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Scaling and intermittency in rainfall models with state dependent noise

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We review the origin of scaling and on-off intermittency and link it to the mechanisms of ‘repulsion from the origin’ of multiplicative noise. We analyze minimalist stochastic models paradigmatic of such a phenomenon and discuss possible applications to rainfall modeling. We also compare this mechanism with other typical processes which produce intermittency and scaling such as multifractal cascades and threshold crossing of free random walks. Finally, we explore the problem of causality and time reversibility in intermittent models of rainfall (especially in regard to convective precipitation).