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Supplement of

Evaluation of root water uptake in the ISBA-A-gs land surface model using agricultural yield statistics over France

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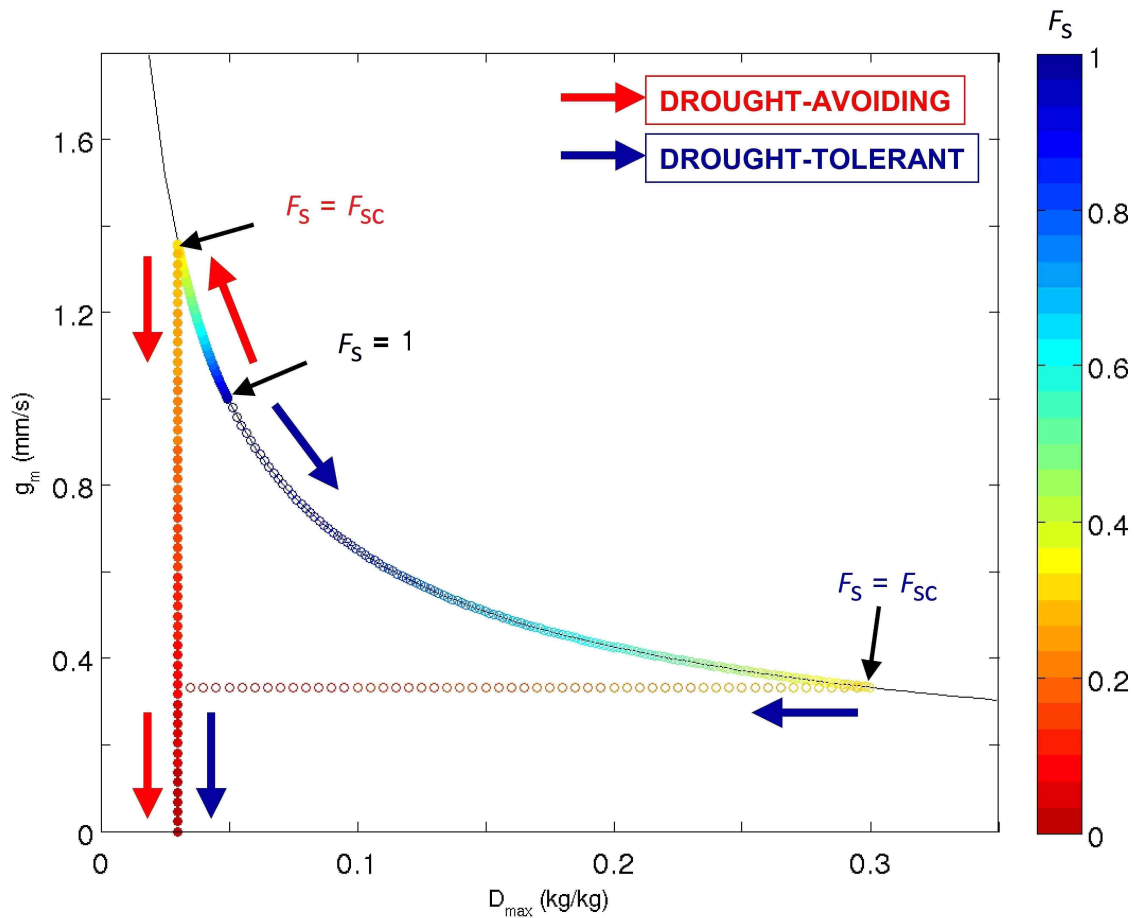
Supplement #1

Figure S1 (adapted from Ca12) – Responses of C3 herbaceous plants to soil moisture stress as represented in the ISBA-A-gs model, through the relationship between the mesophyll conductance at 25°C, g_m, and the maximum leaf-to-air saturation deficit, D_{max}, (Calvet, 2000): drought-avoiding and drought-tolerant (red and blue arrows, respectively). The g_m and D_{max} values in water-limited conditions are driven by the F_S stress index. For moderate soil water stress (i.e. $F_S > F_{SC}$), the deviation of D_{max} from its unstressed value towards its minimum (0.03 kg kg^{-1}) or maximum (0.30 kg kg^{-1}) value (drought-avoiding and drought-tolerant, respectively), is proportional to F_S. The value of g_m is driven by D_{max} through a logarithmic equation (solid line): $\ln(g_m) = 2.381 - 0.6103 \times \ln(D_{max})$, with g_m and D_{max} in units of mm s^{-1} and g kg^{-1}, respectively. For more pronounced soil water stress (i.e. $F_S < F_{SC}$), either g_m or D_{max} (drought-avoiding and drought-tolerant, respectively), decrease from its value at $F_S = F_{SC}$ to its minimum value, proportional to F_S. As an example, F_{SC} and unstressed g_m values equal to 0.3 and 1 mm s^{-1} are used.