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Random dispersion coefficients and Tsallis entropy.

Brownian motion, the classical dispersive process, maximizes the classical Boltzmann-Gibbs entropy. In recent years, the Tsallis q -entropy has been developed as an alternative to the classical entropy for systems in which are non-ergodic. We demonstrate how Brownian motion can be generalized so that the Tsallis entropy is maximized rather than the Boltzmann-Gibbs entropy. This generalization results simply from using a random dispersion coefficient, and we derive the distribution of this coefficient as a function of q for $1 < q < 3$. Applications to transport in the subsurface are considered. (Received September 05, 2014)