



## **An optimized OpenLISEM model for flash floods in Emilia-Romagna, Italy**

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Flash floods, because of its character of strong suddenness induced by overwhelmingly discharge, is one of the most severe natural disaster in the world, posing a threat to the people's life and property safety in the susceptible area. So, it is of great significance to study its forming and response mechanism in order to give a base for flash floods warning systems. In this paper, we made some improvement to optimize the physically based prediction model OpenLISEM, chose the Emilia-Romagna region area which is prone to flash floods as study case and simulated its catchment hydrology and sediment stepsize response process. Also, a three-dimensional digital animation in condition of duartive intense rainfall was illustrated in this process. Firstly, data of DEM (digital elevation model) [U+FF0C] land surface cover data, soil type data was collected and transfered into pracster data. Then, they were intergrated into a whole database including 24 maps in order to Input the software. As well as model was run by imformation provided with 10-year return period, 50-year return period, 100-year return period hourly precipitation data respectively. It provided a detailed process with drawing the hydrographs and sedigraphs at the same time. After that, It showed the evolutionary process of flash floods with 6 sediment maps, 8 flood and channel maps, and 5 slope failure and debris floww maps to esimiate occurance time, scope of influence as a result. In addition, we also adjusted parameters to simulate different heavy rainstorm scenarios to find thresholds. Consequently, a risk assement was generated by marked the dangerous area in maps with different colours. Furthermore, validation of this model was done by comparing simulatng results with hisrotical data. Results show it is roughly consistent with historiacl data, proving its ability to anticipate more precisely and concisely.