Earth System
Dynamics

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Supplement of

Global sensitivity analysis of the climate–vegetation system to astronomical forcing: an emulator-based approach

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Abstract

This supplemantary matariel provides additional plots regarding

- **–** The differences between the 500-year average climates simulated with LOVECLIM, starting from the two different sets of initial conditions,

- **–** The variance analysis and spatial distributions of the first three components of the PC decomposition of climate fields,

- **–** The comparision of glabal sensitivity indices estimated with the PC emulator vs independent emulators.
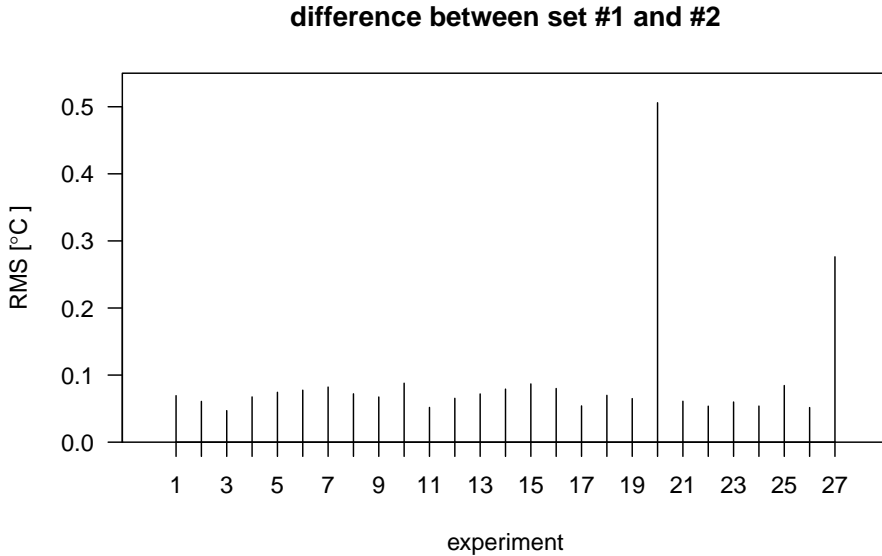
Figure 1. Difference in annual mean temperature associated with the different initial conditions, along with the root-mean-square of the difference.
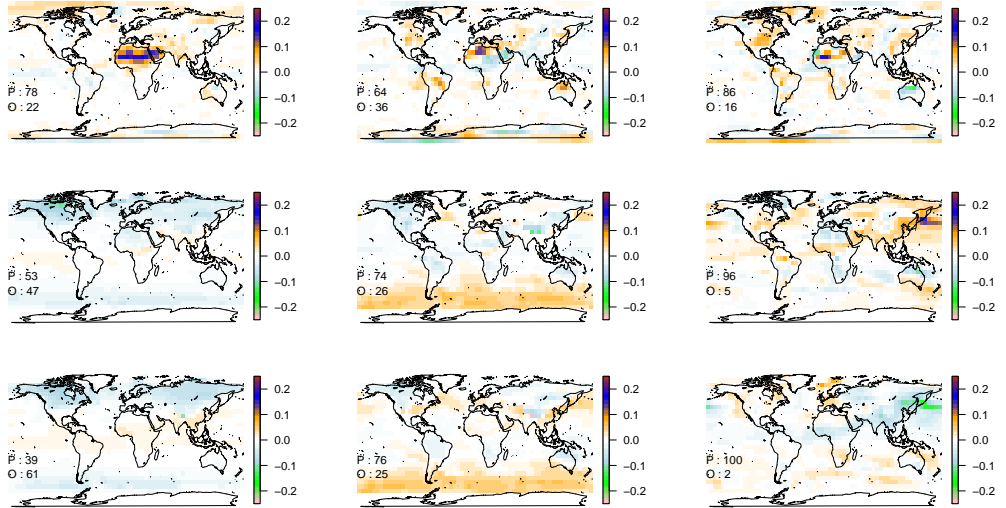
Figure 2. First three principal components of the climate variables. Numbers in the bottom left are the total variance indices (T_i/V), expressed in percentage, of the respective eigenvector scores with respect to precession (P) and obliquity (O). Note that the sum may may exceed 100 % as a consequence of second order terms. Observe however that these second order terms are small for the first two principal components.
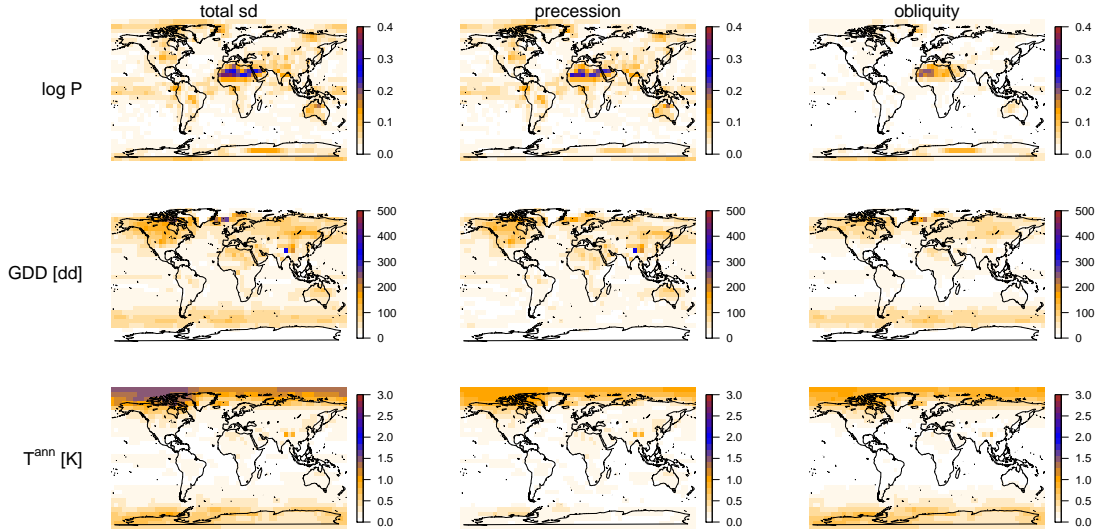
Figure 3. Global sensitivity indices (square roots of variances) associated with precession and obliquity. *Analytical integrals* assuming a uniform distribution in the design cube, estimated using the PC emulator
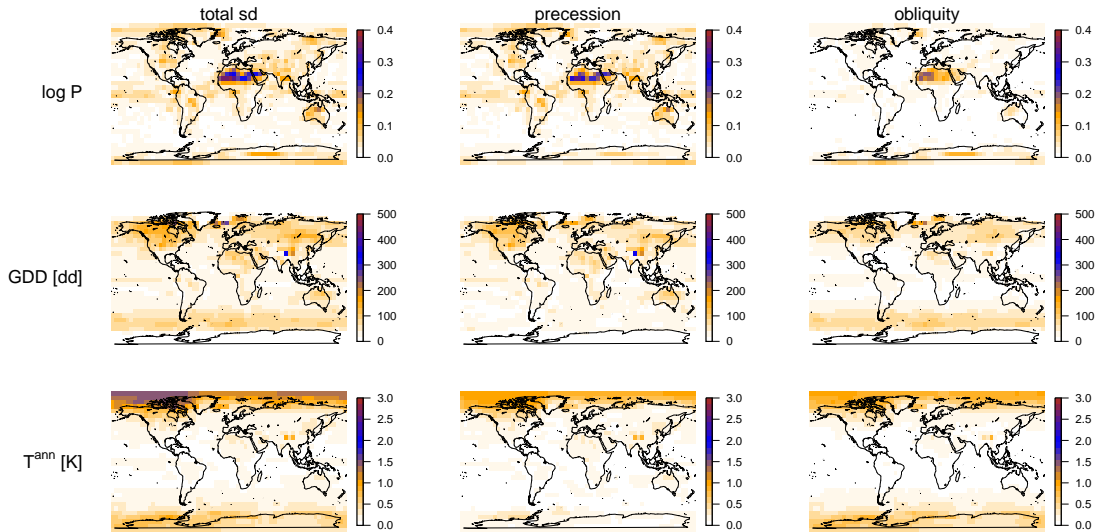
Figure 4. Same as above, but using independent emulators calibrated for all 2048 grid points. The scientific conclusions will be unchanged.