

1 **Figure captions**

2 **Fig. 1** Descriptive analysis of the physical properties and SOM content of each layer of soil studied. L1 = 0.0-
3 0.10-m layer; L2 = 0.10-0.20-m layer; and L3 = 0.20-0.40-m layer. The x contained in the box plot is the average
4 value of the specific property in each layer.

5 *Units: soybean yield, Mg ha⁻¹; PR, MPa; BD and PD, Mg m⁻³; TP, FC, θ_s and θ_r , m³ m⁻³; I, kPa; AWC, mm per
6 layer; n and α parameters; S index, unit-less; clay, sand, SOM, FLF, OLF and HF, g kg⁻¹.

7 **Fig. 2** (a, b, c) Relationship of the soybean yield with penetration resistance (PR), bulk density (BD) and particle
8 density (PD). The gray band around the fitted line represents the 95% confidence interval for the fitted values.

9 **Fig. 3** (a, b, c) Relationship of the alpha parameter (α), n parameter and inflection point (I) of the Van Genuchten
10 model with the soybean yield. The gray band around the fitted line represents the 95% confidence interval for the
11 fitted values.

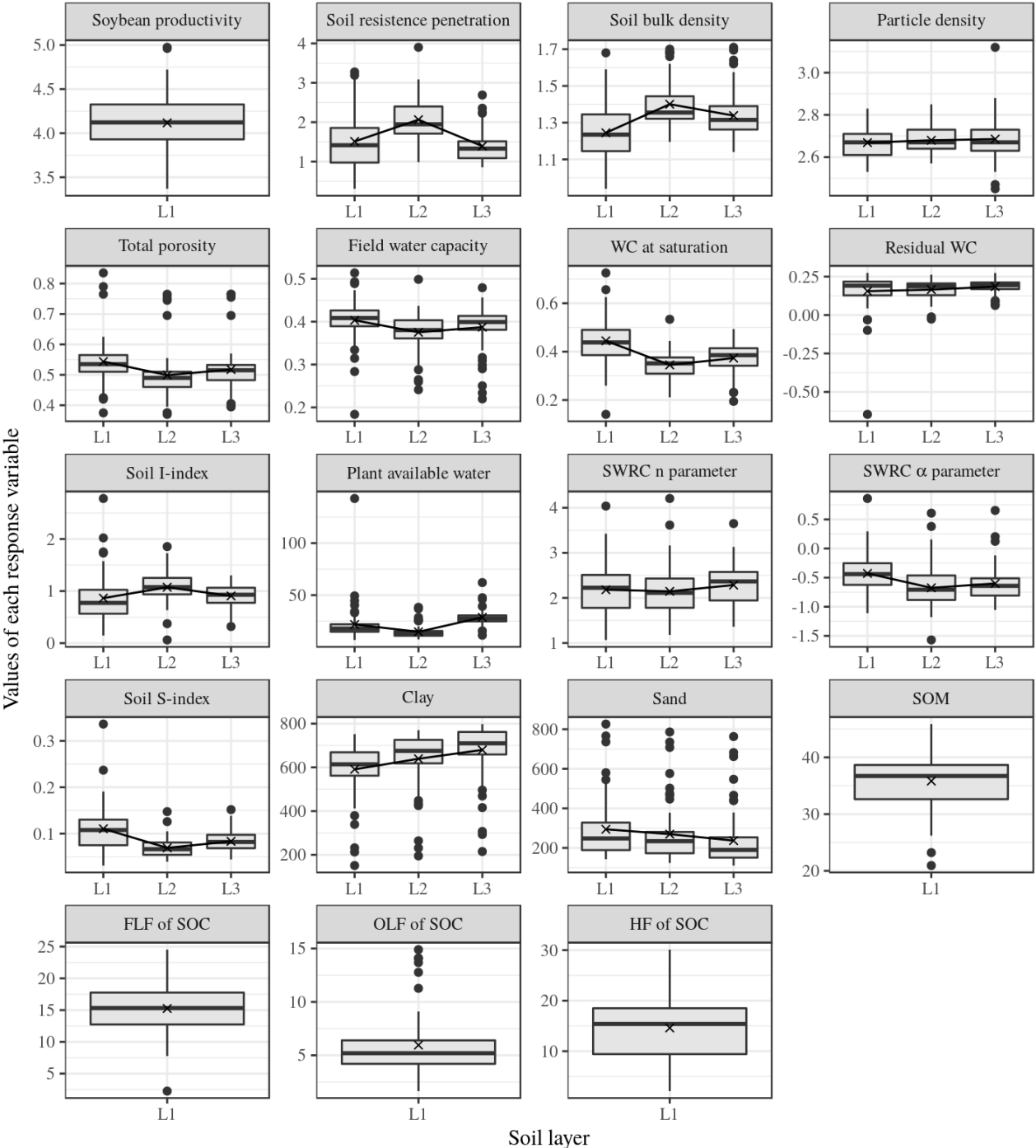
12 **Fig. 4** (a, b, c) Relationship of the total porosity (TP), macroporosity and soil index-S with the soybean yield. The
13 gray band around the fitted line represents the 95% confidence interval for the fitted values.

14 **Fig. 5** (a, b, c) Relationship of the plant available water (AWC), water content at saturation (θ_s) and residual water
15 content (θ_r) with the soybean yield. The gray band around the fitted line represents the 95% confidence interval
16 for the fitted values.

17 **Fig. 6** (a, b, c) Relationship of the clay content, sand content and field water capacity (FC) with the soybean yield.
18 The gray band around the fitted line represents the 95% confidence interval for the fitted values.

19 **Fig. 7** Relationships of the clay content (PAW), penetration resistance (PR), S-index (S) and sand content with
20 the SOM and its FLF, OLF and HF. The gray band around the fitted line represents the 95% confidence interval
21 for the fitted values.

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25 **Fig. 1**
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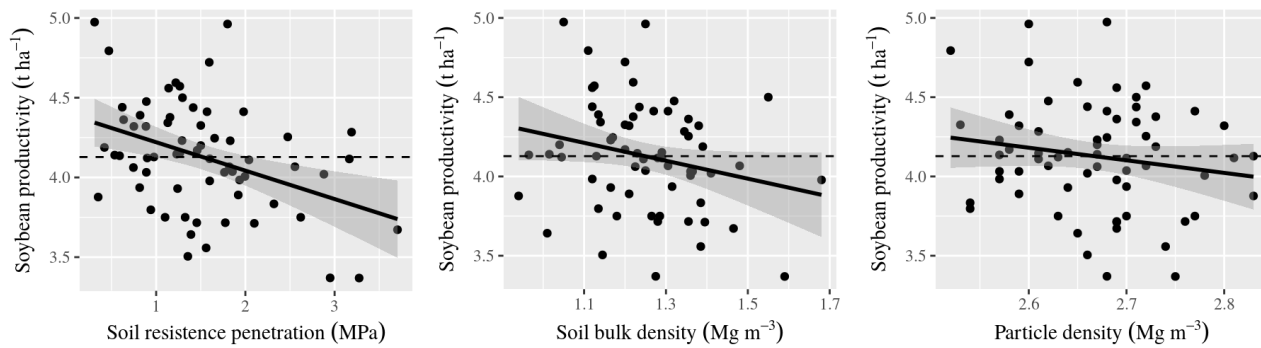


Fig. 2

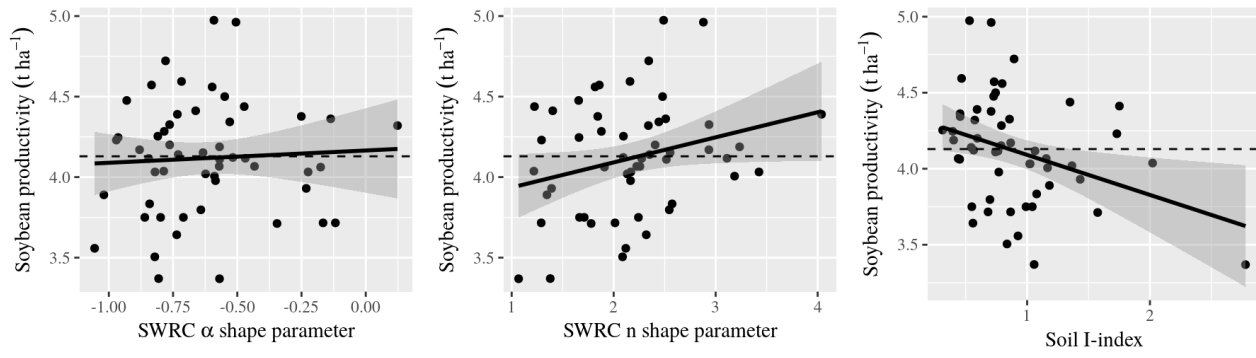


Fig. 3

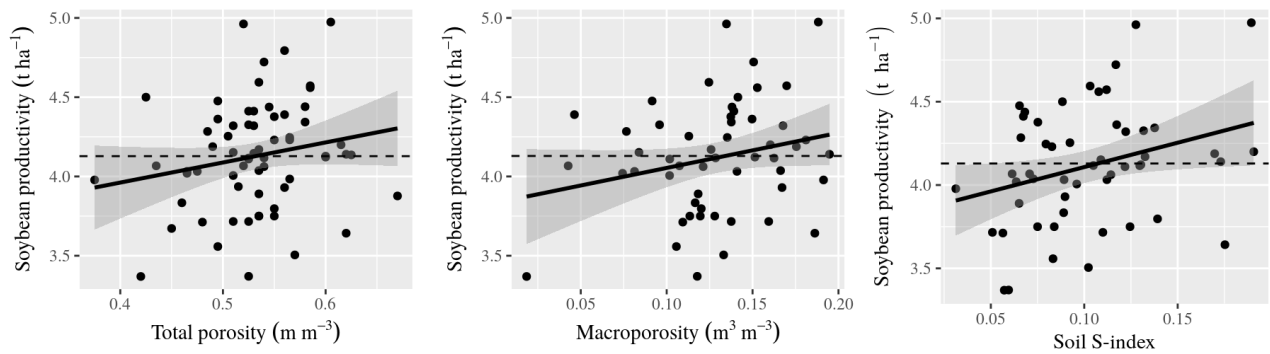


Fig. 4

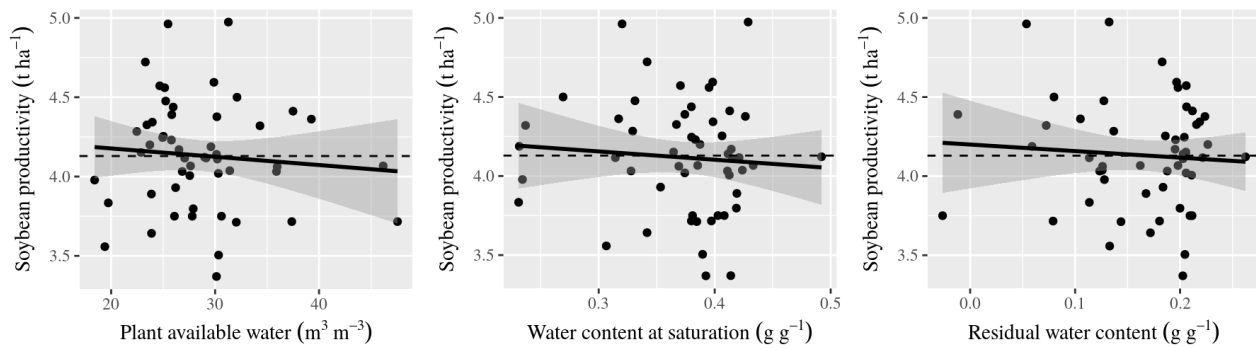


Fig. 5

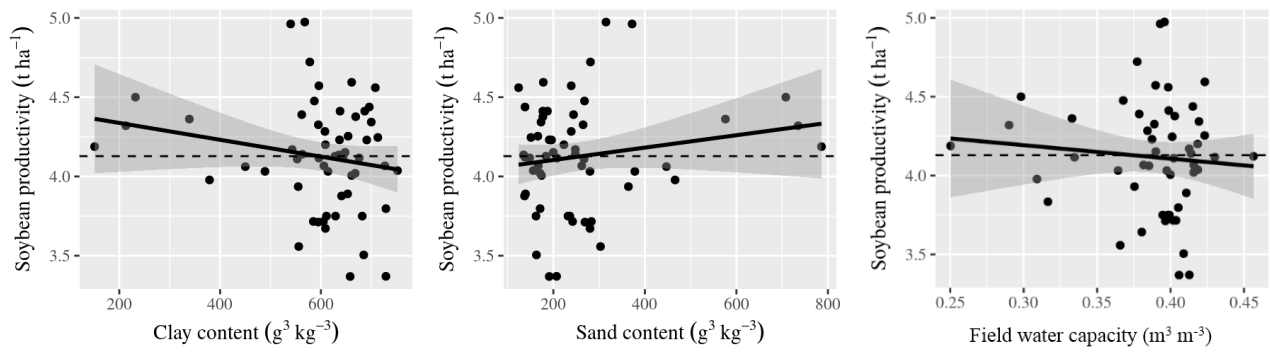


Fig. 6

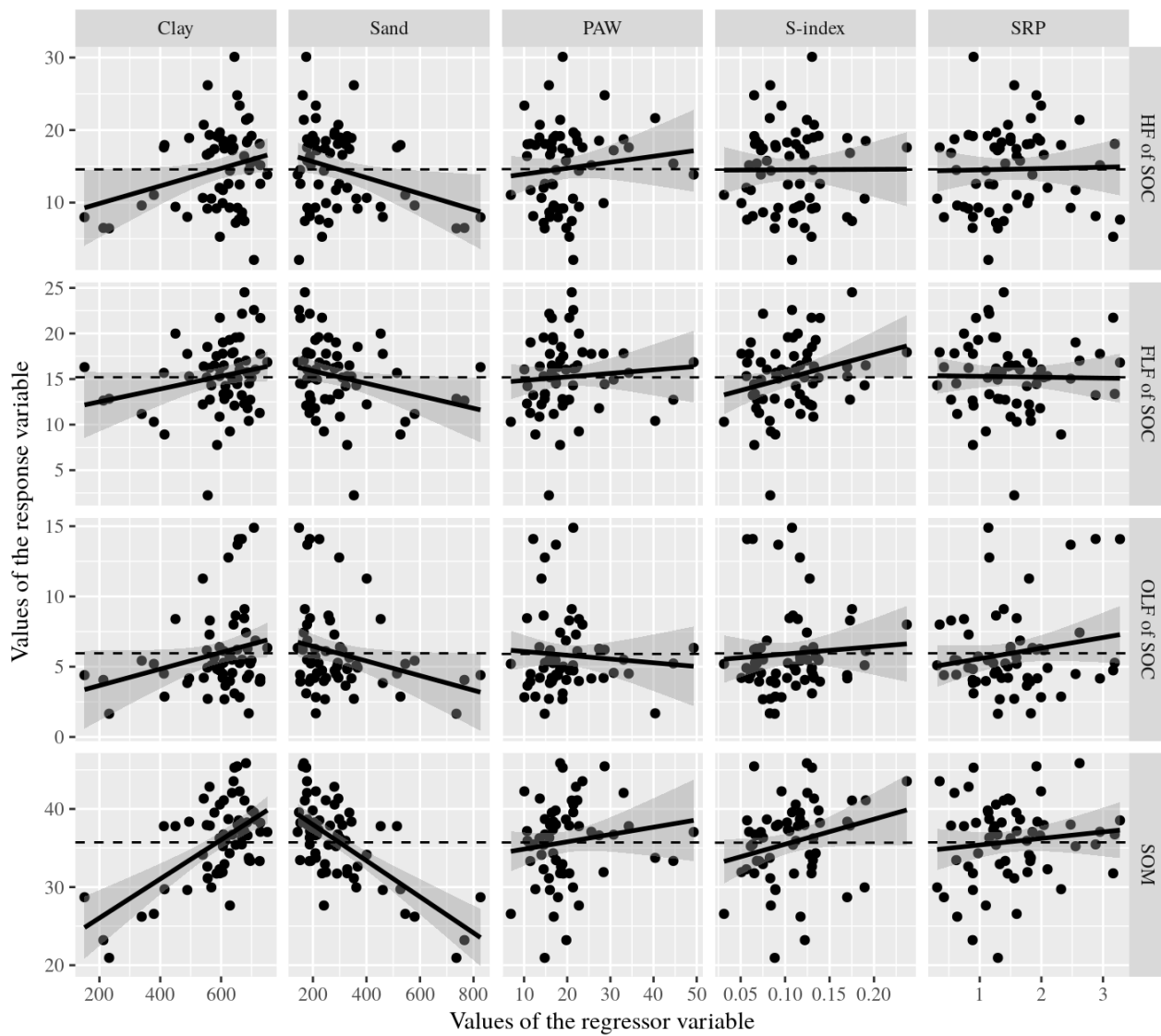


Fig. 7