Response to the Editor

September 27, 2017

Dear Editor,

Following the reviewers' suggestions, we worked on improving the quality, the readability, and the scope of our paper in the new version of the manuscript. The manuscript was modified in consequence as explained in the two responses to the reviewers. The main modifications are made in bold characters.

As you suggested in your last report, we added a paragraph (lines 20-25, page 3) to clarify the question of the torque sensitivity to the resolution of the orography grid raised by reviewer #1, thereby explaining why we used the ERA orography grid, and taking advantage of a recently published paper on the topic. We reproduce here this additional paragraph:

For computation of the mountain torque, we used the model orography at its native $2^\circ \times 2^\circ$ *resolution, thereby ensuring consistency between the wind, pressure, and zonal momentum flux data sets and the derived AAM and torque quantities. A recent study by van Niekerk et al. (2016) found that resolved mountain torques in the Met Office United Model with free atmospheric wind and temperature relaxed to ERA-Interim reanalyses are relatively insensitive to increasing model resolution (see, e.g., their Fig. 7), although they are more strongly impacted by large-scale (synoptic) processes than are the parameterized sub-grid scale torques (not considered in our study).*

With the last revision round, we proposed to add a supplemental material file with a figure (referred to as Fig. S1). That figure was a time-longitude (Hovmoeller) plot of the zonal friction drag anomaly in the Eastern Pacific during the last event. We actually replaced Fig. S1 by a time-latitude plot of the same quantity over the same span that we found showing more explicitely the time and space locations of the friction 'bursts'. The corresponding documenting paragraph in the text is as reproduced below:

A Hovmoeller (time-latitude) plot of the Eastern Pacific frictional drag contributing to the 2015-16 LOD maximum (Fig. S1) highlights its three-belt structure, and shows the EE Pacific contribution (spanning 15°N-15°S) to arise from two areas: one in the southern hemisphere originating from inflow to the westward-displaced boreal winter Hadley circulation, and one in the northern hemisphere originating from enhanced easterly flow on the

equatorward flank of the NE Pacific high pressure area (similar to the Nov-Dec 2015 pressure anomalies seen in Fig. 3e).

Best regards,

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