Maintenance, internal variability, and dynamical regimes of an idealized global atmospheric circulation

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This talk will discuss the different dynamical regimes of an idealized global atmospheric circulation which arises from a three-way interaction between a simplified Hadley cell, midlatitude zonal jet streams and barocliniczlly unstable Rossby waves (eddies). Using the most idealized global circulation model which resolves these components, we obtain a range of dynamical circulation regimes, as the relative strength of the eddies is varied, with a subtropical jet regime corresponding to weak eddies, and an eddy-driven jet corresponding to strong eddies, and a merged jet regime corresponding to intermediate-strength eddies. The talk will discuss the distinctions and definitions of the different dynamical regimes based on the jet structure, the eddy spectra, the mechanisms maintaining the equilibrated jet and eddy states, the characteristics of eddy-mean flow feedbacks and the internal variability of each dynamical regime. We will discuss the relevance of different equilibration theories to each of the dynamical regimes, and the variation in the internal variability dominated by barotropic eddy-mean flow feedbacks (Annular Modes) and baroclinic eddy-mean flow feedbacks (Baroclinic Annular Modes). The relevance to the observed circulation will also be discussed.