Geoscientific
Model Development
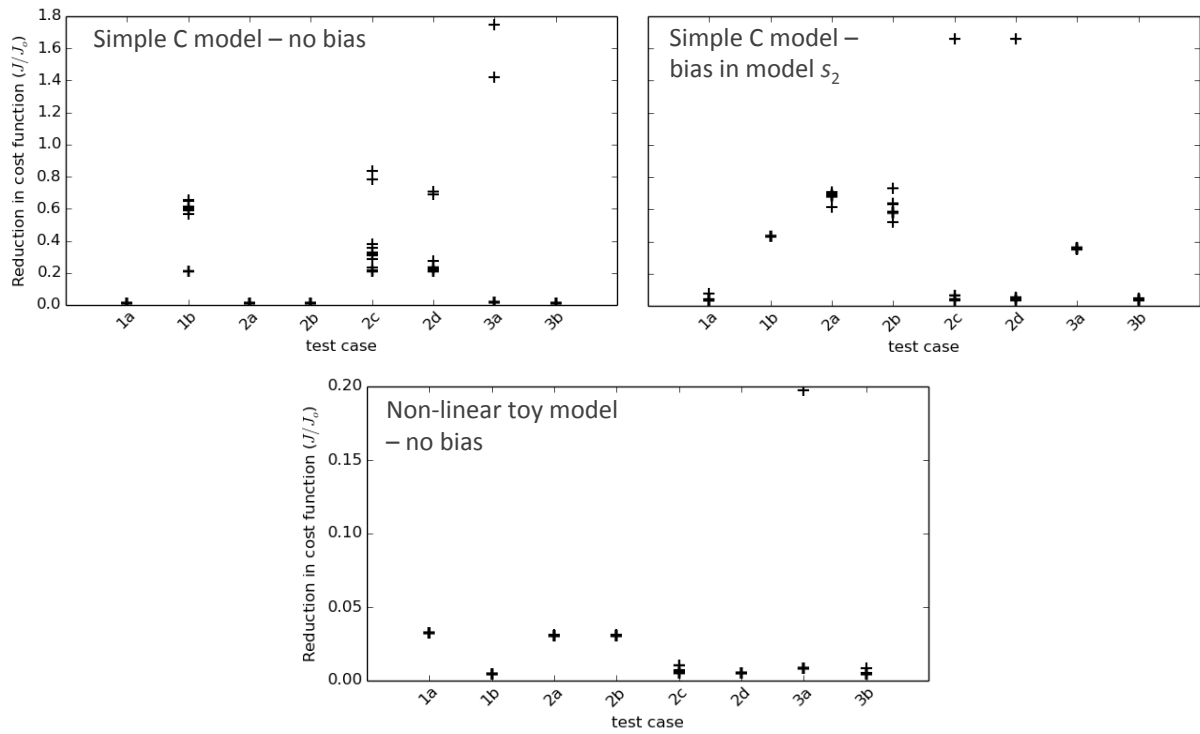
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Supplement of

Consistent assimilation of multiple data streams in a carbon cycle data assimilation system

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1   **Supplementary material**

2

3   Figure S1: Reduction in the cost function (J/J_o) for each model and each test for all 20

4   assimilations with different random "first guess" points in the parameter space (i.e. each cross

5   represents the 20 random "first guess" tests). Top panel – simple C model without bias (left)

6   and with bias added to the simulated s_2 variable (right). Bottom panel – non-linear toy model

7   with no added bias. Note that the majority of the random "first guess" assimilations achieve

8   the same reduction in the cost function even though the final value is different for each test,

9   which is to be expected as each test (for each model) has a different cost function.