Review of the revised manuscript entitled: “On the quasi-steady vorticity balance in the mature stage of hurricane Irma (2017)”, by Jasper de Jong and coauthors, submitted to *EGUSphere for Discussion*

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I am sorry to have to say that I struggled to see the point of this paper and I wonder to what readership it is aimed? In the Abstract, the authors say that “The impermeability theorem for potential vorticity substance, PVS, on isentropic surfaces provides a way to analyze the absolute vorticity structure and tendency in TCs.” While this statement is uncontroversial, the question remains, what do we expect to learn from such an analysis that adds to our understanding of tropical cyclone behaviour. Put another way, what aspects of tropical cyclone behaviour do we not understand, where such an analysis can contribute to further our understanding? Reading on in the abstract, the main take-home message appears to be that “The model results agree with this theorem”, referring to the impermeability theorem. In what way is this a big deal? After all, the theorem is now on par with an axiom and is always true. Its validity is incontrovertible as in `divergence of the curl of a vector field is always zero'. The proof was presented in Haynes and McIntyre 1987 J. Atmos. Sci and we would be suspicious of any study that did not adhere to the PV flux conservation law anywhere in the earth's atmosphere or oceans!

Starting at line 19 on page 1, the authors state: “This study aims to contribute to our understanding of TC intensity by analyzing the budget of vorticity in the mature, quasi-steady stage of hurricane Irma (2017).” Nowhere in the paper did I find an answer to the way in which the paper “contributes to our understanding”. This understanding should be stated clearly in the text and summarized in the conclusions.

At line 39 we are told: “Additional vorticity flux components are responsible for maintaining a steady-state vortex.” However, the existence of a global steady state is controversial. For example, what maintains the convection to achieve a steady state and where does the angular momentum come from to supply that lost by surface friction?

After reading the Abstract and Introduction, I read the Conclusions, where we are told that “The strong agreement between the vorticity flux components indicates its ability to help understand mechanisms driving TC intensity.” How does a study of a "steady-state" hurricane indicate its ability "to help understand mechanisms driving TC intensity change". This seems non-sequitur! Moreover, how one can expect to “understand mechanisms driving TC intensity”, without an analysis of the role of deep convection, which must be a major component in understanding tropical cyclone behaviour. My conclusion is that this paper needs some major rethinking.