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Interactive comment on “A numerical study of the early stages of a tropical cyclogenesis in relation to the MJO” by J. Guerbette et al.

J. Guerbette et al.

matthieu.plu@meteo.fr

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We thank Reviewer #1 for his comments on our manuscript. We consider that our study is self-consistent and that it presents an analysis that may be complemented by further analyses and figures. We will be happy to submit a revised version. We indeed have some further diagnoses available from the Meso-NH simulation (humidity and other thermodynamic fields, simulated IR brightness temperatures, see figure 1 enclosed) and observations (Meteosat-7 geostationary infrared images, see figure 2 enclosed) that may be used to complement our study and support our results, in the revised version of the manuscript. You may find enclosed some observed and simulated IR images.

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Answers to major comments: 1. The article follows a line-of-thoughts which is: - presentation of the case study, - description of the MCS in relation to its environment, - energetics budget. We think that it is a logical organization, which facilitates readability through a progressive introduction of methods and results. However, the suggestion of the reviewer to clearly separate the methodology and the results is another way to organize the article, that we may apply to the revised version of the manuscript.

2. Best Track data and reanalyses do not fit the purpose of our study. Best Track data are not available before the 3rd of December. We consider indeed the very early stages of the cyclogenesis. Simulating a MCS such as the one the study focusses on requires meso-scale modelling. The most refined reanalysis datasource that we have access to is ERA-Interim data from ECMWF, which has 80 km resolution. This is the main reason why reanalysis data would not be adequate for this study.

3. We do not believe it is necessary to extend the domain to the West. The analysis of the MCS dynamics and energetics may start on the 23rd of November (see Figure 3 of the manuscript for instance), after the MCS has reached sufficient intensity and has moved towards the centre of the domain. From the 23rd of November, the MCS is as far as 5° (> 6 gridpoints) away from the western frontier of the domain. Past experience with Meso-NH suggests that the domain frontiers are sufficient to simulate the MCS dynamics.

Answers to minor comments: 1. This information is based on an article from 1993, and may need to be updated by most recent climatologies indeed. We may correct this information in the article as suggested by the reviewer.

2. We may clarify this accordingly.

3. The satellite images from METEOSAT-7 (EUMETSAT) distributed by climserv.ipsl.polytechnique.fr for the DYNAMO campaign are enclosed. Although convective activity is obvious, the images are not helpful to identify isolated MCS or vortices.

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4. The tropical depression is tracked by RSMC La Réunion from the 3rd of December. Our study focusses on the early stages of the cyclogenesis (before 30th Nov), before the cyclone is tracked by RSMC.

5. This convective burst may clearly be seen on the IR images simulated by Meso-NH (see on figure 3 enclosed, and the low brightness IR temperatures around the point 75°E-5°S). This phase of intensification may be further analysed using the outputs (thermodynamical fields) of the Meso-NH simulation.

6. For the instants when the Meso-NH output are not available (before 20 Nov and after 30 Nov), the operational ECMWF IFS operational analyses are used. These global fields are the ones that are used as boundary conditions of Meso-NH. We may clarify the methodology in the article.

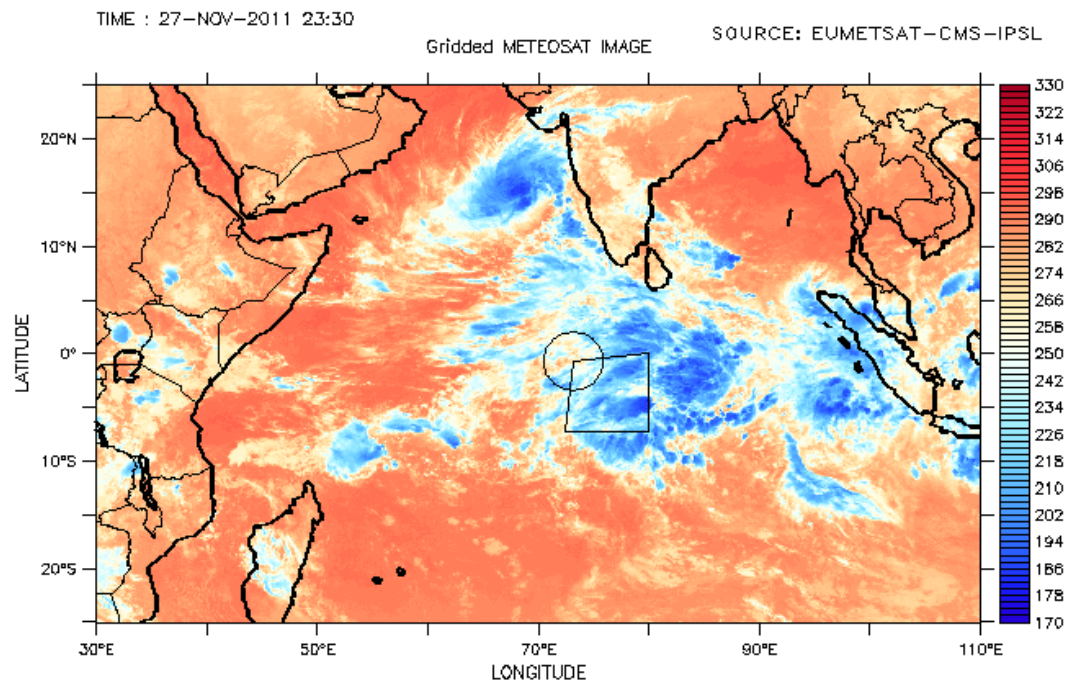
Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 3, 4919, 2015.

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METEOSAT_7 Infrared (IR) Brightness Temperature (K)

Fig. 1.

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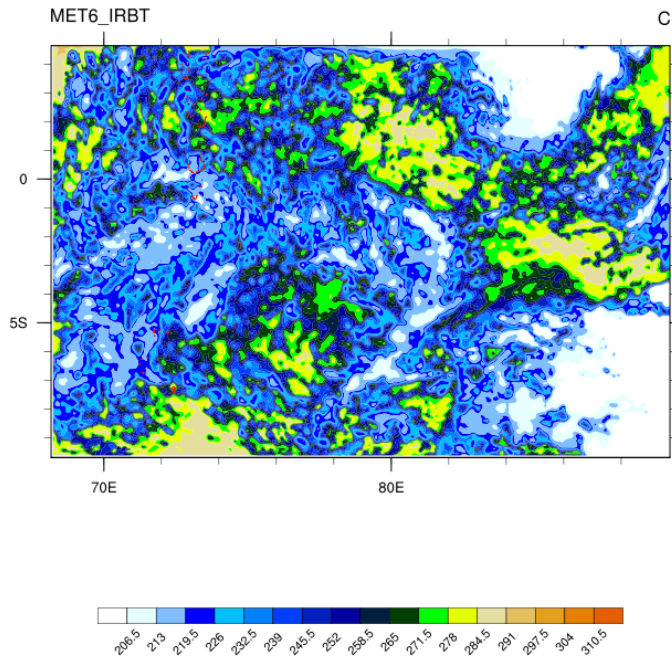


Fig. 2.

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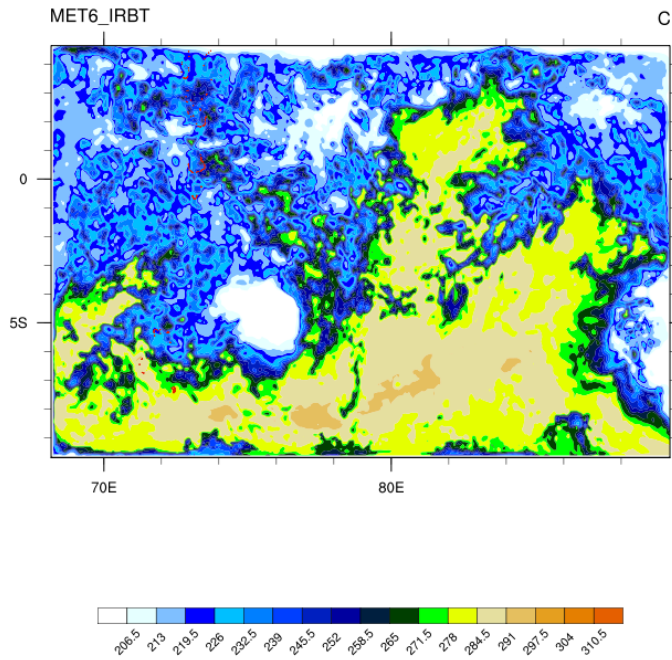


Fig. 3.

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