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Confrontation of the PESERA map with measured soil loss rates at plot scale

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The Pan-European Soil Erosion Risk Assessment for Europe (PESERA) map provides detailed spatially-distributed estimates of soil loss rates (SLR) by water erosion at a European scale. However, a closer look at the map in selected study areas reveals some anomalies and limitations of the erosion estimates. Hence, an external validation of the map may contribute to future improvement of the SLR estimates. While insufficient measured data are available for a comprehensive validation of the map, an initial confrontation between available SLR data measured at a plot scale and the PESERA map may provide information on the magnitude and sources of deviation in SLR between the map and runoff plots.

Therefore, the objective of this study is to further explore differences between SLR predicted by the PESERA map and SLR measured on field erosion plots, and to explain these differences in terms of climatic zone or land use. Measured SLR data for the PESERA map cover area were obtained from a runoff and soil loss plot database for Europe and the Mediterranean, recently established in the framework of the DESIRE project (EU FP6). Only data for plots with conventional land uses (i.e. without experimental conservation practices) for which the PESERA map predicted SLR could be determined were selected. This resulted in a dataset of 3 085 plot years from 95 plot measuring sites distributed over the entire PESERA map cover area.

Results indicate that PESERA predictions for the Atlantic climate correspond relatively well with SLR measured at plot scale, but the PESERA map tends to underestimate SLR in the continental and boreal regions. For the Mediterranean, SLR were found to be overestimated by the PESERA map, which could in part be due to the generally higher rock fragment cover protecting the soil against erosion. Furthermore, for cropland, deviations are related to climatological differences mentioned above. SLR under (semi-) natural land cover types (shrubland, grassland and forest) tend to be overestimated by PESERA, which is consistent with reported observations that erosion models typically over-predict small SLR. SLR in vineyards was found to be over-predicted in the Mediterranean and under-predicted in the Non-Mediterranean, but this should be interpreted with caution since only a limited number of data is available for this land use. Similarly, for tree crops, data availability is limited and measured SLR are highly variable, hence no trend could be found between measured and predicted SLR.

keywords: soil loss rates, PESERA, erosion plot, climate, land use