

Abstract Submitted
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Non-Equilibrium Statistical Dynamics of River Network Evolution¹ XU-MING WANG, School of Physics and Electric Informantion, Ningxia University, PING ZHANG, JIE HUO, RUI HAO, School of Physics and Electric Informantion, Ningxia University — According to the erosion rule in a natural process, a Langevin Equation describing the prolongation of river channel is defined. The determinate prolongation is given by consideration of the characteristics of the early stage in the development of a river channel. The random growth (diffusion) is expressed by the fluctuations of the related stochastic variables or factors. A Fokker-Planck equation that describes the evolution of the distribution of the channel length is derived from this Langevin Equation. The solution presents the transition probability and exceedence probability with a Power-Exponent function which indicates that the channel length distributes in a complicated way. The details show that there exists a critical time, before which river network is developing and marked by exponent distribution., and beyond which river network is developed and marked by power distribution. On the basis of Hack's law, the transition probability of river's area and the corresponding exceedence probability are obtained. They are in excellent agreement with them obtained by field observations.

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