Water Retention Model on City Surface

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In recent years there has been a great interest in the properties of random landscapes, with and without spatial correlation [1]. The reason for this is due to the great number of related problems, ranging from phenomena of deposition, transport in random geometries and geomorphology [2]. In these models, the random landscapes are described by means of a regular network and a numerical value is assigned to each site of the network, corresponding to a height. Once the surface morphology is defined, a layer of fluid, such as water, is considered on the surface. Since the surface has an irregularity in its heights, the fluid will be distributed in valleys present on the surface. An issue relevant to this process concerns the amount of water retained in the landscape. Recently, Craig et. al. [3] have proposed a model to study the retention of liquid on a random surfaces with open contours. As a result from that study, they have showed interesting features, such as the counter-intuitive fact that, if you increase the number of levels in height, there is no guarantee that the amount of retention water should increase.

Subsequently, Schrenk et. al. [1] studied the model proposed by Craig et al with and without correlation at the surface heights, showing that the retention capacity was strongly influenced by the spatial correlation between the sites of the network. Furthermore, the size distribution of lagoons formed on the surface follow a power law. Despite the great advances in the understanding of the properties of random surfaces, many questions and applications still open. Among these we can highlight a model of water retention applied to cities landscape. In this work, we investigated the water retention model using cities landscape in order to identify the free flood paths between points localized in the city network. We believe that results from our study can help to improve the traffic organization and mitigate congestion in big cities as a consequence of flood.