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Roads as sources of heavy metals in urban areas. The Covões Catchment experiment, Coimbra, Portugal

António J. D. Ferreira (1), Daniel Soares (1), Carla S.S. Ferreira (1), and Rory P.D. Walsh (2)

(1) CERNAS, Coimbra Polytechnic Agriculture School, Bencanta, Coimbra, Portugal, (2) Department of Geography, Swansea University, Swansea, UK

Cities are the home to 50% of the human specie [UN 2011 Ramalho & Hobbs 2012], whose wellbeing, way of life and exposure to hazard situations are directly related to the built environment. Cities are often seen as ecological systems just a short step away from collapse [Newman 2006]. Being a human construction, cities disrupt the natural cycles and the patterns of temporal and spatial distribution of environmental and ecological processes. Urbanization produces ruptures in biota, water, energy and nutrients connectivity that can lead to an enhanced exposure to disruptive events that hamper the wellbeing and the resilience of urban communities in a global change context.

A major issue in what concerns the threats to human and ecosystem health in urban areas is the presence of heavy metals, and the related processes that govern their source, transport and fade r uptake by the vegetation.

In this work, we present an analysis of heavy metal sources and transport processes at various types of roads within the Ribeira dos Covões peri-urban experimental catchment in central Portugal.

The surveyed heavy metals (Cadmium, Lead, Coper, and Zinc) show significant differences as a result of the type of rainfall event, the length of the antecedent dry spell, the traffic volume and the heavy metals sources.

For some locations, namely for the roads with heavy traffic volume, the heavy metal concentrations exceed the limits established by law, which has severe implications to the downstream ecosystems and to the possible use of the water from roads to close the resources loop in urban areas, namely in what concerns their use to water the urban green infrastructure or to irrigate the urban agriculture fields.