# Responses of Crop and Soil Phosphorus Fractions to Long-Term Fertilization Regimes in a Loess Soil in Northwest China

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**Table 1**

**Figure** 2

**Table S1.** Soil physio-chemical properties (mean ± SD) measured in different fertilization treatments under the Winter wheat–summer maize cropping systems at 0−20 cm depth.

| Items | Treatments | | | |
|---|---|---|---|---|
| | CK | NPK | SNPK | MNPK |
| SOC (g $kg^{-1}$) | 8 ± 1c | 10 ± 0.3b | 9 ± 1b | 15 ± 1a |
| SIC (g $kg^{-1}$) | 9 ± 1b | 11 ± 2a | 11 ± 3a | 10 ± 4ab |
| Total-N (g $kg^{-1}$) | 0.9 ± 3d | 1.2 ± 1c | 1.4 ± 2b | 1.9 ± 3a |
| Soil pH | 8.4 ± 1a | 8.3 ± 1a | 8.2 ± 1a | 8.1 ± 2a |
| Bulk density (g $cm^{-3}$) | 1.43 ± 0.01a | 1.33 ± 0.01b | 1.29 ± 0.01b | 1.33 ± 0.01b |
| Exch. K (mg $kg^{-1}$) | 157 ± 7d | 237 ± 11c | 277 ± 14b | 378 ± 12a |
| Total-P (mg $kg^{-1}$) | 631 ± 52d | 893 ± 132c | 962 ± 157b | 1423 ± 373a |
| Olsen-P (mg $kg^{-1}$) | 4 ± 2d | 23 ± 9c | 28 ± 9b | 170 ± 66a |
| $CaCl_2$-P (mg $kg^{-1}$) | 0.21 ± 0.03c | 0.31 ± 0.23b | 0.28 ± 0.16b | 3.53 ± 1.25a |
| Clay (g $kg^{-1}$) | 293 ± 0.4 | 297 ± 0.2 | 288 ± 0.2 | 263 ± 21 |
| Silt (g $kg^{-1}$) | 459 ± 0.3 | 457 ± 0.3 | 452 ± 0.3 | 463 ± 16 |
| Sand (g $kg^{-1}$) | 232 ± 0.4 | 235 ± 0.5 | 224 ± 0.5 | 275 ± 24 |

Different lower-case letters in the same row indicate significant differences between different treatments ($P < 0.05$).

**Figure S1.**

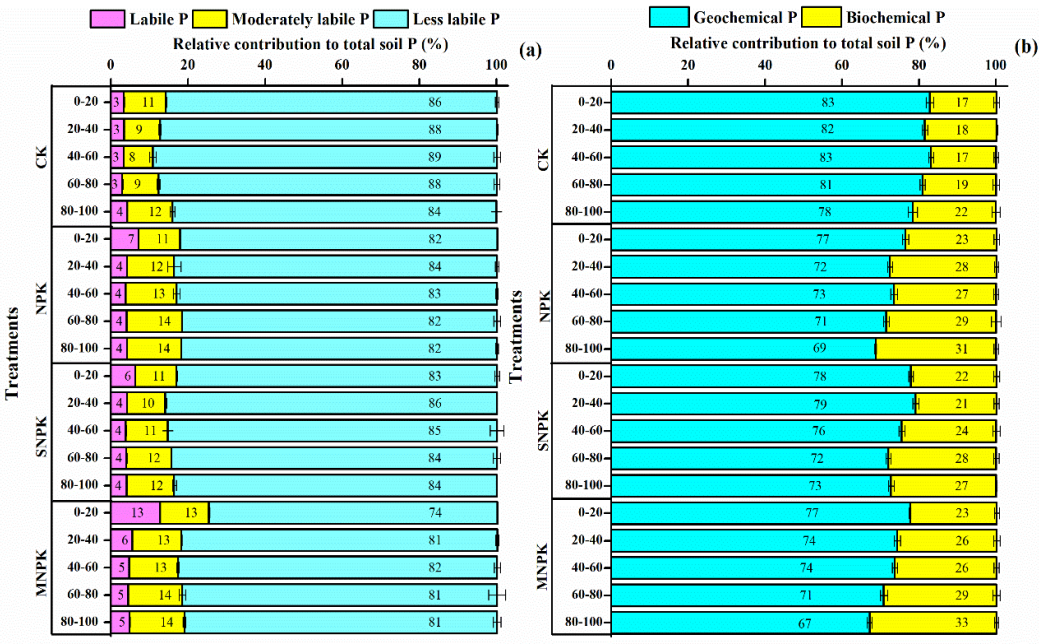


**Figure S1.** The relative contribution of various soil phosphorus pools to total P: (a) labile moderately and less labile phosphorus, and (b) Geo-biochemical phosphorus pools in the 0–100 cm profile in different fertilization treatments under winter wheat–summer maize cropping system. Error bars denote the standard error of the mean.

**Figure S2.**

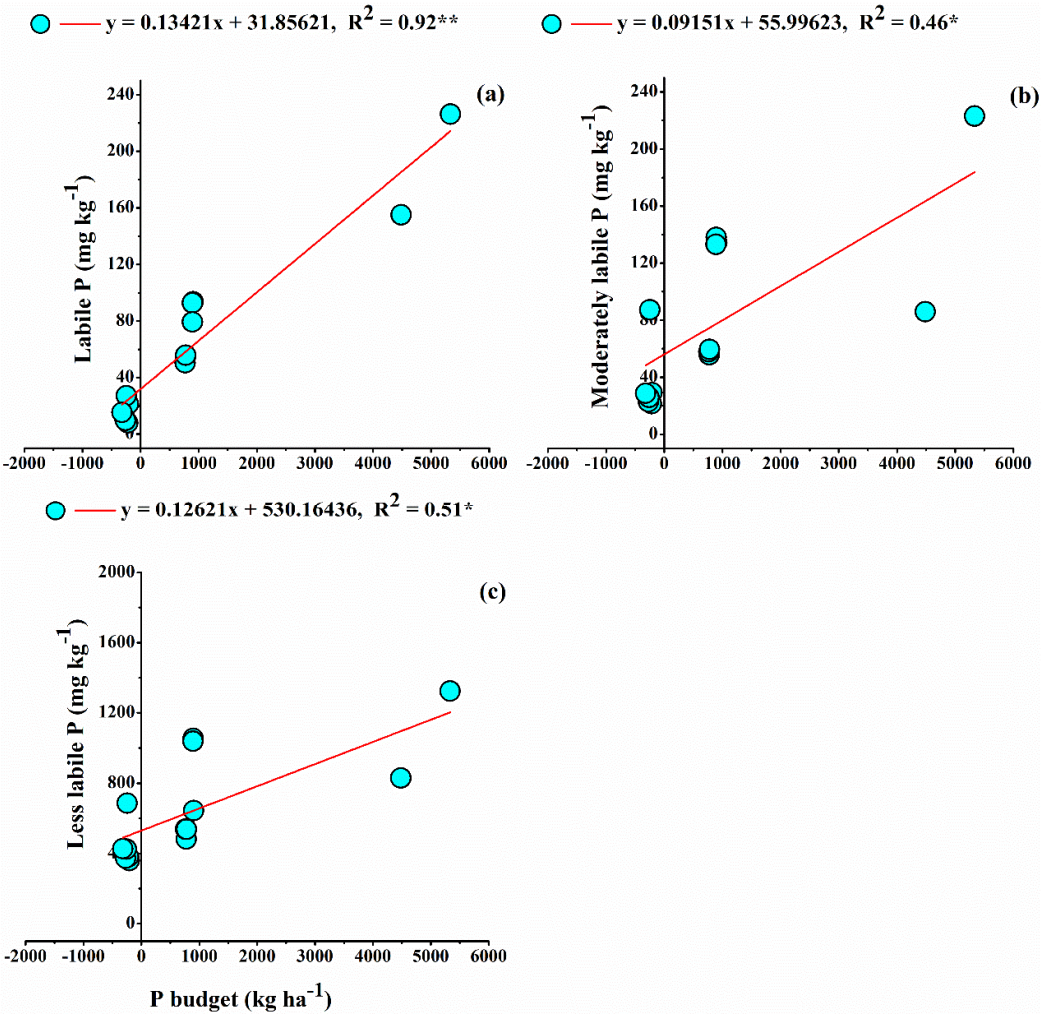


**Figure S2.** Relationships between P budget (kg $ha^{-1}$) and inorganic and organic P components of P fraction contents at surface (0–20 cm) layer (mg $kg^{-1}$); (a) labile P, (b) moderately-labile P, (c) and less labile P across fertilization treatments determined in 2010 and 2014 years.