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Analysis and Model Based Assessment of Water Quality in European Mesoscale Forest Catchments with Different Management Strategies (a Climatic Gradient Approach)

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Forestry activities affect the environmental conditions of river basins by modifying soil properties and vegetation cover, leading to changes in e.g. runoff generation and routing, water yield or the trophic status of water bodies. Climate change is directly linked to forestry, since site-adapted sustainable forest management can buffer negative climate change impacts in river basins, while practices leading to over-harvesting or increasing wildfires can exacerbate these impacts.

While studies relating hydrological processes with forestry practices or climate change have already been conducted, the combined impacts of both are rarely discussed. The main objective of the proposed work is to study the interactions between forest management and climate change and the effects of these upon water fluxes and water quality at the catchment scale, over medium to long-term periods and following an East-West climate gradient. Additional objectives are to increase knowledge about the relations between forest, water quality and soil conservation/degradation; and to improve the modelling of hydrological and matter transport processes in managed forests.

The present poster shows a conceptual approach to understand this combined interaction by analysing an East-West climatic gradient (Ukraine-Germany-Portugal), with contrasting forestry practices and climate vulnerabilities. The activities within this workplan, to take place during the period 2010 – 2014, will be developed in close collaboration with several ongoing research projects in the host institution at the Dresden University of Technology (TUD) and in the University of Aveiro (UA). The Institute of Soil Science and Site-Ecology (ISSE) at TUD has an internationally renowned research tradition in forest hydrological topics using methods and findings from various (sub)disciplines in a multidisplinary approach. The measurement and simulation of forest catchments has also been a point of research at the Centre for Environmental and Marine Studies (CESAM) at UA. This work will profit greatly from the experience in both institutions, therefore enhancing knowledge exchange and collaboration between both parties.