

Response to Diego Tassinari

RC1: Comment on egusphere-2025-3474

General comments

The manuscript presents a multidisciplinary study that seems to fall well within the scope of the journal, covering fields such as petrography, land evaluation, pedology, soil mineralogy, fertility and a field trial with soil amendments (rock powders or remineralizers). In addition to the very comprehensive characterization of the rocks and the soil, the field trial presents a practical and direct application of this initial assessment, highlighting the specific conditions under which the crops positive response was observed. Although simplistic, with modest sources and doses of fertilizers and remineralizers, the field trial must be evaluated also considering the low availability of published data from the studied region, the amount of work needed to grind dozens of kilograms of rock and the significant responses obtained. In addition, the practical applications of the results for this region and elsewhere are very significant, as they deal with fertilizer shortage and food security. What may seem as major setbacks of the study are the lack of plant nutrient contents to show how nutrient uptake responded to the treatments and the field trial restricted to a single crop cycle. Regarding the latter, it must be pointed out that significant differences in yield were already perceived in this first cycle.

Answer: We sincerely thank you, Sir, for this very pertinent remark. We acknowledge that our study did not consider the nutrient content of maize plants, nor did it directly evaluate foliar or grain composition, which limits the precise assessment of plant responses to the different treatments in terms of nutrient uptake. Nevertheless, the agronomic indicators used (yield and growth parameters) provide relevant insights, and the integration of nutritional analyses will be an important perspective for future research.

Specific comments

Treatment application is not clear enough. It is important to understand how the rock powder was applied, with broadcasted in the entire plot or locally applied and whether it was incorporated or not by any tillage practice.

Answer: Dear Sir, we sincerely thank you for your very pertinent question regarding the application of rock powder treatments. We would like to clarify that, after the establishment of the experimental setup and seedling emergence, the rock powder was applied in a localized manner, directly into each planting hole. It was then incorporated at a depth of approximately 5 cm, in order to minimize leaching by water and dispersion by wind. This localized incorporation enhanced the availability of nutrients at the root level while reducing losses. This clarification has been added to the manuscript in line 139-142, in the subsection « *2.2 Experimental design, treatments, and plant material* ».

Yield results could be presented also as relative yield, especially in the discussion, conclusion and abstract, because it may be more directly referred by other studies. For example, for NPK + urea as 100% relative yield, basalt + urea reached 92.6% and trachyte + urea reached 87.3% of the maximum yield, whereas the remineralizers alone resulted in relative yields of 80.8% and 74.7% for basalt and trachyte respectively.

Answer: Suggestion adopted. This information was added in lines 540-544 in the discussion section, in the conclusion in lines 571-575 and in the abstract in lines 27-30.

Technical corrections

Line	Comment
L58	essential nutrients = redundant (plant nutrient = essential element) <u>Answer:</u> "essential nutrients" was replaced by "plant nutrients."
L58	enhance its structure: neither of the cited references evaluated soil structure <u>Answer:</u> The following reference was added: Buss, W., Hasemer, H., Ferguson, S. and Borevitz, J. Stabilisation of soil organic matter with rock dust partially counteracted by plants. <i>Global Change Biology</i> , 30, e17052. https://doi.org/10.1111/gcb.17052 , 2024.
	essential nutrients

L96	<u>Answer:</u> "essential nutrients" was replaced by "essential elements."
2.6 Pedoclimatic Assement	Not sure what is the purpose of this evaluation <u>Answer:</u> Dear Sir, thank you very much. Modifications were made in red in lines 222-225 as follows: The pedoclimatic assessment aimed to determine the suitability of the study area for maize cultivation based on climatic data (precipitation, temperature, relative humidity, and insolation) collected at the Maroua-Salak station (Cameroon, 10°27'0" north latitude and 14°15'0" east longitude) between 1980 and 2020, and the pedological characteristics of soils such as topography, flooding, texture, depth, and cation exchange capacity, base saturation, organic carbon, pH and slinity, in accordance with the climatic and requirements of crops (Sys, 1985; Sys et al., 1993; Issiné et al 2022). It allows to identify the potential limiting factors for maize cultivation. A climatic index (CI) was calculated using the parametric formula (Sys, 1985):
Table 4	There is a surplus line with Mg content after the total major element sum. Maybe the trace elements could be informed in a supplementary material, except maybe for those that are also micronutrients (Zn, Ni and Co). <u>Answer:</u> Dear Sir, thank you very much. This line was deleted. It was Mg# used for magmatic differentiation.
L274-275	Acrually on Table 4 <u>Answer:</u> "Table 3" was replaced by "Table 4"
L344	Parent material instead of parent rock <u>Answer:</u> "parent rock" was replaced by "parent material."
L379-380	Not necessary, since this information was already provided in the methodology. <u>Answer:</u> Dear Sir, this information was deleted
L394	Actually Table 10 <u>Answer:</u> "Table 9" was replaced by "Table 10"

L430 Tableau 10	Please review how the standard deviation for yield was calculated, because the values for all treatments are the same, which is unlikely. <u>Answer:</u> We sincerely thank you Sir. There has been a reporting error. Modifications were made as follows : T₀= 645.8±65.0a ; T₁= 2362.9±120.0b ; T₂ = 2763.9±140.0c ; T₃= 2558.6±130.0d ; T₄= 2931.2±150.0^e ; T₅= 3164.5±160.0f
L524	basalts in larger font size <u>Answer:</u> Correction was made.
Conclusion	Should provide short sentences that summarize the most important results, such as: The soils in Guiring are dominated by a high sand content (62-82%) and low clay (13-23%) and silt (5-15%) contents and mineralogically, these soils are composed of kaolinite, smectites, sepiolite, and quartz. The cation exchange capacity (18.7-25.0 cmolc kg⁻¹ is high, while exchangeable bases (Ca²⁺, Mg²⁺, K⁺, Na⁺) and phosphorus are low to moderate, with base saturation varying between 23.6 and 42.4%. The study area has very favourable climatic conditions for maize growth (suitability index of 91.4), while the land suitability index is 62.4, classifying it as S2sf, indicating moderate suitability for maize cultivation. The control treatment (T₀) showed the lowest yield, with 645.8 kg ha⁻¹. Treatments T₁ (2362.9 kg ha⁻¹) and T₂ (2763.9 kg ha⁻¹) showed notable improvements with trachyte powder application. Treatments T₃ (2558.6 kg ha⁻¹) and T₄ (2931.2 kg ha⁻¹) highlighted the positive effect of basalt powder. Treatment T₅ achieved the maximum yield of 3164.5 kg ha⁻¹.

	<u>Answer:</u> Thank you very much. All your suggestions have been taken into consideration. We also add relative yields as suggested above.
L850	Reference without publication year <u>Answer:</u> The publication year “2024b” was added.