Statistical distribution of landslide volumes

M.T. Brunetti, F. Guzzetti, M. Rossi, and S. Peruccacci

Consiglio Nazionale delle Ricerche, Istituto di Ricerca per la Protezione Idrogeologica, Via della Madonna Alta 126, 06128 Perugia, Italy (MariaTeresa.Brunetti@irpi.cnr.it)

The volumes of 4033 landslides have been compiled from 19 different world datasets, taken both from the literature and from field measurements carried out by the authors. The single datasets contain various landslide types: rock falls, rock slides, rock avalanches, debris flows, slides, soil slides and submarine landslides. The range of landslide volumes spans over 18 orders of magnitude, from 10^{-4} m^3 to 10^{13} m^3. The analysis of the volume distribution has been performed using the kernel density estimator (KDE) tool available in the R statistical environment. The probability distribution of the landslide volumes is heavy-tailed and is approximately described by a power law with a negative exponent ranging from -1.9 to -1.0. The exponent of the power law for each dataset seems to be weakly related to the landslide type for those datasets presumably complete. In particular, rock falls and rock slides have exponents higher than those of slides and soil slides.