

The text below contains the response to the D. Miozzo's comments and suggestions. Text in black are reviewers' comments, the blue text is devoted to our remarks, explanations and the improved text in the paper is in dark green.

1) P. 2640 L. 21: Give an explanation of "relevant historical flood". When, in your article, a flood becomes "relevant"? It would be useful to draw a short list of requirements and indicators.

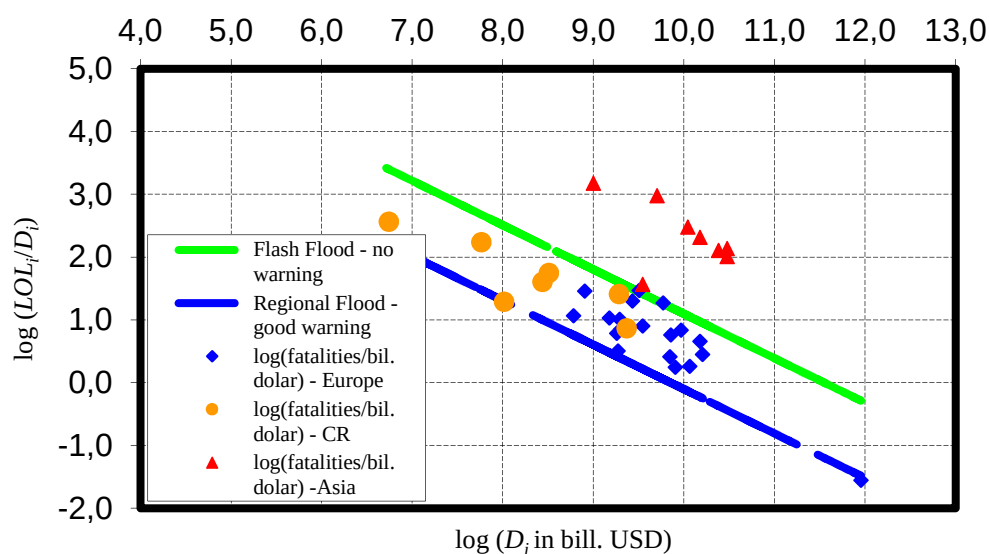
The text of the paragraph will be improved as follows:

„The first step was the collection of data from historical floods worldwide. The comprehensive records obtained from floods all around the world encompassed about 130 flood events. The data from past floods in which fatalities occurred have been used both for the identification of contributing factors and their sorting (Sect. 3.2), and also for further calibration of the proposed model for the estimation of the number of fatalities during floods (Sect. 4). Of key importance in the assessment of the above-mentioned contributing factors was the availability, accuracy and reliability of relevant data describing such factors and enabling their quantification in cases involving both real flood situations and potential flood scenarios. The impact of each factor on loss of life had to be described and, if possible, also quantified.

During the investigation it was found that not all floods are described adequately, that for some floods data regarding the reasons for fatalities were missing, contributing factors were not mentioned and, in some cases, the number of fatalities was not reliably identified. Further analysis also discovered dissimilarities between the conditions under which fatalities occurred. The most important factor was population density, which e.g. in Asian countries like China, Vietnam or Bangladesh is several times greater than that existing in the countries of Central Europe. Incomparably worse preparedness and warning systems are the rule in such locations.“

Comment:

This fact was investigated by expressing the dependence between flood losses and fatalities. As an example we have attached an interim diagram showing the red marks lying outside the margins for the "typical" number of fatalities in Europe.



2) P. 2641 L. 1-2: It is extremely important that you precisely state the source of your information regarding the impact of floods taken into account in this dissertation.

**The paragraphs will be improved by adding a list of requirements and indicators (comment 3), and also the references for the sources of the information about floods will be attached. The following references will be included in the list of References and cited in Tab. 5:**

WRI: Evaluation of the flood in July 1997, CD ROM 1 – 8, 1997, (In Czech).

ERA: The catastrophic 1998 flood in the Orlické hory region, 10 years after the flood, Elbe River Agency, Hradec Králové, 2009, (In Czech).

ERA: Final report on the March 2000 flood in the Elbe River basin, Elbe River Agency, Hradec Králové, 25 pp., 2000, (In Czech).

WRI: Assessment of the catastrophic August 2002 flood in the Czech Republic, Final Report, Ministry of the Environment of the Czech Republic, 160 pp., 2002, (In Czech).

CHMI: The spring flood of 2006 in the Czech Republic, Final Report, Ministry of the Environment of the Czech Republic, 158 pp., 2006, (In Czech).

CHMI: Assessment of the floods of June and July 2009 on the territory of the Czech Republic, Final Report, Ministry of the Environment of the Czech Republic, Prague, 131 pp., 2009, (In Czech).

CHMIa: Assessment of the floods of May and June 2010, Report, Ministry of the Environment of the Czech Republic, Prague, 167 pp., 2010, (In Czech).

CHMIb: Assessment of the August 2010 flood, Report, Ministry of the Environment of the Czech Republic, Prague, 131 pp., 2010, (In Czech).

MACD: The flood protection programme in the SR until the year 2010, Ministry of Agriculture and Rural Development of the Slovak Republic, Bratislava, 1999, (In Slovak).

Habersack, H. and Moser, A. (Eds.): Plattform Hochwasser Ereignisdokumentation. Hochwasser August 2002. ZENAR, in collaboration with Bundesministerium für Land und Forstwirtschaft, Umwelt und Wasserwirtschaft, Vienna, 232 pp., 2003.

Hübl, J., Miklau, F. R. and Schattauer, G.: Ereignisdokumentation 2009. Bericht über die Wildbachereignisse von April bis Oktober 2009 in Österreich, Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft, Vienna, 98 pp., 2009.

BLFUW: Hochwasser 2005 – Ereignisdokumentation. Teilbericht des Hydrographischen Dienstes, Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft, 30 pp., 2006.

Hübl, J., Miklau, F. R. and Schattauer, G.: Ereignisdokumentation 2009. Bericht über die Wildbachereignisse von April bis Oktober 2009 in Österreich, Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft, Vienna, 98 pp., 2009.

Godina, R. and Müller, G.: Das Hochwasser in Österreich vom 22. bis 30. Juni 2009. Beschreibung der hydrologischen Situation Abteilung VII/3 – Wasserhaushalt (H2B), Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft, Vienna, 21 pp., 2009.

Petrascheck, A. and Hegg, Ch. (Eds.): Hochwasser 2000. Ereignisanalyse / Fallbeispiele. Berichte des BWG, Serie Wasser, Bundesamt für Wasser und Geologie, Bern, 250 pp., 2002.

BAFU: Hochwasser 2005 in der Schweiz, Synthesebericht zur Ereignisanalyse, Bundesamt für Umwelt, 24 pp., 2008.

BAFU: Ereignisanalyse Hochwasser August 2007. Analyse der Meteo- und Abflussvorhersagen; vertiefte Analyse der Hochwasserregulierung der Jurarandgewässer, Bundesamt für Umwelt, 211 pp., 2009.

DKKV: Hochwasservorsorge in Deutschland, Lernen aus der Katastrophe 2002 im Elbegebiet, Deutsches Komitee für Katastrophenvorsorge e. V., Bonn, 152 pp., 2003.

**Table 5 will be improved as follows (references included):**

| Flood event      |                | Reference                          | Number of fatalities<br><i>LOL</i> | Material loss <i>D</i> [USD] | <i>P</i> | <i>W</i> |
|------------------|----------------|------------------------------------|------------------------------------|------------------------------|----------|----------|
| Date             | Locality       |                                    |                                    |                              |          |          |
| 1997 - July      | Czech Republic | WRI, 1997                          | 49                                 | 1.91E+09                     | -0.55    | -0.19    |
| 1998 - July      | Czech Republic | ERA, 2009                          | 10                                 | 6.18E+07                     | -0.43    | -0.53    |
| 2000 - March     | Czech Republic | ERA, 2000                          | 2                                  | 1.03E+08                     | 0.24     | 0.44     |
| 2002 - August    | Czech Republic | WRI, 2002                          | 17                                 | 2.32E+09                     | 0.14     | 0.11     |
| 2006 - spring    | Czech Republic | CHMI, 2006                         | 11                                 | 2.74E+08                     | 0.27     | 0.30     |
| 2009 - June      | Czech Republic | CHMI, 2009                         | 18                                 | 3.21E+08                     | 0.30     | -0.58    |
| 2010 - May, June | Czech Republic | CHMIa, 2010                        | 3                                  | 2.45E+08                     | 0.36     | 0.47     |
| 2010 - August    | Czech Republic | CHMIb, 2010                        | 5                                  | 5.23E+08                     | 0.37     | -0.30    |
| 1997 - July      | Slovakia       | MACD, 1999                         | 1                                  | 6.71E+07                     | -0.23    | 0.43     |
| 1998 - July      | Slovakia       | MACD, 1999                         | 47                                 | 3.04E+07                     | -0.82    | -0.81    |
| 1999 - July      | Slovakia       | MACD, 1999                         | 1                                  | 5.43E+07                     | 0.10     | -0.34    |
| 2002 - August    | Austria        | Habersack and Moser, 2003          | 9                                  | 2.27E+09                     | 0.30     | 0.23     |
| 2005 - August    | Austria        | BLFUW, 2006                        | 3                                  | 1.40E+07                     | 0.53     | 0.48     |
| 2009 - July      | Austria        | Hübl, Miklau and Schattauer, 2009, | 1                                  | 7.34E+06                     | 0.58     | -0.05    |
|                  |                | Godina and Müller, 2009            |                                    |                              |          |          |
| 2000 - October   | Switzerland    | Petrascheck and Hegg, 2002         | 16                                 | 3.82E+08                     | -0.03    | 0.27     |
| 2005 - August    | Switzerland    | BAFU, 2008                         | 6                                  | 2.33E+09                     | 0.38     | -0.26    |
| 2007 - August    | Switzerland    | BAFU, 2009                         | 1                                  | 3.15E+08                     | 0.49     | -0.10    |
| 1997 - July      | Poland         | WRI, 1997, DKKV, 2003              | 54                                 | 2.80E+09                     | -0.49    | -0.13    |
| 2002 - August    | Germany        | DKKV, 2003                         | 21                                 | 8.75E+09                     | 0.26     | 0.05     |

3) P. 2641 L. 7-14: The flood data “should” include: : : The standard of living of affected countries should be: : : – Population density in these countries should be similar: : : I’d eliminate the conditional. A dataset needs to be framed within precise indications: it does or it does not include a particular item.

**The paragraphs will be improved according to the reviewer’s suggestions:**

To ensure the homogeneity of the set of floods compiled for further statistical assessment only floods fulfilling the following criteria have been chosen from the entire set:

- The flood data must include real loss of life, material losses and also information about the standard of living in the country and the flood routing procedures applied.
  - The standard of living of selected countries must be comparable in terms of flood routing, flood mitigation and control, and also land use and the value of property owned per capita. For this purpose the gross national product and also the gross domestic product per capita were used. The gross domestic product per capita was expected to be higher than 30 000 USD per capita.
  - The population density in selected countries must be comparable with that of the Czech Republic and Central Europe, i.e. between 100 and 400 inhabitants per km<sup>2</sup>.
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4) P. 2641 L. 12: GNP Vs GDP. I’d personally use the second with PPP (Prices and purchasing power parities) adjustments in order to reduce misleading international comparisons derived by fluctuations of exchange rates. You can find some information on PPP on the OECD site:

<http://www.oecd.org/std/purchasingpowerparitiesfrequentlyaskedquestionsfaqs.htm> and  
<http://www.oecd.org/std/prices-ppp/eurostatocdmmethodologicalmanualonpurchasingpowerparitiesppps.htm>

The authors thank the reviewer for his comment. It is true that a more accurate comparison of economic standards is possible using GDP PPP. The authors have made a comparison of the two lists of countries obtained by sorting the countries according to their GNP and their GDP PPP. The order of the countries was found to be practically identical in each case, meaning that the final list of selected countries would be the same if we used GDP PPP. Based on this finding the text on P. 2641 L. 12 will be completed (see above).

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5) P. 2641 L. 15 “non-consistent” - Eliminate the quote marks and give a brief explanation for the inconsistency of Asia and Africa in your analysis.

**The text will be changed and completed as follows:**

For this reason, regions such as Asia, Africa and also North America have been excluded from the analysis. The data from these regions concerning real floods were incomplete and unreliable. The living standards in most of the Asian and African countries involved are much lower than in central Europe. Also, preparedness, warning and rescue procedures are basically of a lower standard.

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6) P. 2641 L. 23: converted to the 2010 currency level – Please be more precise, during 2010 the fluctuation of currencies was very impacting on exchange rates. Which month are you looking at? And where are you getting the currency exchanges rate from?

**For the conversion the exchange rates from the time periods in which individual floods took place were considered. The text will be changed as follows:**

The material losses for the analysed floods have been converted to USD using exchange rates valid at the time when the given flood took place. Inflation was taken into account by converting the flood losses to the average 2010 currency level, which was regarded as the reference level when constructing the model. For the conversion the GDP (Gross Domestic Product) deflator was used. The exchange rates were taken from the Czech National Bank pages [CNB], while the GDP deflators were sourced from data published by The World Bank [The World Bank].

**Two references will be added to the list:**

Kurzycz: <http://www.kurzy.cz>, last access: 10 March 2014.

The World Bank: <http://data.worldbank.org/indicator>, last access: 10 March 2014.

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7) P. 2642 L. 5: by so-called flood tourism” – please expand the subject. Since you use this concept to complete the classification of flood deaths it is rather important. Section 3.2

**Following text will be added:**

Flood tourism includes different types of misconduct and wilful risk-taking behaviour. Crowds of people often gather on bridges and also on the banks of swollen rivers to watch floods. Such onlookers can be swept away by the roaring waters; moreover, they complicate rescue and evacuation activities on the riverbanks. Frequently, recreational boaters attempt to boat or raft on flood waters, crashing, capsizing and drowning in the high velocity stream. Their irresponsible behaviour can sometimes also lead to the deaths of rescue personnel.

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8) P. 2643 L. 17: The percentage of flood-related deaths increases at twilight or during darkness, especially in the case of flash floods – please insert quote or bibliographical reference.

**References to the work of DeKay and McClelland (1993) and McClelland and Bowles (2002) will be added. The text will be extended as follows:**

... especially in the case of flash floods, when darkness can hinder warnings and rescue activities (DeKay and McClelland, 1993, McClelland and Bowles, 2002).

**The following reference will be added to the list:**

McClelland, D. M. and Bowles, D. S.: Estimating life loss for dam safety risk assessment – a review and new approach. IWR Report 02-R-3, USACE, 403 p., 2002.