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Nonlinear Processes in Geophysics
Discussions
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Interactive comment on "Diagnosing non-Gaussianity of forecast and analysis errors in a convective scale model" *by* R. Legrand et al.

Anonymous Referee #1

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General comments: This manuscript is addressing the non-Gaussian error assumptions typically used in data assimilation. In particular, the authors evaluate the departure from Gaussianity by calculating the K2 statistics from D'Agostino test. The results performed using a 90-member ensemble of Meteo-France operational regional model indicate a stronger non-Gaussian behavior of specific humidity, as well as of the control variables divergence and vorticity, which may have some implications on the choice of data assimilation control variables. The manuscript is well written and documented. The paper is an important contribution to data assimilation and the related issue of non-Gaussian errors. I recommend the submission subject to minor corrections (comments included below).

Specific comments: (1) p.1072, L.5-9: what is the implication of small K2 in the re-

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gions of large ensemble forecast variance? Could you elaborate in more detail? (2) p.1075 (section 4.2.1): Could you further elaborate on vorticity and divergence control variables and the possible reasons for their non-Gaussian behavior. Is it possible that this is related to their definition as second derivatives of stream function and velocity potential, both commonly used as Gaussian? Would this suggest it may be better to use stream function and velocity potential as control variables in order to stay within the Gaussian framework?

Technical corrections: (3) p.1063, L.13: Delete "Of course", start sentence with "In general . . .". Substitute "will lead" by "could lead", unless there is a reference stating that. In that case include the reference. (4) Figs.3, 6, 8, 9, and 10: It is difficult to distinguish between the dotted and dashed lines. Would it be possible to recreate this figure with more distinct lines? Also, please include in the figure caption the description of lines (e.g., dashed, dotted, full, . . .)

Interactive comment on Nonlin. Processes Geophys. Discuss., 2, 1061, 2015.