Modeling and pricing rainfall options

*Philip Ngare** (Univ. Linz), *Gunther Leobacher* (Univ. Linz)

We are interested in pricing a rainfall option written on precipitation at specific locations. We assume the existence of some financial assets in the exchange markets with dynamics affected by change in the quantity of rainfall. We then construct a suitable Markovian Gamma model for the rainfall process which accounts for the seasonal change of precipitation and develop maximum likelihood parameter estimation process to fit the probability distributions into data. We derive optimal strategies for exponential utility from terminal wealth for a discrete time space with finite time horizon, determine an indifference price of the claim and the corresponding derivative hedges. The method is illustrated with actual measured data on rainfall from a location in Kenya.