

Re-evaluating the 1940s CO₂ plateau

Supplementary Information

Ana Bastos¹, Philippe Ciais¹, Jonathan Barichivich¹, Laurent Bopp¹, Victor Brovkin², Thomas Gasser¹, Shushi Peng³, Julia Pongratz², Nicolas Viovy¹, and Cathy M. Trudinger⁴

¹Laboratoire des Sciences du Climat et de l'Environnement, LSCE/IPSL, CEA-CNRS-UVSQ, Université Paris-Saclay, F-91191 Gif-sur-Yvette, France.

²Max Planck Institute for Meteorology, Bundesstraße 53, 20146 Hamburg, Germany.

³Sino-French Institute for Earth System Science, College of Urban and Environmental Sciences, Peking University, Beijing 100871, China.

⁴CSIRO Oceans and Atmosphere, Aspendale, Victoria, Australia

Correspondence to: Ana Bastos (ana.bastos@lsce.ipsl.fr)

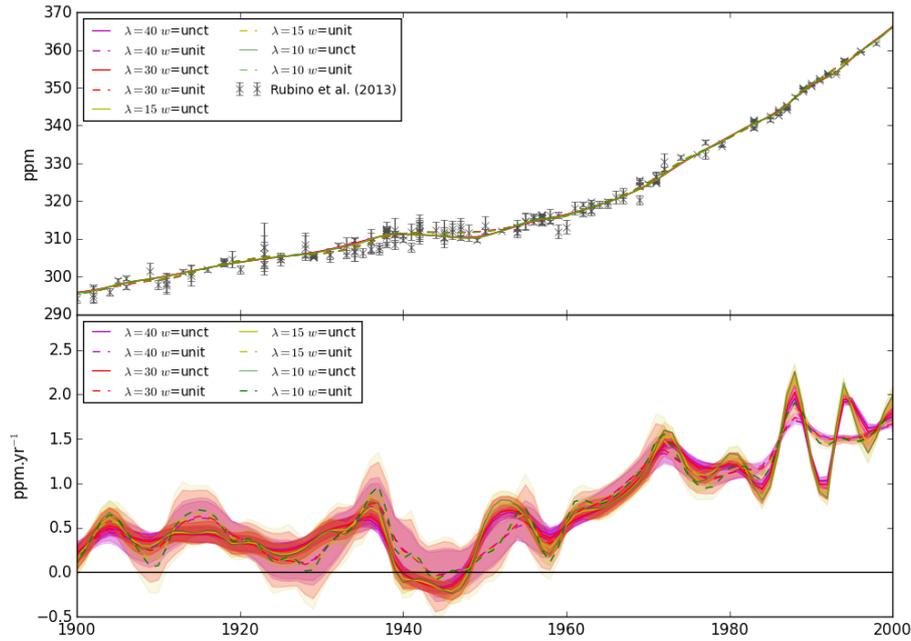


Figure S 1. Sensitivity test of atmospheric CO₂ concentration and AGR to the choice of the parameters of the smoothing-spline fit, as discussed in Enting et al., (2006). In total, eight tests are performed, using four different values for the regularisation parameter λ , which result in different cut-off periods, and for each value of λ two types of weights (w) are used: weights corresponding to the uncertainty values in each point and unit weights. The cut-off period values corresponding to each value of λ are: $\lambda=40$: 24yr; $\lambda=30$: 23yr; $\lambda=15$: 19yr; $\lambda=10$: 17yr.

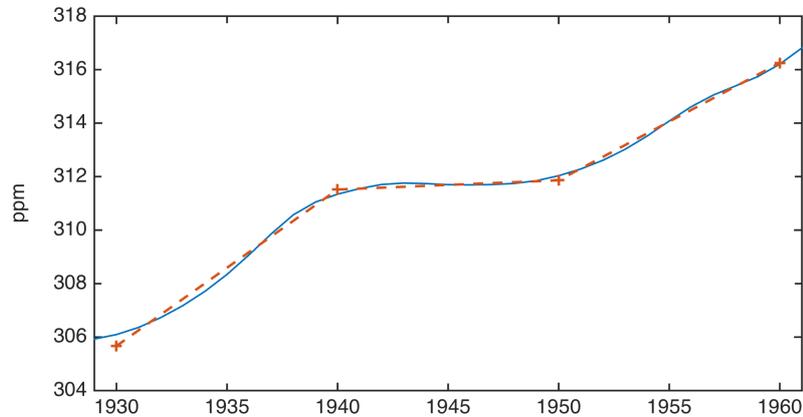


Figure S 2. Piecewise linear regression model fit (orange dashed lines) on the annual values of atmospheric CO₂ between 1930 and 1960 (blue solid line) calculated from the spline-fit shown in Fig. 1. The trend break-points are marked by +, and correspond to the years 1940 and 1950. During this period, atmospheric CO₂ does not present any significant trend.

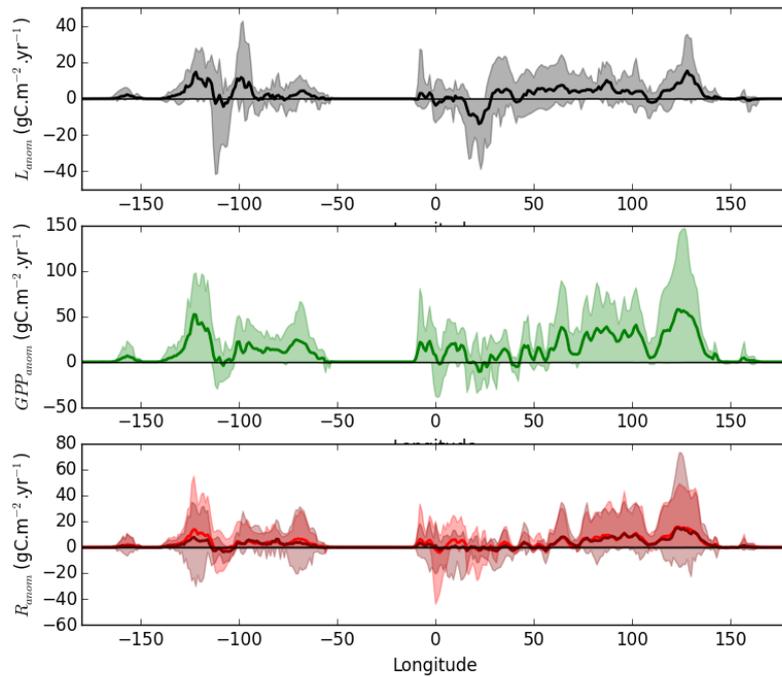


Figure S 3. Longitudinal average of the anomalies in Northern Hemisphere ecosystem fluxes in response to the climate anomalies during the 1940-1942 El Niño shown in Fig. 6: net terrestrial sink, L (black, top); gross primary productivity, GPP (green, centre), autotrophic and heterotrophic respiration (light and dark red respectively, bottom). The lines indicate the inter-model average and the shaded areas the inter-model spread.

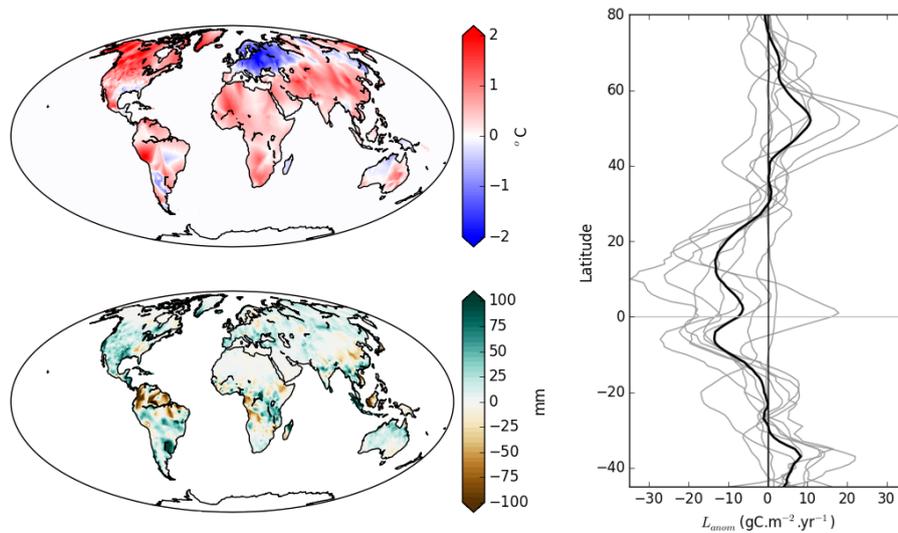


Figure S 4. Response of the terrestrial ecosystems to the climate anomalies during El Niño of 1940-1942, simulated by the DGVMs. Temperature (left top) and precipitation (left bottom) anomaly fields during 1940-42 (relative to 1900-1930), and the corresponding latitudinal anomaly of L_{DGVM} estimated by each model (grey lines) and the multi-model average (right panel).