Sediment yield in Europe: regional differences in scale dependence

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Abstract Current understanding of the regional variation in sediment yield (SY) and its scale dependence is limited for Europe. Based on an extensive literature review, a SY-database was assembled to bridge this gap. Measured SY-data from 1794 different locations throughout Europe were collected, representing a minimum of 29 203 catchment-years of records and comprising a wide range of catchment areas (0.01 km² to 1 360 000 km²). Clear differences were observed between the temperate regions of Europe (low SY-values, i.e. <50 t km⁻² year⁻¹) and the Mediterranean and mountainous regions of Europe where SY-values are generally higher (i.e. >300 t km⁻² year⁻¹). Furthermore, for most temperate regions a negative relationship was found between catchment area and SY. For mountainous and Mediterranean regions, this was generally not the case. A comparison of catchment SY with rates of sheet and rill erosion also points to clear regional differences. Whereas soil erosion rates are generally higher than SY for temperate regions, this is not the case for the Mediterranean region. This indicates the importance of other erosion processes (i.e. landslides, riverbank erosion, and gullies). The results illustrate important regional differences in the scale dependence of SY and emphasize the need for an integrated modelling approach considering various types of sediment source and sink.

Key words sediment yield; database; Europe; erosion; scale-dependence; sheet and rill erosion