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Supporting Information for

Calibration and Uncertainty Quantification of Gravity Wave Parameterization in an Intermediate Complexity Climate Model

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Introduction

The Supporting Information includes Supplementary Figures showing the Quasi-Biennial Oscillation in used to estimate parametric uncertainty in this study and a Supplementary Movie showing the Markov chain Monte Carlo sampler exploring the posterior distribution.

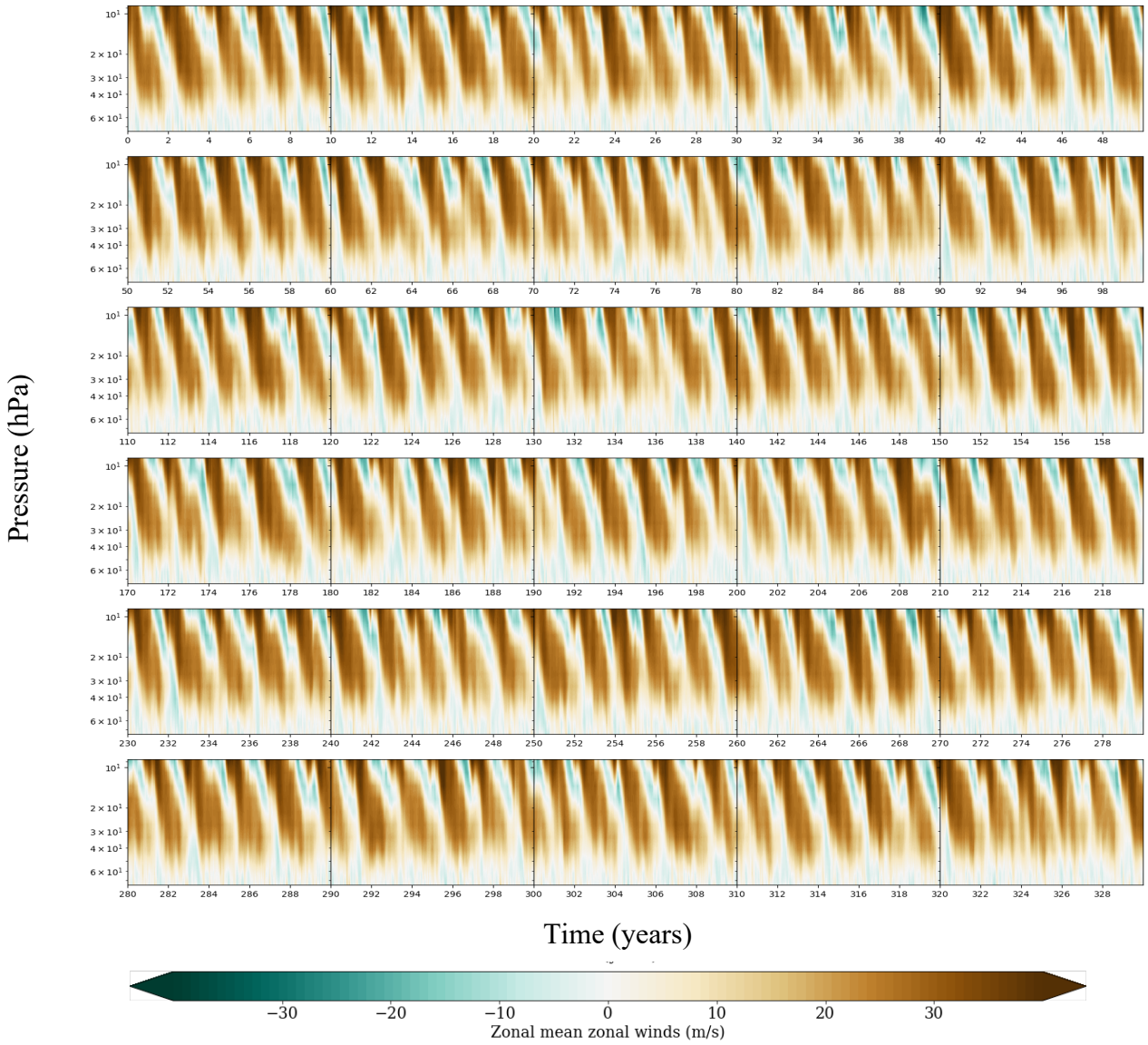

Figure S1. Time-height cross section of zonal mean zonal winds between 5°S and 5°N showing the QBO under a 2xCO_2 forcing for a 300 year simulation, where gravity wave parameters are set to their control values, $c_w = 35$ m/s and $Bt_{eq} = 0.0043$ Pa. The simulation is initialized from a spun-up state.

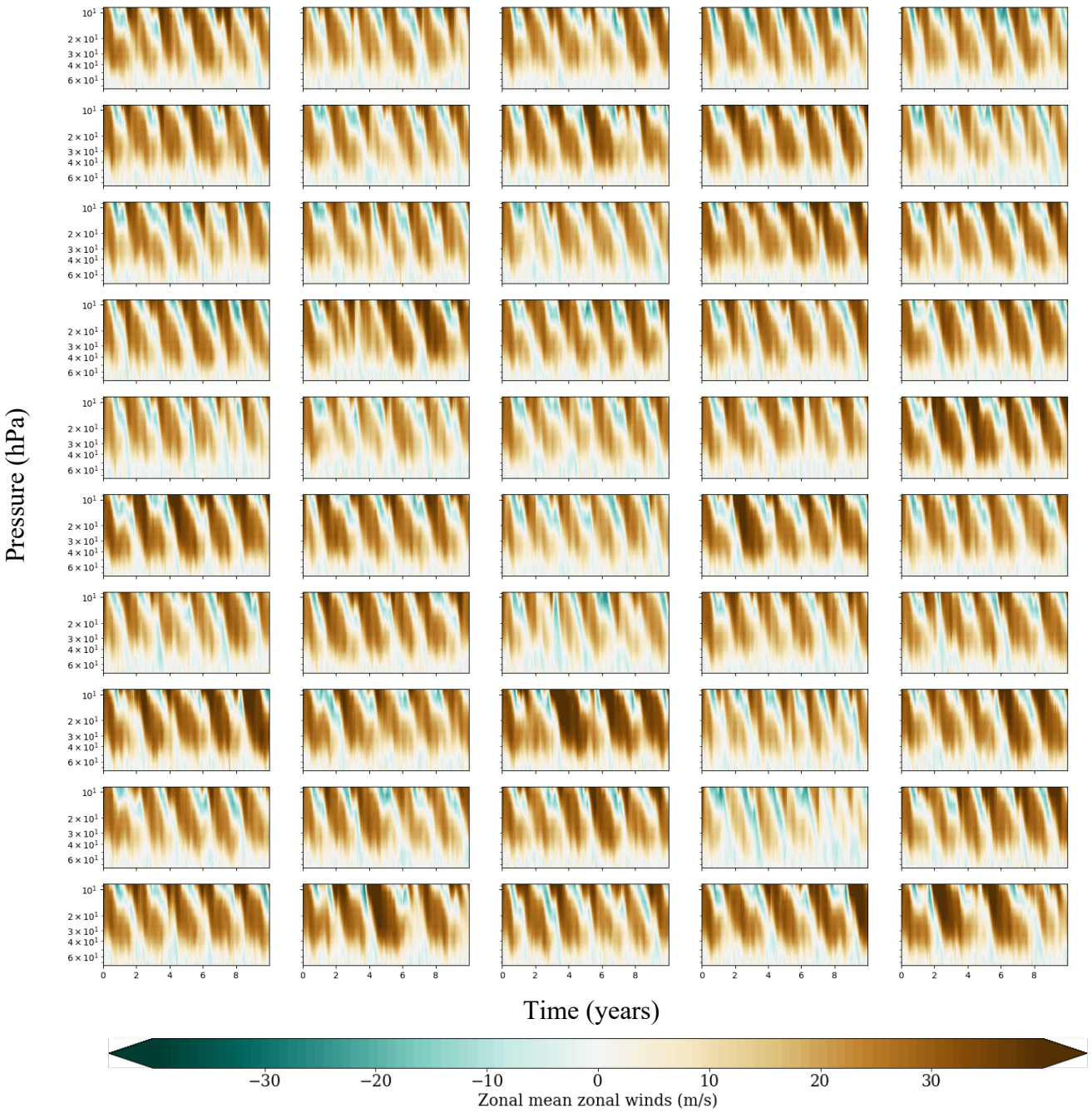

Figure S2. Time-height cross section of zonal mean zonal winds between 5°S and 5°N showing the QBO under a 2xCO_2 forcing for 50 ensemble members, where gravity wave parameters are sampled from the posterior distribution in Figure 6. Each ensemble member is initialized from a spun-up state and run for 10 years. Periods and amplitudes of each cycle within all ensemble members are used to generate Figure 7 of main text and to estimate the parametric uncertainty.

Additional Supporting Information (Files uploaded separately)

mov01.gif

Movie S1. Animation of MCMC samples from posterior distribution overlaid on Gaussian process predictions over parameter range (Figure 4 of main text) for perfect model setting.