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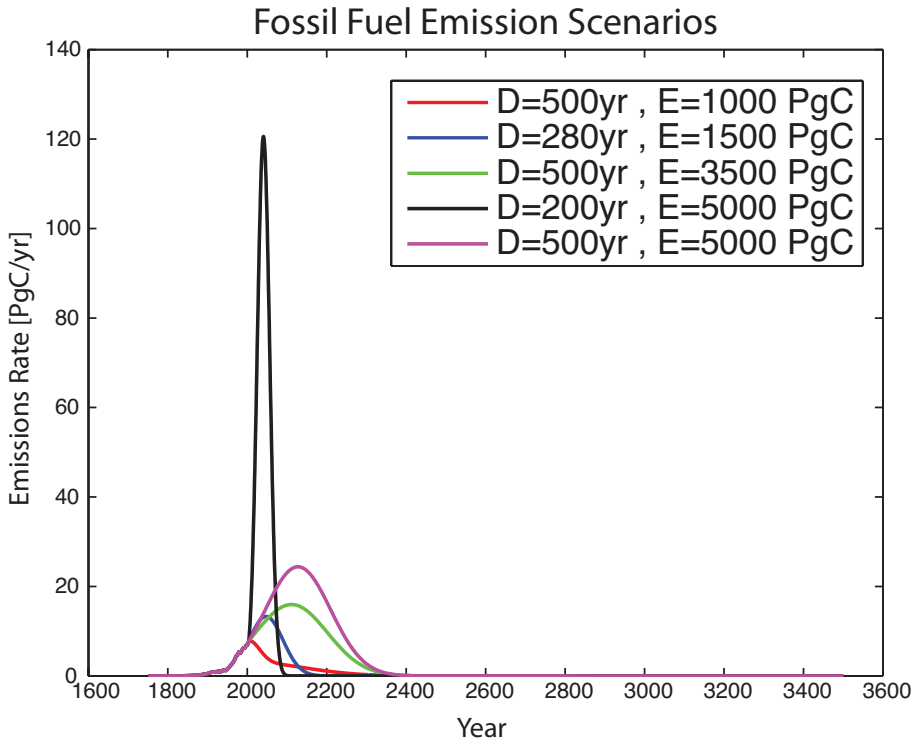
*Supplement of*

## **Scaling laws for perturbations in the ocean–atmosphere system following large CO<sub>2</sub> emissions**

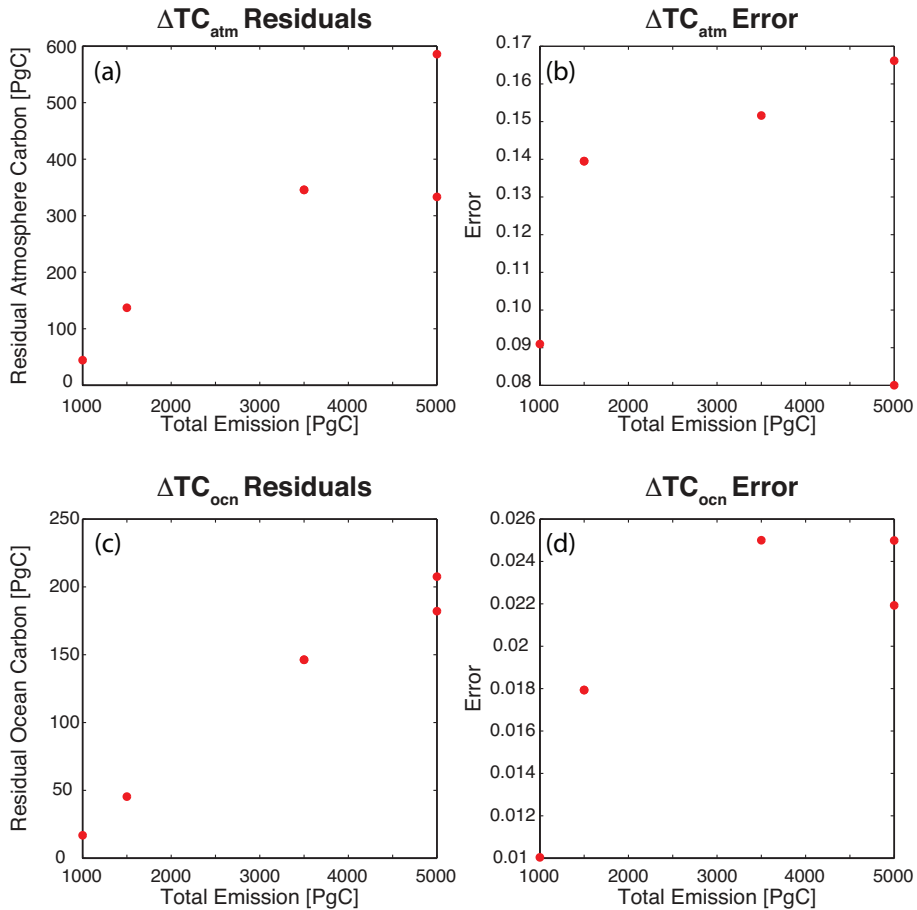
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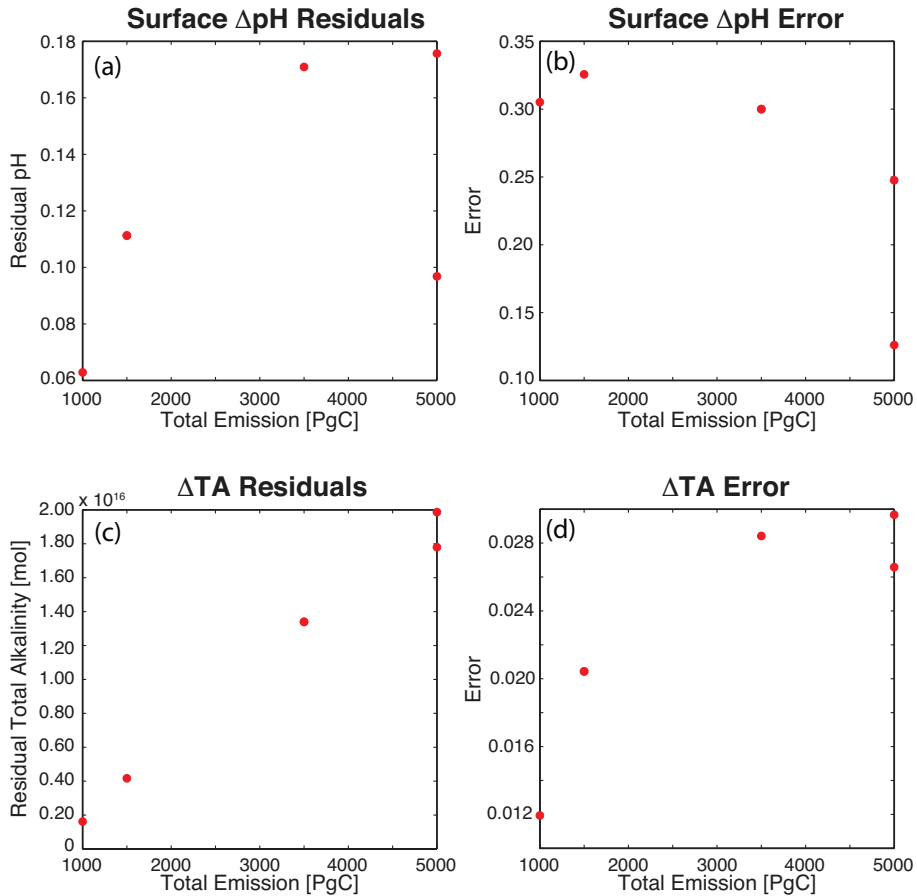
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**Figure 1.** Anthropogenic  $\text{CO}_2$  emission scenarios. For each scenario the perturbation is characterized by duration,  $D$ , and total size of emission,  $E$ . As in Zeebe et al. (2008), these scenarios are based on historic emission data with total emissions of 315 PgC until year 2004 with the projected future emissions being described by a single (or the sum of two ) Gaussian function(s).



**Figure 2.** Comparisons between peak system response and predictions based on modern scaling laws for anthropogenic emission scenarios. **(a,c)** Residuals. **(b,d)** Error.



**Figure 3.** Comparisons between peak system response and predictions based on modern scaling laws for anthropogenic emission scenarios. **(a,c)** Residuals. **(b,d)** Error.