Sustaining ecosystem services in forest landscapes

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A new tool for evaluating road transport fuel consumption and CO_2 emissions based on open geographical databases

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The analysis of road transport costs and efficiency relies strongly on the availability of spatial data which in some regions are difficult or expensive to obtain. Open geographical databases seem therefore a promising alternative for these regions. OpenStreetMap©, due to permanent development and improvement by a large number of collaborators, is able to provide reliable data at no cost; as a result, the development and application of specific geographic information tools in most locations becomes possible. In this work we developed routines for forest logistics based on data from OpenStreetMap©, specifically to evaluate fuel consumption and costs as well as CO_2 emissions in wood transport in the Northeastern region of Portugal, where the road network is strongly affected by topography that has impact on forest logistics and the viability of alternatives of wood mobilization. We applied our methodology in a real case study of transport of forest biomass to a pellet plant, deriving surface estimates of fuel consumption, fuel costs, CO_2 emissions, and accessibility performance to be used as criteria for deciding on support systems for forest management and planning in the Northeastern region. This application demonstrates the importance of available geographic information data and tools in forest mobilization.

