A Reduced Model of ExB and PV Staircase Formation and Dynamics[1] P.H. DIAMOND, M.A. MALKOV, A. ASHOURVAN, University of California, San Diego, D.W. HUGHES, University of Leeds — Staircases are patterns consisting of narrow, quasi-periodic corrugations interspersed by regions of partially flattened gradients or steps. Staircases are secondary pattern structures, produced by generalized "negative diffusivity" mechanisms, which trigger first order transitions. We develop a simple reduced model for PV gradient driven staircases, which evolves mean field and potential enstrophy density. Two different approaches yield the same model structure. The model conserves enstrophy, explicitly. Numerical solutions show the appearance of staircases, followed by multiple time scale step coalescence and competition dynamics. An interesting feature is that turbulence spreading is sufficient to maintain the step width. Further results and extensions will be discussed.

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