

# Rare events in complex dynamical systems: the examples of the climate and the solar system dynamics

Freddy Bouchet \*

[Freddy.Bouchet@ens-lyon.fr](mailto:Freddy.Bouchet@ens-lyon.fr)

---

I will discuss a set of recent developments in non-equilibrium statistical mechanics applied to climate and the solar system dynamics. Those two complex dynamical systems are wonderful new playgrounds for statistical mechanics. Their understanding involves large deviation theory, stochastic partial differential equations, and diffusion Monte-Carlo algorithms. The first application will be extreme heat waves as an example of rare events with huge impacts. The second one will be the study of rare trajectories that change the structure of a planetary system.