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Sequential gaussian simulation of suspended sediment concentration during an extreme rainfall episode in a Mediterranean experimental basin

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Extreme rainfall episodes are increasingly becoming a major concern in terms of risk erosion and solute loss, especially in Mediterranean environments where after a dry summer, autumn storms cause significant flashfloods. High resolution temporal data is required in order to assess the effects of these rainfall episodes and its hydro-ecological response. But, unfortunately during these episodes measurement instruments are sometimes experiencing technical problems or even they are not able to log data. Consequently researchers are forced to look for cost-effective solutions to these technical problems. In this study, we calculate Suspended Sediment Concentration (SSC) with Sequential Gaussian simulation (SGS) using auxiliary data. Vernegà experimental basin is located in *les Gavarres* Massif (Iberian Peninsula). In this experimental basin are installed two gauging stations, within the draining area are represented two land uses; forest (*Quercus suber and Pinus pinea*) with 1.6km^2, and agriculture 2.4km^2 (*Hordeum vulgare*). The rainfall episode happened in October 2005 and it reached intensities over 55mm/h, and the cumulative precipitation in three days was 270mm. SGS take into account second variables as in this case discharge (Q) to use a secondary variable in the model. So, SGS yields a more realistic result of SSC than any other regression method, and also the correlation between the observed discharge and SSC simulated is improved by the simulation model. Beyond this, the simulation results of SSC returns average values of 1.4516mg/l in the agriculture gauging station, and 1.6755mg/l in the forest gauging station with maximum peaks of 15mg/l in the agriculture and forest station. Assuming simulation results,

the SSC yield in forest land use is larger than in the agriculture gauging station. Forest land use area drains a smaller area than the agriculture land use, however in this rainfall episode, the forest land use yielded more quantity of SSC. Forest managing operations, namely clear-cut and thinning, carried out within the forest land use over the last years are likely causing a larger movement of sediments in the forest land use than in the agriculture