Manuscript prepared for Clim. Past
with version 2014/09/16 7.15 Copernicus papers of the LaTeX class copernicus.cls.
Date: 7 October 2015

Palaeo plant diversity in subtropical Africa – ecological assessment of a conceptual model of climate–vegetation interaction

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Appendix A

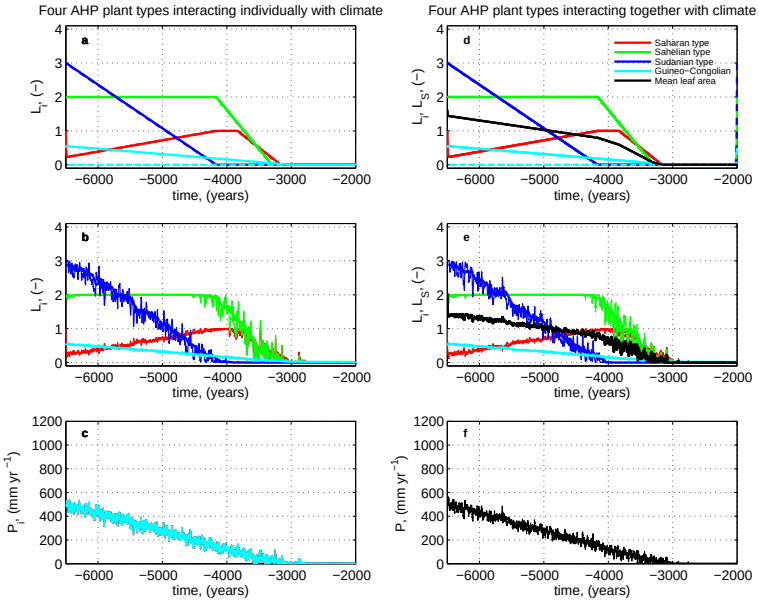

Figure 1. Transient dynamics of four African Humid Period (AHP) plant types interacting individually **(a–c)** and together **(d–f)** with climate for D_B = 0 $\mathrm{mm\,yr^{-1}}$. The effective leaf areas L_i and the corresponding precipitation amounts P_i are shown for the Saharan type (red), Sahelian type (green), Sudanian type (blue) and Guineo–Congolian type (light blue). Mean effective leaf area L_S and the corresponding precipitation P are calculated with the niche approach (black) (see Eq. 9). Simulations without background noise **(a, e)** include forward simulations (solid lines) and simulations backward in time (dashed lines). Simulations with background noise are depicted in **(b, e)** for L_i and L_S, and for precipitation P in **(c, f)**. Thin lines show annual mean values and thick lines show a 100 year running mean.

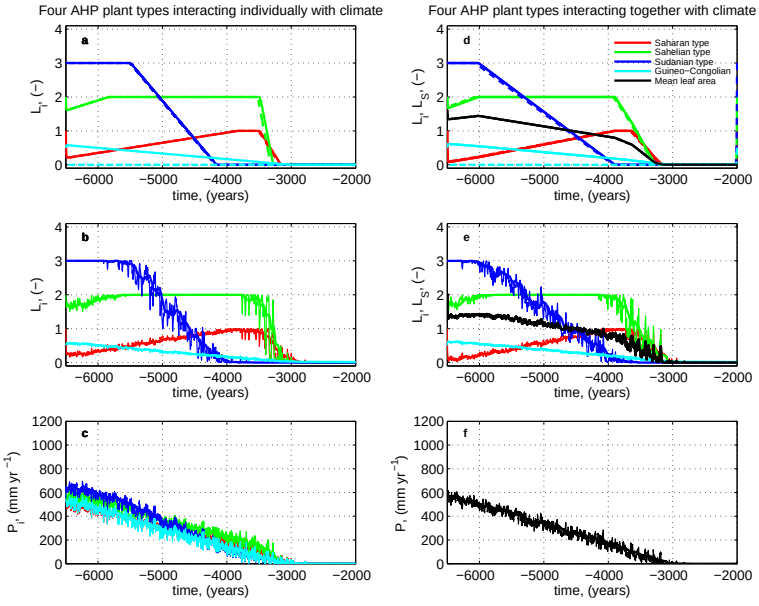

Figure 2. Transient dynamics of four African Humid Period (AHP) plant types interacting individually **(a–c)** and together **(d–f)** with climate for D_B = 50 $\mathrm{mm\,yr^{-1}}$. The effective leaf areas L_i and the corresponding precipitation amounts P_i are shown for the Saharan type (red), Sahelian type (green), Sudanian type (blue) and Guineo–Congolian type (light blue). Mean effective leaf area L_S and the corresponding precipitation P are calculated with the niche approach (black) (see Eq. 9). Simulations without background noise **(a, e)** include forward simulations (solid lines) and simulations backward in time (dashed lines). Simulations with background noise are depicted in **(b, e)** for L_i and L_S, and for precipitation P in **(c, f)**. Thin lines show annual mean values and thick lines show a 100 year running mean.

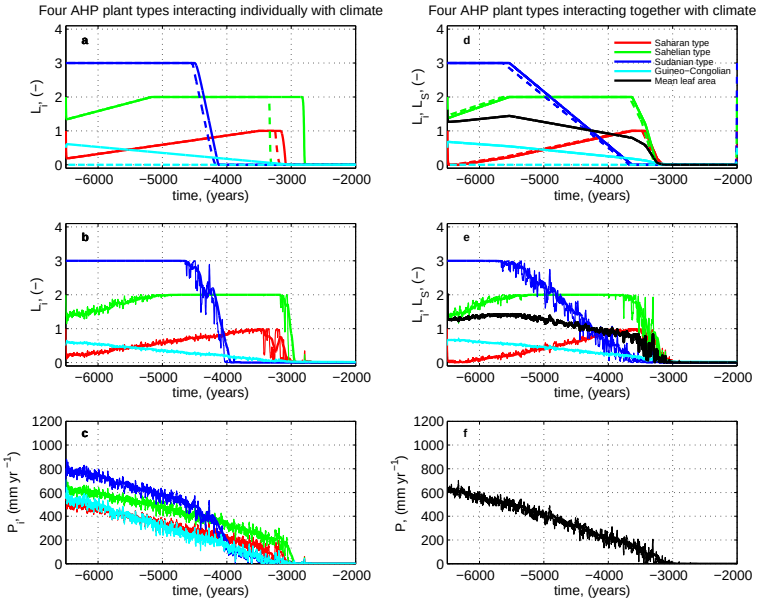

Figure 3. Transient dynamics of four African Humid Period (AHP) plant types interacting individually **(a–c)** and together **(d–f)** with climate for D_B = 100 $\mathrm{mm\,yr^{-1}}$. The effective leaf areas L_i and the corresponding precipitation amounts P_i are shown for the Saharan type (red), Sahelian type (green), Sudanian type (blue) and Guineo–Congolian type (light blue). Mean effective leaf area L_S and the corresponding precipitation P are calculated with the niche approach (black) (see Eq. 9). Simulations without background noise **(a, e)** include forward simulations (solid lines) and simulations backward in time (dashed lines). Simulations with background noise are depicted in **(b, e)** for L_i and L_S, and for precipitation P in **(c, f)**. Thin lines show annual mean values and thick lines show a 100 year running mean.

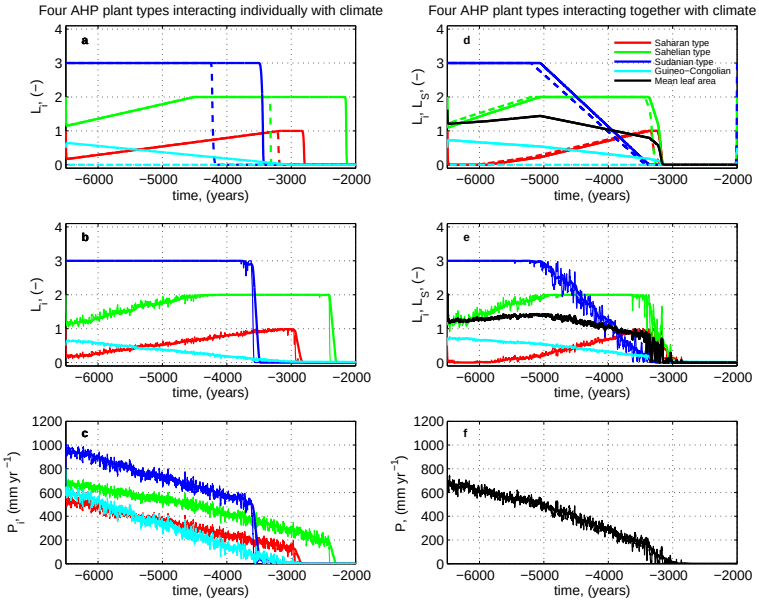

Figure 4. Transient dynamics of four African Humid Period (AHP) plant types interacting individually **(a–c)** and together **(d–f)** with climate for D_B = 150 $\mathrm{mm\,yr^{-1}}$. The effective leaf areas L_i and the corresponding precipitation amounts P_i are shown for the Saharan type (red), Sahelian type (green), Sudanian type (blue) and Guineo–Congolian type (light blue). Mean effective leaf area L_S and the corresponding precipitation P are calculated with the niche approach (black) (see Eq. 9). Simulations without background noise **(a, e)** include forward simulations (solid lines) and simulations backward in time (dashed lines). Simulations with background noise are depicted in **(b, e)** for L_i and L_S, and for precipitation P in **(c, f)**. Thin lines show annual mean values and thick lines show a 100 year running mean.

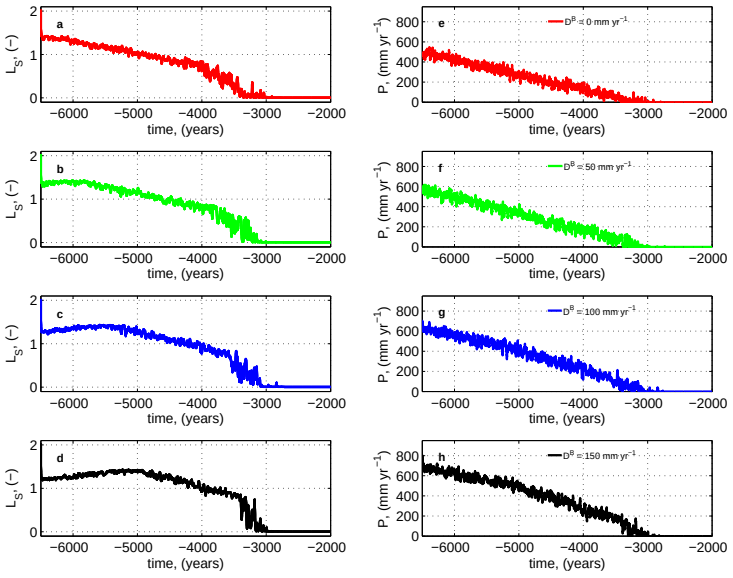

Figure 5. Transient dynamics of mean effective leaf area L_S of four African Humid Period (AHP) plant types interacting together with climate, and the corresponding precipitation P for different feedback sensitivity coefficients D^B. Simulations with background noise are depicted in **(a–d)** for L_S, and for mean annual precipitation P in **(e–h)** for D^B = 0 $\mathrm{mm\,yr^{-1}}$ (red), D^B = 50 $\mathrm{mm\,yr^{-1}}$ (green), D^B = 100 $\mathrm{mm\,yr^{-1}}$ (blue), and D^B = 150 $\mathrm{mm\,yr^{-1}}$(black). Without feedback between vegetation and precipitation **(a, e)**, L_S and corresponding P decrease almost linearly. Low feedback coefficients **(b, f)** result in a non-linear but gradual decline of L_S and corresponding P with small fluctuations. The higher D_B, the stronger the amplitude of fluctuations and the steeper the decline of L_S and corresponding P.

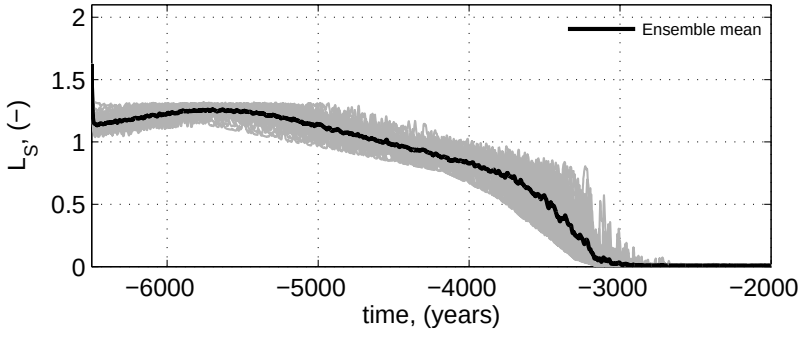

Figure 6. Mean effective leaf area L_S of four African Humid Period (AHP) plant types i interacting together with climate with different sets of specific climate feedback coefficients D_i^B. 30 simulations with different variations of D_i^B in the range from 0 to 150 $\mathrm{mm\,yr^{-1}}$ are shown in gray, the ensemble mean is shown in black.