**Hydrology and
Earth System
Sciences
Discussions**

Interactive
Comment

Interactive comment on "Forest cover influence on flood assessment in Italian catchments" *by* F. Preti et al.

Anonymous Referee #2
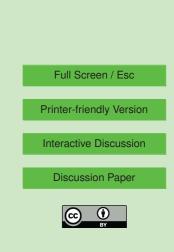
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The manuscript proposes to modify the rational formula with a corrective factor to include the forest cover information that apparently could affect the runoff coefficient.

The topic is interesting and potentially useful for the peak runoff estimation in ungauged basins.

My evaluation is generally positive and I suggest major revision.

Major comments:

1) The rational formula, in my opinion, is dated since event-based procedures and continuous models can be currently applied also in ungauged basins using similar empirical parameters included in the rational formulas. So a first general suggestion is

to try to apply the same approach on more advanced rainfall-runoff model. This is just a comment and not a specific request to the authors.

2) One of the most important conditions of the rational formula is that the rainfall should be homogeneous in space. This condition restricts its applicability to small basins for which, in addition, there are not accessible runoff observations and consequently simple and empirical formulas are reasonable solutions. Authors selected 75 basins and many of those are quite large (>5'000 Km2) and for which probably it is not appropriate to apply the rational formula. Looking the figure 4 it seems that limiting the attention on basins with contributing area < 500km2 still authors have a good sample on which they can apply the proposed approach.

3) Other "dangerous" assumptions are related to use the Giandotti formula to estimate the concentration time and the formula (3) to quantify the Cobs. In both cases we do not have a clear idea of the error source. Are there other methods to estimated these parameters using observed data? if not, I understand that to make spatial analyses we need to find a compromise.....but probably this problem should be considered in the manuscript. For instance when the authors hypothesize the reasons of the differences between Cobs and CL they should mention that probably this difference is not exclusively due to the forest cover fraction but also to the variability induced by the adopted estimation procedures.

4) As, carefully underlined by the reviewer 1, authors should take care of references and editing in general....there are too many typos and errors that should be avoided.

Detailed comments, section by section, are listed in the following.

Section 1

I would remove all the Italian references except for specific cases (like Institutional reports). I am sure that there are international journal references to substitute Italian journal and conferences.

Burch et al. 1996 is not included in the reference list

De Vito et al. 2005 is not included in the reference list

Cognard-Plancq, 2001 is not a single author paper

Van Diijk et al. 2008 is not included in the reference list or is 2007

Hamiton 2008 or 2005?

Lopez-Moreno et al. 2006 is not included in the reference list

Bathurst at al., 2011 is not included in the reference list

Lewis at al., 2010 is not included in the reference list

Calder , 1990 is not included in the reference list

Section 2

the watershed selection criteria should be mentioned.

I would suggest to write "Catchment Area" instead of "Catchment extend".

There are also international references where Giandotti is applied...

Section 3.1

Looking the table 2 I would not say that there is "significant" correlation....but I probably I am wrong because I did not fully understand the Table 2. How did you define the Spearman rank (a reference should be added) and how did you estimate the p-value?. Does Table 2 show the rk/p-value ratio? Why some numbers are in Italic font? Why some values are zero? Why the table is not symmetric?

Section 3.2

- in the text "procedures" instead of "procedure"

Section 3.3

Table 8 is missing

Section 4

How general is the formula 4? Is it valid for all return times? It seems that the choice of T=20 years in the formula 3 could affect the results. Assuming a basin with 70% of forest cover fraction and using the optimal value V= 13.9 mm ...with 200mm of rainfall the effect in term of C is only 0.05... so apparently it seems that for high return time the correction is limited.

Did the author evaluate the effect of the formula 4 in term of peak runoff ? It could be appropriate to suggest a range of values for which is reasonable to apply the proposed corrective factor.

Figures & Tables

Table 1 . It could be useful to see all 75 basin information.

Figure 1. I would suggest to use the Italian names of the regions...and in any case to be consistent.

Figure 2. it seems that there are a lot of basins with SP=0% ...and I do not know if so many particular cases could affect the results.

Figure 4. it should be improved.

Figure 7 ...in the text it is assumed that the difference Cobs-CL decreases increasing the Tc......but it seems that there are not enough data to say that....I mean if I would have had more basins with Tc=40h probably I would had more variability.

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