Nonlinear Processes
in Geophysics

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Discussions

Interactive comment on "Analytic Solutions for Long's Equation and its Generalization" *by* Mayer Humi

Anonymous Referee #1

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This paper is one of a series by this author on various forms of "Long's equation". Longs equation is a linear form of equation for steady density-stratified flow over an obstacle, and depends on a particular form of upstream flow, generally uniform with height, or approximately so. The solutions of it are limited to obstacles of sufficiently small height because, if the obstacle is tall enough, experiments show that it generates upstream-propagating disturbances of a columnar nature that effectively alter the upstream velocity and density profiles. The author's publications on this topic do not seem to address this issue and the resulting limitations on applicability of his solutions, though in section 2.3 of this paper it appears that a variety of upstream conditions can be chosen (2.44).

The author does introduce a variety of factors into his equations (here, additional "tem-

perature" variations), and the solutions shown in Figures 1 and 2 look quite realistic, but the analysis appears to be effectively a form of steady-state linear analysis. The main virtue of this paper is that the author gives analytic expressions for the solutions, for uniform upstream flow in section 3.2, and for uniformly sheared upstream flow in section 4 (though there are no figures for the latter).

Interactive comment on Nonlin. Processes Geophys. Discuss., https://doi.org/10.5194/npg-2017-32, 2017.