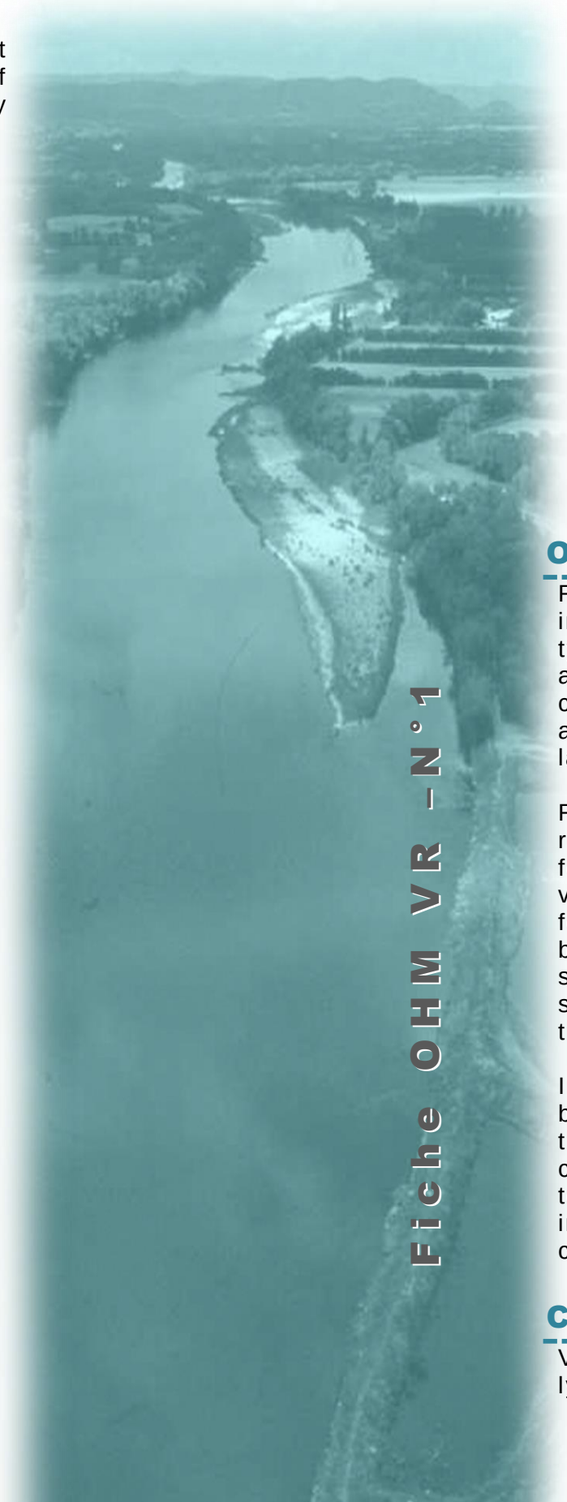
Le service écoystémique de séquestration du carbone lié aux stratégies de gestion de la ripisylve sur le vieux Rhône



Résumé :

Ce projet concerne la caractérisation de la séquestration du carbone dans la ripisylve. Nous documentons les stocks de carbone contenus dans la biomasse et dans les sols des forêts en régénération associées aux casiers Girardon du Rhône. Les travaux visent à produire les données de base pour mieux comprendre les répercussions des actions de gestion sur le puits de carbone qu'est la ripisylve, et aussi à estimer les revenus escomptés provenant des crédits de carbone. Cette année nous avons accompli nos travaux de terrain. Nous avons prélevés des échantillons de sol sur des sites âgés de 30 à 125 ans, où nous avions précédemment fait une analyse forestière, ainsi que sur des sites non-végétalisés, dont les sédiments proviennent de la dernière crue de l'Isère en 2015. La teneur en carbone dans ces sols a été mesurée.

Objectifs du projet et mise en contexte

Riparian forest constitutes a potentially substantial carbon sink, especially in water-limited regions where grasslands or other non-forest vegetation types predominate. However, because it occupies comparatively little land area compared to forests traditionally exploited for timber, this forest carbon sink has been virtually ignored by foresters and by policymakers, and the impact of river management strategies on its size and dynamics is largely unknown.

Riparian forest stands along the highly managed vieux-Rhône, which have resulted from fine sediment infill between Girardon structures and the former channel margin, are of considerable conservation and scientific value to many stakeholders in the Rhône Basin. Management of these forests balances needs for flood security, ecological benefits from biodiversity at different successional stages, and (potentially) carbon sequestration. Changes in management strategy (e.g., dike removal, sediment reintroduction, channel widening) should be evaluated, in part, for their impacts on the riparian carbon sink.

In this project, we seek to measure the carbon stocks contained in soil and biomass of forest plots at different stages of vegetation development, with the aim of characterizing the size of the riparian forest carbon sink, and calculating carbon credit income that could be gained or lost with changes to forest management. This year, we collected soil samples at sites ranging in successional age from 1-125 years and are analyzing them for their carbon concentration.

Contacts :

Virginia Matzek, vmatzek@scu.edu; Herve Piegay, herve.piegay@ens-lyon.fr; John Stella, stella@esf.edu

Perspectives :

Plus-value pour les praticiens :

We expect that carbon credits may figure into management strategies for the Rhône in the future. Understanding the impact of management on the carbon sink, and having a robust methodology for calculating credits, can aid management.

Références :

Méthodologies :

We contracted with the firm Géo-Peka to conduct the field sampling. The field collection of soils took place in August 2015. To add to sites already sampled for the forest analysis, Géo-Peka identified 6 sites very recently sedimented by deposits from the last flood on the Isère River, in May 2015. In all, 37 sites were sampled to a depth of 45 cm, except a few where a gravel layer was reached at around 30 cm depth.

Soil samples were taken in a trench dug to 60 cm depth and cleared of organic debris at the surface. Three cores were removed, representing the 0-15 cm, 15-30 cm, and 30-45 cm depths, for quantitative bulk density measurements and carbon concentration. Soils were sieved to remove the gravel fraction and air dried before weighing. The dry mass and the gravel-corrected volume are used to calculate bulk density.

Aliquots of each soil core were shipped to the United States for C concentration analysis. Soils were pulverized and subjected to flash combustion analysis on a CHN analyzer at Chapman University.

Principaux résultats :

Our results are pending analysis. Our next step is to use the bulk density data and carbon concentration results to estimate the belowground carbon concentration of soils of varying successional age. We can then combine this information with a previous study, also funded by OHM-VR, that measured the density and basal area of live and standing dead trees, along with the density and volume of coarse woody debris, in the same wooded plots. Using allometric equations based on diameter at breast height for the species found in the riparian margins, we can calculate biomass in individual trees, then scale up to the hectare level. After soil and biomass stocks are calculated on an area basis, we will use GIS to scale up to the Rhone corridor.