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Interactive comment on "Sediment loss and its causes in Puerto Rico watersheds" *by* Y. Yuan et al.

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GENERAL COMMENTS: This paper aims to identify the mayor factors that influence the sediment yield and sediment concentrations in several watersheds of Puerto Rico. The paper itself not introduces relevant aspects in terms of a new method/approach; but gives a potential analysis for better land use planning. Overall, this paper is of a great interest for the scientific community, technicians and managers and falls within the scope of the journal. There are however, some issues that need to be addressed before its publication. In general terms, the manuscript requires some rework. In some cases, information has to be eliminated and, in contrast, additional information has to be introduced. Explanations of data analysis and methods have to be largely

improved. In addition, authors could consider group Sections 2.1.1, 2.1.2 and 2.1.3 in a single section (called, for instance, Study area). Figure 2 and 3 should be improved. The information shown in these figures is extremely difficult to visually interpret. The information gave in the Study area 2.1.1. section is not relevant for the paper; despite is highly interesting!!!. Please consider to eliminate. In contrast, a better general picture of the island (distribution of the precipitation, main geographic features of the island: localization of the mountain region; land uses distribution, soil types, etc...) could be given. To better understand the obtained results, authors should give this general information to the lector (not everybody is familiarized with PR).

RESPONSE FROM AUTHORS: Dear Referee, thank you for the time you devoted to reviewing this manuscript and for your compliments and helpful comments. We carefully considered your comments and will take them into account for further revisions. Following your advices, we decided to just include those 11 stations for this study. We struggled very much during writing to present the analysis we performed in a clear way. Because we studied those 20 independent watersheds, we just thought to present them all. Actually, analysis on those 11 stations would provide clear identification of the main results of the manuscript. In this way, the paper would be more concise. Furthermore, we will revise section 2 and remove repetitions and add more information data analysis. If we only present those 11 stations, figures 2 and 3 are easier to read. In summary, following major changes will be made: 1. Section 2. 1. 1 was removed. In fact, the paper just has 2.1. Study area and this section is totally revised to provide more relevant information to the study.

Comment from referee: In section 2.2. authors start indicating that 20 independent watersheds are analyzed but at the end, only 11 stations are used for the PLS analysis. This is confusing me. Please, clarify what stations were used and how these were selected? RESPONSE FROMAUTHORS: We totally rewrite section 2.2. and only include 11 stations used for the PLS analysis to reduce confusion. Regarding what stations were used and how these were selected, they were selected based on availability of

data during study period and how unique the station is, we try to find common period for comparisons, uniqueness of the station. This information is moved to section 2.2 from section 2.3. Comment from referee: Overall, check the writing of the paper (there is some redundant information).

RESPONSE FROM AUTHORS: we totally revised section 2 to eliminate redundant information. Specific comments: Introduction. Mostly OK. Some minor ticks: 1) Better is change “sediment and nutrient runoff” by “sediment and nutrient load”. Line 25 and 26 consider change by “PREVIOUS studies in PR have SHOWED that sediment contaminants have increased 5- to 10-fold since pre-colonial levels, with a (eliminate “a”) 2- to 3-fold increase in the last 40–50 years (Sturm et al., 2012)”.

RESPONSE FROM AUTHORS: we agree and changes were made. 2) There is an excess of references such as, for instance, in page 479 line 16 to 18. Please, give no more than 2 or 3 references per topic.

RESPONSE FROM AUTHORS: we agree and extra references were removed. 3) Consider move line 25 (page 479) to line 2 (page 480) to line 19 (page 479); the final text could be: “Watershed-scale studies regarding the potential effect of land use changes on water quality are essential to minimize water pollution. Various studies have linked stream pollutants to landscape variables using process-based hydrological models (Jha et al., 2010; Kirsch et al., 2002; Ullrich and Volk, 2009; Hu et al., 2014) and/or statistical methods (Lenat and Crawford, 1994; Liu et al., 2009; Lopez et al., 2008; Mehaffey et al., 2005; Nash et al., 2009; Nie et al., 2011; Mbonimpa et al., 2014). For example, Lenat and Crawford (1994), (using statistical models; eliminate), found that urban land use is the highest contributor to sediment loss when they analyzed water samples from three watersheds each having a different dominant land use (forest, urban, agricultural) in the Piedmont ecoregion of North Carolina. Mbonimpa et al. (2014), using partial least squares (PLS) regression analysis, identified urban land use and agricultural land growing corn as main factors that produce an? (were associated, eliminate with) increases in total suspended sediment and total phosphorous

in streams. However, these models require detailed input data, which often are not available for all areas of interest”.

RESPONSE FROM AUTHORS: based on the focus of this study and also make the paper flow better, the final text is changed to: “Watershed-scale studies regarding the potential effect of land use changes on water quality are essential to minimize water pollution. Various studies have linked stream pollutants to landscape variables using process-based hydrological models (Jha et al., 2010; Ullrich and Volk, 2009; Hu et al., 2014) and/or statistical methods (Lenat and Crawford, 1994; Nie et al., 2011; Mbonimpa et al., 2014). Process based hydrologic models have been successfully used to characterize watershed processes and sources of stream pollutants, but these models require detailed input data, which may not be available for some areas. For instance, Hu et al. (2014) showed the difficulty of calibrating a SWAT model for the Guánica Bay, PR, watershed due to limited data for numerous reservoirs and dams in the basin. On the other hand, various studies have demonstrated statistical relationships between landscape metrics and water quality. For example, Lenat and Crawford (1994) found that urban land use is the highest contributor to sediment loss when they analyzed water samples from three watersheds each having a different dominant land use (forest, urban, agricultural) in the Piedmont ecoregion of North Carolina. Mbonimpa et al. (2014), using partial least squares (PLS) regression analysis, identified urban land use and agricultural land growing corn as main factors that caused increases in total suspended sediment and total phosphorous in streams. . .” Methods. Study area 2.1.1. 1) Please, consider eliminate from line 6 to 9 (page 482) or move to introduction. Data acquisition. 1) In section 2.3 authors mix methods and results. For instance: from line 13 to line 15 (page 483). Item from line 18 to 20 or line 24 and 25. 2) Line 18: “Soils in the studied watersheds varied, but with the majority of the soils in the study watersheds...”. Rewrite. 3) What means “developed” (“...other land uses include developed..”)? 4) Better if change the order of the table 2 and 3. In the present format, in table 3 are described the soil types (code, name, etc.) but not in table 2. Then, changing the order of tables, lectors could know the soil name and the SSURGO Code and

understand the nomenclature of table 2. 5) In page 484: consider eliminate the land use categories (these are indicated in table 2). Idem for slope (categories described in table 6). At that point, what means slope = 0.0 (not slope or for instance <0.001)?) In page 484, authors explain that: “Although the USGS stations do not have measured data in exactly the same time periods, they do overlap in their monitoring periods as shown in Figs. 2 and 3.” This is accomplished for some stations but not always (in some cases the data set of the stations is only composed by 2 to 4 years data....). 8) Eliminate paragraph from line 15 to 20 (page 484). Is repeated!!!

RESPONSE FROM AUTHORS: we agree and line 6 to 9 (page 482) were removed. Actually, we rewrote the entire section and only relevant information is presented. The section becomes: 2.1. Study area 2.2. Data acquisition and preliminary analysis (combined section 2.2 with 2.3): in this section, we rewrote line 18 to line 22 (Page 483) to make it flow better; we do not agree that line 13 to line 15 (page 483) are results... We removed land use categories and items for slope (page 484), we also removed repetitions. Regarding to the slope, “0.0” means less that 0.05. Regarding availability of data, we chose stations which have at least 5 years of monitoring from 1983 to 2011. Results. 1) The variable “water” is not representative (only 1 station has “water”) and this should be eliminated from all the analysis carried out.

RESPONSE FROM AUTHORS: we agree. Water was removed and we performed the analysis again. 2) In the ANOVA test there is a large difference between the number of years recorded in stations 5, 10, 12 and 19 versus 18... Results should be carefully read.

RESPONSE FROM AUTHORS: after careful consideration, we decided to delete ANOVA test. 3) Could be interesting summarize the results in one table indicating the basin features and the main factor/s that produce an increase of the sediment load. In contrast, table 5 is not necessary.

RESPONSE FROM AUTHORS: Table 5 is deleted. We will try to summarize the results

in one table indicating the basin features and the main factor/s that produce an increase of the sediment load.

Interactive comment on SOIL Discuss., 2, 477, 2015.