Referee #1

The authors introduced a new model that can significantly improve the prediction of monsoon, which is key to local agriculture, economy, and disaster preparedness. The prediction ability of this new model is encouraging. I think the manuscript is clearly written although some loose ends need to be addressed. Specifically, I found that the overall quality of the figures varies a lot. High-quality figures are important to convey key results. I think a major revision is needed to address this. Then it could be published at GMD. Please see my detailed comments below.

Reply: We thank the reviewer for the constructive comments and suggestions. The figures have been added with high-quality and addressed all the reviewer comments below...

1. Figure 1c, the legend needs to be fixed (solid lines vs. dash lines)

   Reply: We thank the reviewer for the suggestion. The below figure shows the legend modification with the same single y-axis scale.

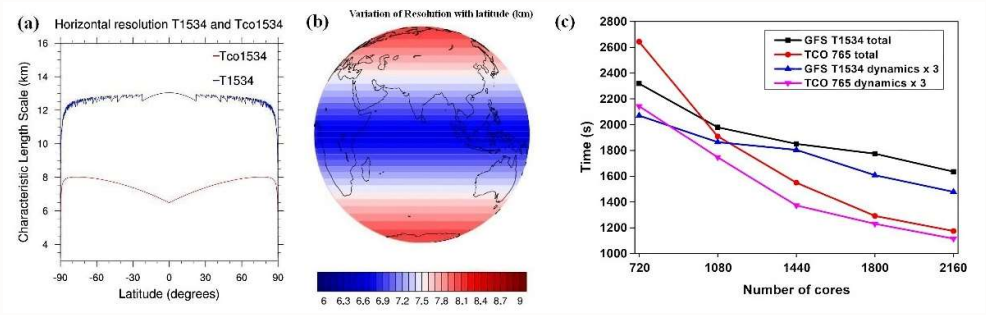

   FIGURE R1: Variation of grid length with latitude in GFS (blue) and Tco (red) (a), depiction of grid resolution over the globe in Tco grid (b), total and dynamics time taken for different number of cores (c). Time taken by GFS and HGFM for one day forecast (Left vertical axis is total time taken and model dynamics time multiplied by 3).

2. Also figure 1c, it is inconvenient to compare the ratio of dynamics time to total time. Perhaps only using one single y-axis?

   Reply: In Figure R1, single Y-axis is used to compare the total and dynamics time (multiplied by 3).

3. Why only considering 200 hPa kinetic energy? How about other vertical levels?

   Reply: Thank you for the valuable comment. As maximum kinetic energy and potential to kinetic energy conversion occurs in the upper troposphere, we display kinetic energy spectra at the 200 hPa level.

4. Figure 3: It would be better to add the model names to each panel. I am confused by lines 188-189. To me, HGFM and GFS look more similar to each other while ERA5 look quite different, especially over the gulf of Mexico and northwestern Pacific. I am suggesting plotting the difference for better comparisons among the three outputs.

Reply: Thank you for the suggestion. The Difference of dCAPE between ERA-5 and models is presented for day-1 & day-3 lead time forecasts. The dCAPE differences quantified from ERA-5 with GFS T1534 were –49.0570 (J/kg/day) and –47.3799 (J/kg/day) for day-1 and day-3 lead times respectively, similarly with HGFM –49.1278 (J/kg/day) and –43.7668 (J/kg/day) for day-1 and day-3 lead times respectively, the quantified values will be included in the manuscript.

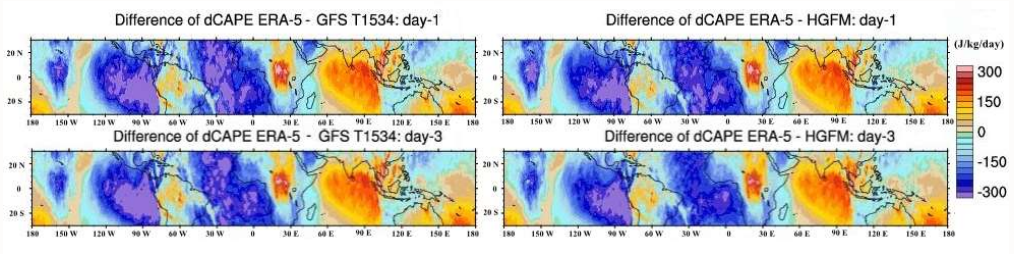

FIGURE R3: The difference of dCAPE from ERA-5 and GFS T1534 for day-1 and day-3 (left panels), and from ERA-5 and HGFM for day-1 and day-3 (right panels).

5. Figure 4 and line 194 to 203: there are some discussions about the biases over the tropical ocean. I am wondering if there are any specific reasons why both models overestimate the precipitation over the tropical eastern Pacific? Is it due to the shallow convection scheme?

   Reply: Most of the CMIP5 models overestimate precipitation over the tropical eastern pacific. Precipitation biases over tropical oceans are largely dependent on model physics, i.e. convection and cloud radiation interaction, and show little dependence to model resolution.

6. Figure 5&6: is it cm/day or mm/day?

   Reply: Thank you for the suggestion. It is cm/day and modified in the revised version.

7. Figure 7: improve the quality of this figure (mixed font sizes, panel sizes, etc.).

   Reply: Thank you for the suggestion. It is corrected and modified.

8. Why convective precipitation is reduced from GFS to HGFM? Due to Tuning?

   Reply: Higher resolution possibly helps better resolving the topography etc. and resolves mesoscale convection which is manifested through improved large scale precipitation (Fig. 7d) and reduced sub-grid scale precipitation (Fig. 7c). The convection in this model uses the scale aware scheme of Han et al. (2017) where the scheme adjusts the proportion of sub-grid scale convection and grid-scale which appears to be more effective in HGFM (being a variable grid model) than the Gaussian linear GFS T1534.

9. What is the point of figure 13?

Reply: This figure is added to provide the official track provided by India Meteorological Department.