Comment:

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I congratulate the authors for the innovative tropical storm transposition using the numerical weather model. I have been skeptical about the numerical model based PMP estimation for tropical storm regions. Although this methodology may be difficult to ensure maximizing precipitation in a target watershed, these numerical experiments are scientifically very interesting as well as potentially useful in practice. Therefore, I believe this manuscript should be accepted for publication in the HESS. I have a few minor optional questions on this work:

1. Is there any risk of numerical instability due to the storm transposition?

2. What state variables did you modified? It may be worth to list up the state variables in the WRF simulations in this article.

3. When the atmospheric state variables is interpolated, is there any note on the topography effect?

Response:

Thank you for your positive feedback. Regarding your questions:

1. Is there any risk of numerical instability due to the storm transposition?

The emergence of numerical instability due to the manipulation of the input data is a valid concern. In our case however, we did not observe any numerical instability due to the storm transposition. Indeed, we have endeavored to develop a transposition scheme which perturbs the initial conditions as little as possible. The storm is first separated from its background field and only this “perturbation” is transposed. Moreover, we insisted that the transposition exercise should ideally be performed when the tropical cyclone moves over the ocean, far from land, and before it starts its extratropical transition. Under these conditions the vortex is usually relatively small and seems to be advected by the large scale flow. Finally, although there is technically no limits regarding how far the tropical cyclone can be transposed from its initial location, we believe that this transposition exercise should remain a perturbation exercise: the nonlinearity in the system is taken advantage of so that a small perturbation of the initial location of the vortex brings sufficient changes to its track, enabling the storm to overlap the

target area. Numerical instabilities can certainly occur if the amount of shift is too large and if the tropical cyclone is implanted at a location where it has no legitimacy to be, which is the case for example if it is transposed from a location over the ocean to a location over land.

2. What state variables did you modified? It may be worth to list up the state variables in the WRF simulations in this article.

The state variables that were modified are:

1) Surface variables: skin temperature, temperature at 2 meters, relative humidity at 2 meters, wind speed at 10 meters, surface pressure, pressure at mean sea level;

2) Pressure level variables: temperature, wind speed, relative humidity, geopotential height.

Thank you for your suggestion: we will list up the state variables in the WRF simulations in the article.

3. When the atmospheric state variables is interpolated, is there any note on the topography effect?

State variables are interpolated over the ocean, so that topographic effects are usually negligible. However, some state variables such as the surface wind speed and the surface relative humidity are very sensitive to the transition from sea to land, which might raise some complications if the initial vortex is located near an island, as it was the case for Hurricane Isaac (see Figure 10c). In such a case, the background fields were interpolated only over the ocean, so that the perturbation fields did not carry with them unrealistic values. We note that this work is only a preliminary work to show that it is possible to estimate the probable maximum precipitation over a river basin subject to the effect of tropical cyclones in the eastern U.S. using a physically based approach.