

Interactive comment on “A conceptual model of check dam hydraulics for gully control” by C. Castillo et al.

Anonymous Referee #2

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General comments: This paper presents an interesting work conducted on the modeling of check dam hydraulics for gully control. The paper is clearly written and the figures are all useful.

Authors should improve their bibliography, they should add the book “Check dams, morphological adjustments and erosion control in torrential streams” edited by C. Conesa-Garcia and M.-A. Lenzi (2010). Several chapters are dealing with their main topic (flow modeling, gullying, etc.) and could improve their paper.

In the discussion and in the conclusion, authors should discuss the possibility to compare their results with field measurements and observations and how they could proceed to improve their knowledge about the processes and the model.

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Specific comments: Line 23-24: “A check dam is a small dam designed to reduce flow velocity and to enhance sediment deposition in order to control soil erosion within a stream, such as a gully.” They although contribute to maintain the stability of the adjacent slopes by limiting the undercutting processes.

Page 11903 Lines 15-20. The spacing between dams is also depending on the dam height, the angle of deposition of the material behind (or trapped if you prefer) the check dam, the length of potential downhill scour and the original channel gradient (see VanDine, 1996, Debris Flow control structures for forest engineering).

Page 11906 Lines 14-21. Authors should justify the ranges of their parameters. Why did they choose these values? For example, the gully gradient is usually higher than the bed slopes (0.02-0.1) used by the authors.

Page 11909 Lines 22-24. “In the model, the HJ characteristics were estimated by comparing graphically the FSP calculated in both directions in order to find the point of correspondence between the downstream subcritical and upstream supercritical regimes.” Authors should add a figure to illustrate their methodology; this would significantly help the reader.

Page 11915 Lines 12-17. Authors should add (if they exist) some references regarding the use of the IBER model in scientific papers.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 11901, 2013.

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