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Forests and Soil Erosion across Europe

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Land use and climate change threaten the ability of Europe's forests to provide a vital service in limiting soil erosion, e.g. from forest fires and landslides. However, our ability to define the threat and to propose mitigation measures suffers from two deficiencies concerning the forest/erosion interface:

1) While there have been a considerable number of field studies of the relationship between forest cover and erosion in different parts of Europe, the data sets are scattered among research groups and a range of literature outlets. There is no comprehensive overview of the forest/erosion interface at the European scale, essential for considering regional variations and investigating the effects of future changes in land use and climate.
2) Compared with forest/water studies, we have a poorer quantitative appreciation of forest/erosion interactions. In the forest/water area it is possible to make quantitative statements such as that a 20% change in forest cover across a river catchment is needed for the effect on annual water yield to be measurable or that a forested catchment in upland UK has an annual water yield around 15% lower than an otherwise comparable grassland catchment. Comparable statements are not yet possible for forest/erosion interactions and there are uncertainties in the mathematical representation of forest/erosion interactions which limit our ability to make predictions, for example of the impact of forest loss in a given area.

This presentation therefore considers the next step in improving our predictive capability. It proposes the integration of existing research and data to construct the "big picture" across Europe, i.e. erosion rates and sediment yields associated with forest cover and its loss in a range of erosion regimes (e.g. post-forest fire erosion or post-logging landslides). This would provide a basis for generalizations at the European scale. However, such an overview would not form a predictive capability. Therefore it is also necessary to identify a range of predictive methods, from empirical guidelines to computer models, which can be recommended for applications such as extrapolating from the local to the regional scale and for planning mitigation strategies. Such developments could help improve efficiency in the integrated management of forest, soil and water resources, benefit local engineering projects ranging from hazard mitigation plans to road culvert design, contribute to the implementation of the EU Water Framework Development, form a more objective basis for cost/benefit analysis of proposed management actions and help in putting a value on forest services.