

# Zonally varying ITCZs in a Matsuno--Gill-type model with an idealized Bjerknes feedback

## Damped Gill Model

The linear model uses simple finite differencing for spatial derivatives and a leap-frog scheme with a Robert-Asselin filter for time integrations. The meridional wind  $v$  is set to zero at the poles; the zonal wind  $u$  and the height  $h$  are meridionally staggered from  $v$ .

The following table provides the set of parameters required to obtain the results presented in the paper, and their corresponding parameters in the text:

Parameter	
D.C	$C_E$
D.Ekman_Flag	A flag for activating the Ekman coupling routine (1 / 0 = Active / Inactive)
D.y0	$y_0$
D.SigY	$\sigma$
D.Ax	$A$
D.gamma	$\gamma$
D.epsilon	$\epsilon$
D.EndTime	Duration of integration in scaled days
D.Nx	Zonal number of grid points
D.Ny	Meridional number of grid points

The model outputs into a subdirectory 'Saved Runs', in which the run output has the name: 'Nx\_[X]\_Ny\_[Y]\_[RunName]'

Where X is equal to D.Nx, Y is equal to D.Ny, and RunName is set by the string parameter 'D.ForcingString', which is set in the function 'InitialConditions'. For example,

'Nx\_200\_Ny\_80\_Walker\_Damped3.mat'

contains the output of a run where D.Nx = 200, D.Ny = 80, and D.ForcingString was set to 'Walker\_Damped3'.

The following table provides the parameter set, determined in the function 'InitialConditions', for each of the presented results:

Parameter	Fig. 8a,d	Fig. 8b,e	Fig. 8c,f	Fig. 9a,d	Fig. 9b,e	Fig. 9c,f	Fig. 10
D.C	0	0	0	0	0	0	0.2
D.Ekman_Flag	0	0	0	0	0	0	1
D.y0	0.2	0.2	0.2	0.2	0.2	0.2	0.2
D.SigY	1	1	1	1	1	1	1 1.5 2
D.Ax	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1 -0.2 -0.3
D.gamma	0	0	0.9	0.9	0.9	0.9	0
D.epsilon	0.1	1	1	1	1	1	1
D.EndTime	100	30	30	100	30	30	30
D.Nx	200	200	200	200	200	200	200
D.Ny	80	80	80	80	80	80	80