

## ASHES – Advection and Diffusion of Suspended Sediments from Wildfires in Rough Open Channel Flows

### Summary

ASHES addresses the hydrodynamics of suspended sediment (SS) transport in rough open channels with vegetated areas. Our motivation arises from the strong pressure to mitigate problems related with diffuse pollution from wildfires responsible of generating extensive transport of ash and soil, possibly contaminated (metal and PAHs), into aquatic systems.

Riparian vegetation has been pointed out as playing a crucial role in controlling the effects of diffuse pollution. Despite of the advances on hydrodynamics of vegetated flows, effect of vegetation on suspended loads has not received enough attention and the knowledge on the flow-vegetation-sediments interaction is still limited. A thoroughly understanding of the dynamics of sediment transport and retention processes in wetlands is, thus, of paramount importance for water quality (WQ) management.

The main goals of ASHES consist in: i) scientific advances on the advection and diffusion processes of SS within vegetated areas; ii) mitigation measures for water pollution driven by wildfires, meeting the societal need of complying with the Water Framework Directive

requirements. The feasibility of the project is granted by a multidisciplinary approach integrating field, laboratory and numerical work. The experimental work design will be supported by data from field monitoring. The field work will be led by UA team, the laboratory work at the patch scale will be supervised by UBI team while the stem scale laboratory and numerical works will be coordinated by IST-ID team.

Field work aims at monitoring the post-fire erosion at the slope-stream transition zone in an area to be selected following a wildfire in 2018. To improve the visualization of flows within complex distribution of elements simulating boulders or vegetation stems, a channel for refractive index matching experiments (CRIME) will be built, configuring one of the project novelties. i) curated databases of flow velocities and SS concentrations; ii) WFD compliant recommendations for design criteria of vegetated areas to promote retention in the slope-stream transition zones and instream retention, mitigating wildfire pollution related problems.

A key feature of the project representing a positive societal impact concerns training of young researchers at master (3) and PhD level (2).

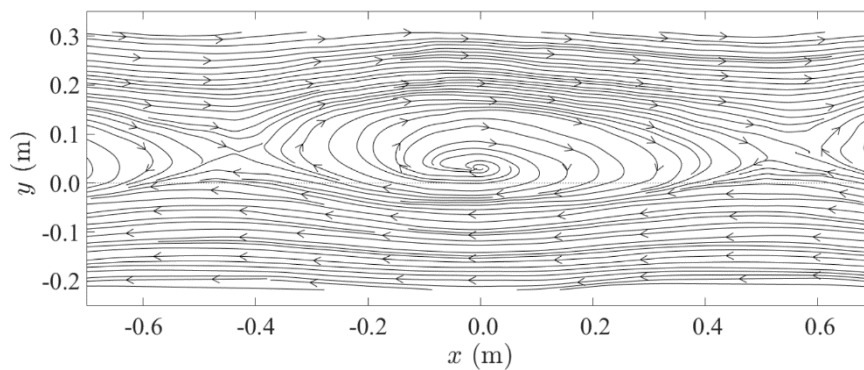


Figure 1. Streamlines of the phase-averaged clear water flow in the interface between the riparian gallery and the main channel.

### Project Reference

PTDC/ECI-EGC/29835/2017 / POCI-01-0145-FEDER-029835

### Leading Institution

UBI – Universidade da Beira Interior (Portugal)

### Partners

IST-ID – Associação do Instituto Superior Técnico para a Investigação e Desenvolvimento (Portugal), UA – University of Aveiro (Portugal)

### CERIS Principal Investigator

Rui Ferreira  
([ruiferreira@tecnico.ulisboa.pt](mailto:ruiferreira@tecnico.ulisboa.pt))

### CERIS Research Team

Ana Margarida Ricardo

### Funding

FCT – Fundação para a Ciência e a Tecnologia, COMPETE 2020, Portugal 2020

### Period

2018-2022

### Total

239 950.80€

### CERIS

54 331.30€

### Project Website

-