PythOm: A python toolbox implementing recent advances in rainfall intensity (ombrian) curves

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Curves of rainfall intensity at various scales and for various return periods, else known as ombrian (or IDF) curves, are central design tools in hydrology and engineering. Construction of such curves often relies heavily on empirical or semi-empirical approaches, which hinder their applicability over large scales, and preclude simulation. Recent work by Koutsoyiannis (2020) has advanced these curves to theoretically-consistent stochastic models of rainfall intensity (ombrian models) extending their applicability to the full range of available scales, e.g. from minutes to decades. We present an open-source python toolbox implementing these advances in a straightforward and user-friendly manner and prove its applicability. The toolbox also employs advanced statistical fitting methods for extremes (K-moments), accounts for bias induced by temporal dependence, and allows optional blending of daily-scale data to reduce uncertainty of sub-daily records. The end result is the parameterization of the ombrian model and the graphical representation of rainfall intensity for any range of scales (supported by the data) and return periods.

Reference: Koutsoyiannis, D. 2020. 'Rainfall extremes and Ombrian modelling' in *Stochastics of Hydroclimatic Extremes - A Cool Look at Risk* (ed 0), National Technical University of Athens, Athens, pp 243-273, http://www.itia.ntua.gr/en/docinfo/2000/.