**Title: C-factor and post-fire risk of soil erosion in riparian areas**

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**Synopsis**

Estimating soil erosion and its impacts on forests and agro-ecosystems is a major need for sustainable natural resources management, notably under the increasing threats of climate change extreme events (such as megafires). Increased frequency of megafires are expected to have pervasive consequences on natural ecosystems and the services they provide. This is the case of riparian forests, which are known by their contribution to improve water quality with their capacity to filter pollutants and retaining sediments. The Revised Universal Soil Loss Equation or [RUSLE](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/revised-universal-soil-loss-equation) is an empirical model developed to predict the erosion rates of distinct land-use land-cover types. Among the several factors used in the equation, the C-factor (Vegetative Cover factor) is perhaps the most important variable because it represents conditions that can most easily be managed to reduce erosion. While the C-factor has been estimated for distinct agriculture and forest land-uses, in several climatic regions, little is known about its specificities for the riparian systems, particularly in the Mediterranean region.

This thesis aims to estimate the C-factor for the riparian vegetation and assess the post-fire risk of soil erosion in riparian areas surrounded by distinct land-use types.

The study area is located in Ribeira do Alvoco, in Alva catchment, a sub-basin of Mondego River, burned by the severe wildfires of 2017. Riparian burned and un-burned (control) sites were selected, using a stratified land-use sampling design. The C-factor will be derived for a 10km length and 100 m width river reach of Ribeira do Alvoco using riparian structural variables extracted from the analysis of Unmanned Aerial Vehicle (UAV) imagery (RGB, 10cm of spatial resolution). A field campaign was conducted in the Spring of 2019 to calibrate the model, using structural characteristics for the estimation of the C-factor in riparian systems, obtained from field sampling namely strata complexity, buffer width, patch heterogeneity, percentage of canopy cover and surface cover.

This theme offers the opportunity of participating on a top-priority environmental issue (post-fire riparian management), and develops simultaneously a sound research question. The study is integrated in an ongoing larger CEF-project- RipSedFire, addressing a real-world example, and thus results will be convert in concrete management actions in order to facilitate the restoration of priority burned areas. The project RipSedFire has emerged and developed in tight collaboration among CEF researchers and the local stakeholders from the region, and the results are to be shared and transferred, offering the student the possibility to link research and social involvement.

**Objectives/questions**

* Estimate the C-factor for the riparian vegetation using field data
* Derive the post-fire risk of soil erosion for the Ribeira do Alvoco using UAV imagery
* Propose post-fire riparian management practices to reduce soil erosion

**Requisites**

Basic knowledge of GIS techniques

To be independent and organized

**Valued**

Fluency in English