1. [This manuscript describes mathematical research. The application is to a classical hydrological problem but the results are about comparing (theoretical) calculated quantities.]

Response: Many thanks for your insight comments. This manuscript developed a new method to partition the climate and catchment effects on runoff. I think that it is quite reasonable to compare the method with the existing ones.

2. [In more detail, the formulation of the problem addressed in described in detail on pages 2-3 (lines 77-89). The basic idea is that the standard first order expansion for a total differential does not adequately consider the order of the differentiation. A new proposal is made that enables the first order expansion to be used. In short I did not understand the proposed formulation of the problem.]

Response: Yes. Many previous studies have used the first order approximation to evaluate the hydrologic response to climate and catchment conditions, so that they are not mathematically precise. Please see Yang et al (2014) for details.

3. [To my mind this is classical calculus and it may be better to get a professional mathematician to evaluate the work. My own evaluation is that I could not see the underlying point of the formulation. On my understanding (and remembering that I am not a professional mathematician) we use a first order expansion to get the total differential, and each of the individual differentials are considered to be infinitesimal in which it does not matter about the order. If we want more detail then we make a second order expansion, e.g., using the example from the text, i.e., R=f(x, y), we have for the relevant second order term a differential like; $\partial 2R/(\partial x\ \partial y)$ to more fully account for the missing part. Such rigour is rarely used in Hydrological (or science) practice since we usually have finite differences (rather than differentials) and the necessary accuracy is usually only 10% or so.]

Response: Yang et al (2014) have shown that the first order expansion has caused an error of the climate impact on runoff ranging from 0 to 20 mm (or -118 to 174%) over China. Although the error is probably trivial sometimes, anyway, a precise method is always desirable.

Reference

Yang, H., D. Yang, and Q. Hu: An error analysis of the Budyko hypothesis for assessing the contribution of climate change to runoff. Water Resources Research, 50, 9620–9629, 2014.