This is an interesting work to unify the SCS-CN and VIC type model. I have to acknowledge that I didn't check each equation in the manuscript, and assume that they are all correctly presented. I have some concerns the author could consider to address:

1. The motivation of the work is not clear to me. In my opinion, a scientific gap should be filled by a new published work. The author presented a lot of work on equation derivation, but the scientific gap in the current community filled by this work is not clear to me. The author may consider to rephrase the introduction section and make his motivation more visible.
2. Line 65: "The objective of this paper is to unify..''. Why should we unify SCS-CN and VIC type model? What are the individual drawbacks of SCS-CN and VIC type model for the application of hydrological modeling? Line 53:"Bartleet et al [2016b] unified …". What is the new contribution of this paper to Bartleet et al [2016b]?
3. I would suggest to reduce the number of equation in the text to make it more readable. The author could consider to remove or move some of the equations to the Appendix, such as euqs. 8, 11, 21, 25, 29 and 30, and some other equations. Listing some of the equations in several tables could be another alternative.
4. A Table to summarize the parameters and boundary conditions of the SCS-CN, VIC-type and the unified methods should be provided.
5. Line 231: "The probability density function… is represented by:". Is this function created by the author? Could you please provide some references to proof its assumptions?
6. Line 383: From my taste, the mentioned future works should be done in this paper. Practice application in case studies should be added to clarify the benefits of the new proposed method. It is really difficult to judge the scientific contribution of this work based on the list of 42 equations.

In general, I think this work presents an interesting attempt to compare different calculation methods of direct surface runoff in the community of hydrological modeling. I would suggest the author to reduce the number of equation in the text to increase its readability. Moreover, some case studies should be provided to compare the performance of various methods and therefore to proof the benefits of the proposed new method.