**FINAL DRAFT**

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Jorge Rodriguez-Hernandez[1], Andrés H. Fernández-Barrera[2], Valerio C.A. Andrés-Valeri[3], Angel Vega-Zamanillo[4], Daniel Castro-Fresno[5]

[1] *Ph.D. M.Sc. Civil Engineer, Assistant Professor, Department of Transports, Civil Engineering School (ETSICCP), Universidad de Cantabria, Av. de los Castros 44, 39005, Santander, Spain (rodrighj@unican.es).*

[2] *Ph.D. Construction Engineer, Assistant Professor, Construction Engineering School, Faculty of Engineering,*

*Pontificia Universidad Católica de Valparaíso, Av. Brasil 2147, Valparaíso, Chile (andres.fernandez@ucv.cl)*

[3] *M.Sc. Civil Engineer, PhD Student, Civil Engineering School (ETSICCP), Universidad de Cantabria, Av. de los Castros 44, 39005, Santander, Spain (valerio.andres@unican.es).*

[4] *Ph.D. M.Sc. Civil Engineer, Assistant Professor, Department of Transports, Civil Engineering School (ETSICCP), Universidad de Cantabria, Av. de los Castros 44, 39005, Santander, Spain (vegaa@unican.es).*

[5] Ph.D. M.Sc. Civil Engineer, Professor, Department of Transports, Civil Engineering School (ETSICCP),

Universidad de Cantabria, Av. de los Castros 44, 39005, Santander, Spain

(castrod@unican.es).



The writers wish to thank the discusser for the careful analysis of the original paper (Rodriguez-Hernandez et al. 2013), and want to address the points and aspects reported in his discussion. The authors will try to give a point-by-point response to each of the questions reported by the discusser.

First of all, the writers would like to acknowledge the discusser's help in highlighting the inconsistency between the number of papers taken into account in the statistical analysis and the total number of papers reported in the abstract. In fact, the authors selected 37 papers on runoff water quality as references, but only 25 of these papers were statistically analyzed, forming a database with 41 catchment areas.

The authors agree with the discusser about the influence of sediment particle sizes on the pollutant distribution in impervious areas. It is well known that different pollutants were related to different particle size fractions, with higher bonding capacity of smaller-sized particles. Different studies pointed out that anthropogenic activity is the main source of fine particles (Ferguson and Ryan 1984), so the particle size distribution of sediment deposited in impervious surfaces could be considered to be related to land uses in catchment areas. In the original paper, the different particle size distribution of the sediments deposited on impervious areas was limited by the reduced area of the catchments analyzed and implicitly considered with the classification of the different catchments depending on the type of land use. In this context, the main influence of the particle size of sediments in runoff water quality was related to the distance of transport of the pollutants (Deletic et al. 1997). For this reason, the authors did not select the references provided by the discusser or the particle size distribution as catchment characteristics.

The authors agree with the discusser that different studies concluded that non-point pollution of stormwater runoff is directly related to the imperviousness and land uses of the watershed areas (Novotny 2003, Campbell et al 2004). For that reason, the authors selected this parameter as a catchment characteristic. Nevertheless, the statistical analysis carried out in the original paper highlights that there were no significant differences in pollution levels among different types of land use for the EMC of the 25 papers analyzed. Consequently, in the discussion section, s a possible explanation for this fact was provided arguing that impervious pavements are “similar elements in which the environmental conditions do not have a greater effect in the measurements”.

The only parameter demonstrated to influence the analyzed water quality parameters was the Average Daily traffic (ADT) of the catchment areas, finding differences among the High level of ADT and the other levels. In the authors’ opinion, by increasing the number of basins, the ADT influence of O&G should continue to be significant as the original paper showed. Probably, with higher numbers of catchment areas for each level of ADT, the post-hoc analysis would more clearly show the significant differences among O&G EMCs according to the ADT.

The aim of the original paper was to analyze the influence of the different characteristics of the catchment areas on the runoff water quality, particularly in the EMC of some runoff pollutants. With this aim, each catchment characteristic was divided into different groups and inferential statistical methods were applied to obtain a mean comparison among the different groups by using SPSS 20 software. Inferential tests are usually conducted to reject the null hypothesis with respect to the alternative hypothesis, which is expected to be the cause of the phenomenon under study. The significance level of these tests refers to the borderline of probability for accepting or rejecting the tested hypothesis, and it is associated with the test confidence level. The use of a fixed significance level of 0.05 is a convention in statistical analysis (Sawyer 2009), and refers to a 95% confidence level. This level has been accepted as the standard (Fisher 1958), it being appropriate for taking decisions in professional practice.

The F-Test (ANOVA or Analysis of Variance) and T-tests are statistical methods commonly used to compare the mean score of a continuous variable for different groups of populations. Both techniques are parametric statistical methods, which involve a number of assumptions (Sawyer 2009): parametric data, normally distributed population, homogeneity of variance, dependent variable measured in continuous range, independence of observations and random sampling. In this context, while the F-Test is a statistical method that enables comparison of the mean scores in a continuous variable of k-groups, the T-test can only be used for two groups of populations. Considering that both tests should be performed for homoscedastic and normally distributed populations of independent samples, the F-statistic of the F-test evolves according to the Fisher-Snedecor probability model, and the t-statistic used to generate the p-value in the T-Test has a Student's distribution.

The significance value of these tests, referred to in most studies as a *p-value*, defines the probability of observing an extreme anomalous mean value of the dependent variable in the group distribution if the tested null hypothesis is true. By comparing the significance level with the significance value obtained in the test, it can be stated that the tested hypothesis is true or not, with the confidence level established. If the p-value is below the significance level, the probability to have an error is lower than the fixed value of significance level (Vergura et al 2009). The exact value of the significance result of a test simply indicates how strong the presumption against the null hypothesis is. In real terms the significance value only allows us to make statements with a degree of precision, for example: for a significance level of 0.05, a p-value $> 0.05$ implies no presumption against the null hypothesis, whilst a p-value $< 0.01$ could be considered to imply a very strong presumption against null hypothesis.

For two independent samples, the T-test and F-test provide the same significance value results because a direct relationship exists between the Student's t-statistic and Snedecor-Fisher F-statistic in these conditions (Sawyer 2009). Nevertheless, when there are more than two groups for comparisons, multiple T-tests increase the chances of making a Type I error (i.e. an incorrect rejection of a true null hypothesis). Although each T-test can be done with a specific significance level, the significance levels accumulate over a series of tests. For this reason, when all pairwise comparisons are carried out, the significance level has to be lowered to account for multiple comparisons (Sawyer 2009). When the significance level is lowered, it makes the test more restricted, requiring lower significance values of the test before rejecting the null hypothesis. On the other hand, the F-Test puts all the data into the F-statistic and gives one significance value for the null hypothesis. Consequently, the F-statistic provided by the F-test is more conservative and robust than the t-statistic of the T-test for multiple paired comparisons. If the F-test rejects the null hypothesis, post-hoc analysis is used to determine which samples are different from others by carrying out pairwise comparisons. Specifically, Tukey's HSD procedure was used in the original paper for this purpose due to its protection from Type I errors (Sawyer 2009).



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