



## ***Interactive comment on “Nonlinear feedback in a six-dimensional Lorenz Model: impact of an additional heating term” by B.-W. Shen***

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I would like to thank the reviewers and Editor for their valuable comments. One of the major concerns raised by both reviewers is how new modes were selected to derive the 6DLM. Here, I would like to emphasize (1) that based on the analysis of the Jacobian term,  $J(\psi, \theta)$ , new modes are selected to extend the nonlinear feedback loop that can provide additional nonlinear feedback to stabilize or destabilize solutions; and (2) that our approach, using incremental changes in the number of Fourier modes, is to help trace their individual and/or collective impact on the solution stability as well as the extension of the nonlinear feedback loop. To facilitate discussions, we have (a) created two tables which list the Fourier models used to construct different higher-order Lorenz models and the corresponding critical values of the normalized

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Rayleigh parameter for the onset of chaos; and (b) finished supplemental materials with a brief summary on the mathematical analysis of the nonlinear feedback loop in the 3DLM and its extension in the 5DLM and 6DLM. The tables are included in the end of this response file. In the following, specific responses are discussed in a pdf file which also contains the supplemental materials.

Please also note the supplement to this comment:

<http://www.nonlin-processes-geophys-discuss.net/2/C464/2015/npgd-2-C464-2015-supplement.pdf>

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