Hydrol. Earth Syst. Sci. Discuss., 9, C2508–C2511, 2012
www.hydrol-earth-syst-sci-discuss.net/9/C2508/2012/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Joint impact of rainfall and tidal level on flood risk in a coastal city with a complex river network: a case study for Fuzhou city, China" *by* J. J. Lian et al.

Anonymous Referee #2

Received and published: 25 June 2012

This paper is not suitable for publication at present. The concept and calculations are interesting and potentially worthy of of publication, but the English is poor and the detail is difficult to follow in places. It should have been reviewed further, perhaps by a natural English speaker involved in this type of work, before submission to HESS, rather than as part of the formal external peer review process. I have some sympathy for authors writing in a second language, and I don't want to discourage completion of this paper. I therefore make only main technical points below, and not the detailed line-by-line points that I would usually make in peer review assignments.

This paper presents an assessment of the joint probability of rainfall (and its drainage through a city river system) and tidal level (in the river into which the drained water discharges). It is a potentially interesting case study but the paper needs more work before publication. Primarily, the English needs to be improved, and the flood risk assessment, that is probability of occurrence multiplied by consequence, needs to be completed.

The paper is in good second-language English (and I could not attempt any second-language writing myself). However, for an English-language technical journal, the English is not good enough. The paper is largely intelligible, but in places the authors' intended meanings are unclear. I started marking up proof-reading edits, but stopped after a page or so when they were coming at a rate of about one per three lines of text.

The paper purports to focus on "flood risk", which is normally understood to be a function of both probability of occurrence and consequence of occurrence. There are frequent references to "severity", "flood risk", "combined risk" etc. The probability of occurrence is addressed in the paper, but consequence is poorly represented, with, I think, no attempt to combine the two into a single risk function. Consequence is expressed only in terms of a poorly defined percentage, with no context as to what percentage is significant, although the consequence of Typhoon Longwang is described.

The wording of the top six lines of Page 7477 implies that previous researchers have failed to "tackle the problem properly", although I doubt if that is the authors' intended meaning. The authors suggest that the focus should be on "the threshold conditions for flood", although this would not be true for most flood risk studies, for example where threshold flooding may have no consequence. The low-lying parts of the grounds in which my office stands flood about one winter in three, sometimes to a metre or so of water depth, but there is no significant consequence and hence no significant flood risk.

The first paragraph of Section 2 states that "typhoons land directly throughout the city

HESSD

9, C2508–C2511, 2012

twice a year on average". This high frequency would be highly improbable if typhoons were defined the same way as hurricanes or tropical cyclones are defined in some other countries. If this statement is retained, it should be accompanied by the definition of a typhoon, including the nearness criterion applied to the distance between the centre of a typhoon and the centre of Fuzhou.

Context for "Luo Zero Vertical Datum of China" in Section 3 would be helpful, for example that it represents mean sea level; plus some reference levels for the range of levels that can occur in the river.

Reference the first paragraphs of Sections 3.3 and 4.3.3. It is unclear whether the tidal levels used in the analysis are taken coincident in time with the annual maximum rainfall, or whether they are themselves high and extreme values. For example, the first line of Section 4.3.3 refers to "annual maximum flood tidal level" but this may refer to something different to the "annual maximum daily rainfall AND ITS CORRESPONDING TIDAL LEVEL" in Section 3.3. If the values of the two variables are taken coincident in time, then presumably the majority of river level values would be just normal average river levels, and not suitable values from which to estimate extreme river levels. If they are, for example, the highest river levels within one day or one month of the annual maximum rainfall, or just in the same year, then these value-pairs may provide a poor representation of "joint" extremes. The imprecise wording suggests different definitions in different places so I can't tell whether the definition used is appropriate. It is possible that high and extreme values of both variables occur only during typhoon conditions, and if so this point should be made somewhere in the paper, perhaps with a note that the method is unsuitable for use in non-typhoon conditions.

Section 4.3.3, Lines 18-20. As written, this statement is illogical, implying that the imposition of an additional condition increases the probability of occurrence; analogous to saying, incorrectly, that the probability of drawing specifically an ace and a king in two cards is higher than the probability of drawing specifically an ace in one card. The authors' intended point is unclear.

HESSD

9, C2508–C2511, 2012

If a flood risk conclusion is added, it may be interesting also to demonstrate how it would be altered under a future climate change scenario.

Table 2. Maybe these variables are defined somewhere in the paper, but it would be helpful to summarise their meanings on the same page as the table. And again, the Z value, I think representing river level, is meaningless without a datum and some typical river levels for context.

Would it be helpful, for context, to include Typhoon Longwang in some or all of Figures 8-10?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 7475, 2012.