



## **Spatial and temporal issues in the validation of an erosion model in a small Mountain research basin.**

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The Vallcebre research basins are located in a subhumid middle mountain area in the southern Pyrenees, Spain. Due to the physiographic and climatic characteristics as well as the land use history, most of the surface of these basins is covered by protective vegetation, with very low sediment yield rates. On the other hand, relatively small intensely eroded areas with badland landforms are the main sources of sediments. Observations carried out for over 20 years in these basins demonstrated that, at the small basin scale, the main source of runoff is overland flow on saturated areas and subsurface flow, whereas Hortonian overland flow from badlands and other impervious areas plays a small contribution relevant only during intense summer showers. Sediments are mainly eroded from badlands during these summer rainstorms that result in flashy runoff events with high sediment concentrations and major deposition of sediments on the stream beds. Large runoff events at the basin scale during wet periods carry most of the sediment loads taking advantage of the sediments stored in the stream network.

Within this context, the KINEROS2 erosion model was implemented with the data obtained during 3 years in an elementary badland (0.124 ha) and used to estimate the sediment production from the badland areas in the Ca l'Isard (132 ha) basin during 15 years. The validation of the model results with the sediment load records at the Ca l'Isard gauging station provided some information on the functioning of the basin but raised several issues when sediment volumes were considered. Although the uncertainty of model predictions was rather high, on the long run it was compensated by the high inter-annual variability of both sediment production from badlands and sediment load at the basin scale, the first being smaller than the second. Yet, the assessment of the active badland areas connected to the drainage net and therefore contributing to sediment load, was also a relevant source of uncertainty. It follows that the uncertainty associated with model results should be analysed considering the data uncertainty as well as the spatial and temporal representativeness of the data and simulations.