



Supplement of

Global patterns and drivers of phosphorus fractions in natural soils

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Table S1. Gridded data

Group	Variables	Brief description	Original resolution	Data source
Climate	Mean annual temperature	30-yr (1981 to 2010) annual average temperature	1 km	http://worldclim.org/bioclim
	Mean annual precipitation	30-yr (1981 to 2010) annual average precipitation	1 km	http://worldclim.org/bioclim
	Biomes	Potential Biomes	1 km	https://sedac.ciesin.columbia.edu
Soil	Total soil phosphorus	Total soil phosphorus concentration	50 km	https://doi.org/10.6084/m9.figshare.14583375
	Soil organic carbon	Soil organic carbon concentration	250 m	https://openlandmap.org
	Soil pH	Soil pH	250 m	https://openlandmap.org
	Soil clay	Soil clay content	250 m	https://openlandmap.org
	Soil sand	Soil sand content	250 m	https://openlandmap.org
	Soil order	Taxonomy soil order class	250 m	https://openlandmap.org
	Soil depth	Soil depth	10 km	http://globalchange.bnu.edu.cn/research/data
Topography	Elevation	Land surface elevation	250 m	https://openlandmap.org

22 **Table S2. Comparison of P pool concentrations between our estimates and estimates by Yang *et al.* (2013).**

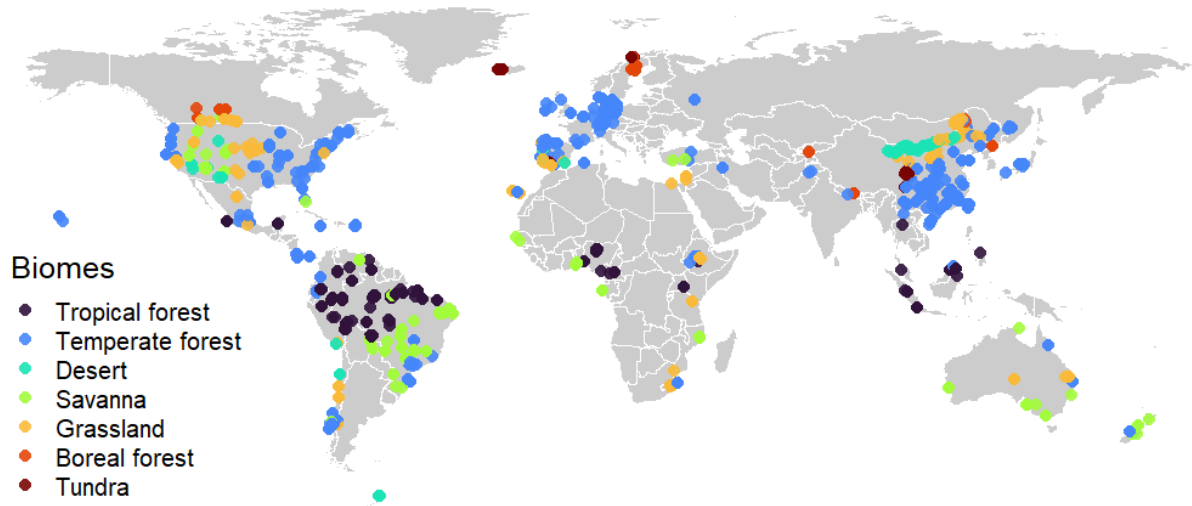
	Labile Pi	Organic P	Moderately labile Pi	Primary P	Occluded P
Median					
He	29.9	157.6	46.1	95.6	215.8
Yang	27.9	69.4	26.8	89.1	104.0
Mean					
He	34.4	195.2	62.9	111.2	213.3
Yang	33.5	85.4	30.6	117.5	115.6

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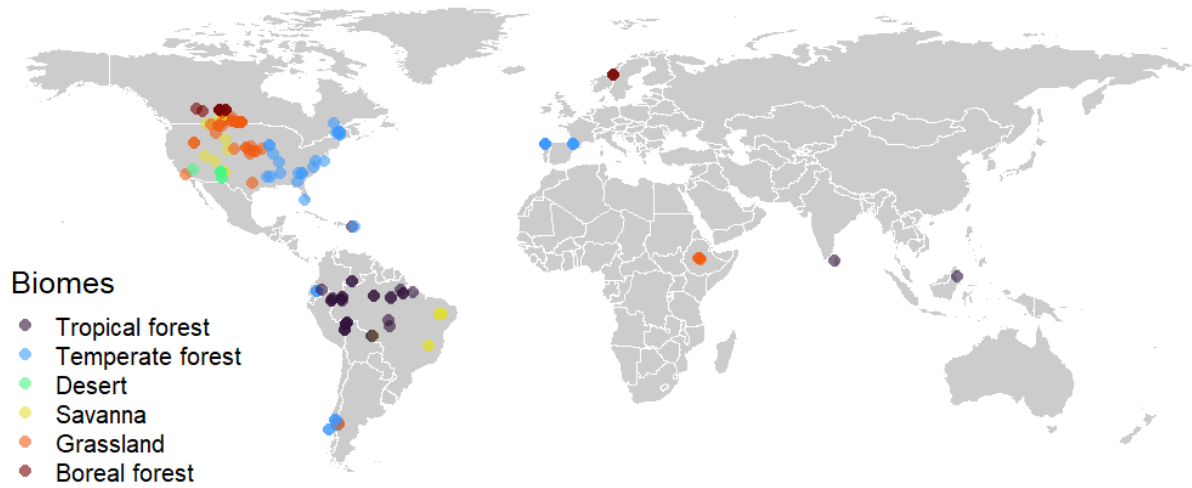
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25 **Figure S1. Comparison of site-level Hedley P pool measurement distributions between our database and Yang et al.'s**
26 **(2013).** Our database (A) contains 1838 observations, while Yang et al. (2013) (B) contains 178.

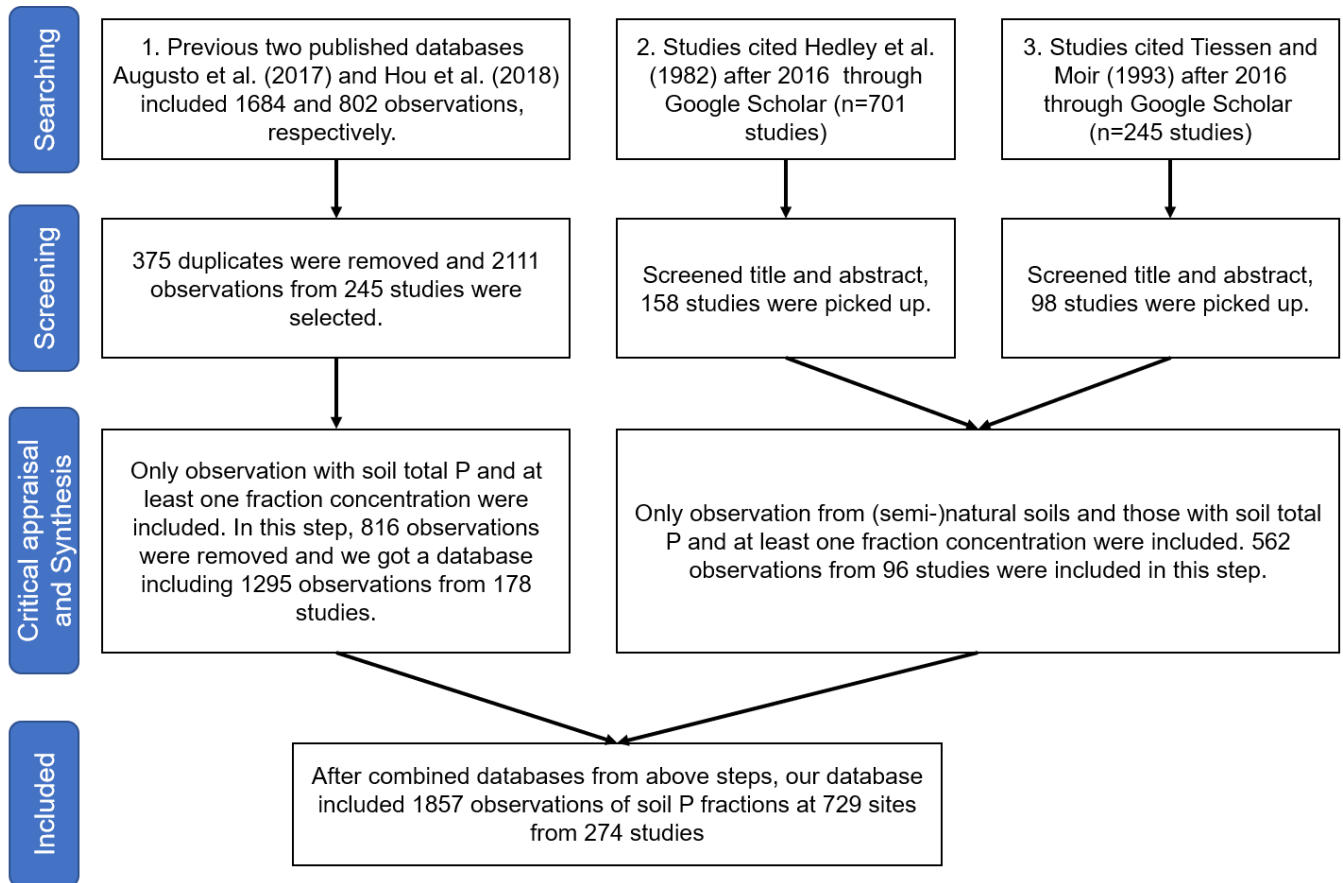
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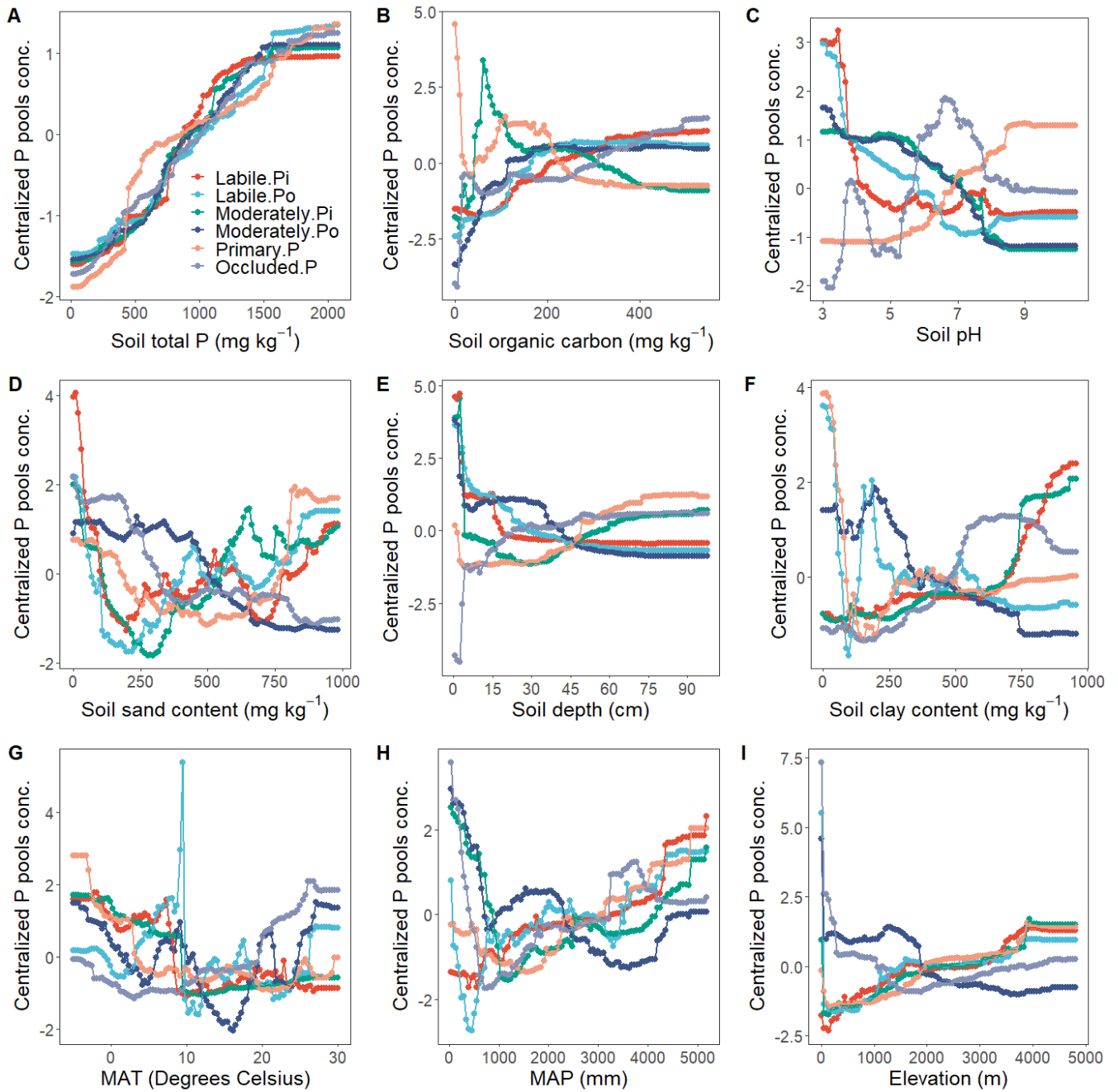
B



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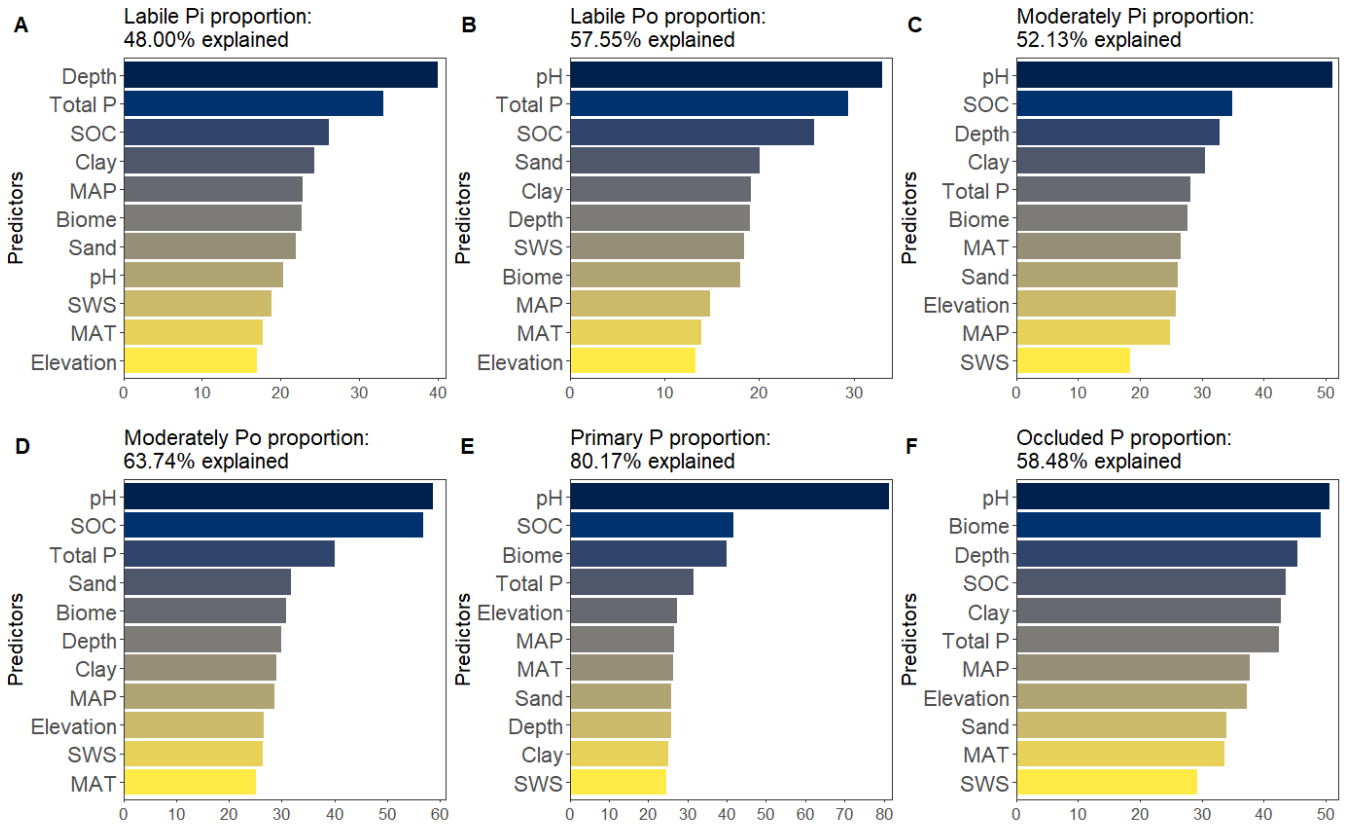


32 **Figure S3. Partial dependence plots showing dependence of centralized soil P pool concentrations on predictors.** To
33 simplify comparison, partial dependent analysis results are centralized in this plot.



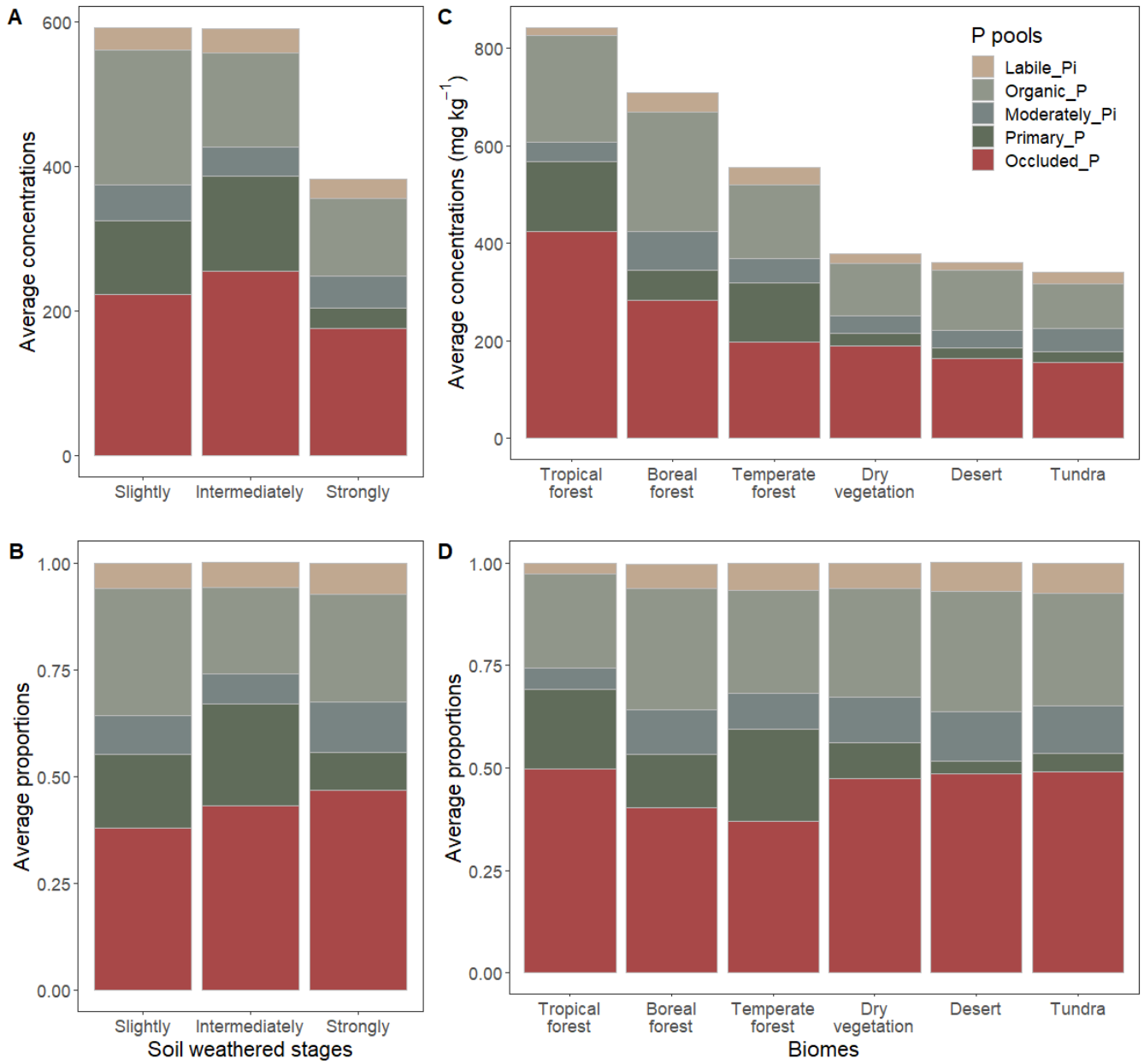
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37 **Figure S4. Relative importance of variables for predicting proportions of soil P pools quantified using random forest**
 38 **models.** Mean decrease accuracy (%IncMSE) indicates the relative importance of each variable for predicting soil P pools.
 39 SWS: soil weathering stage.



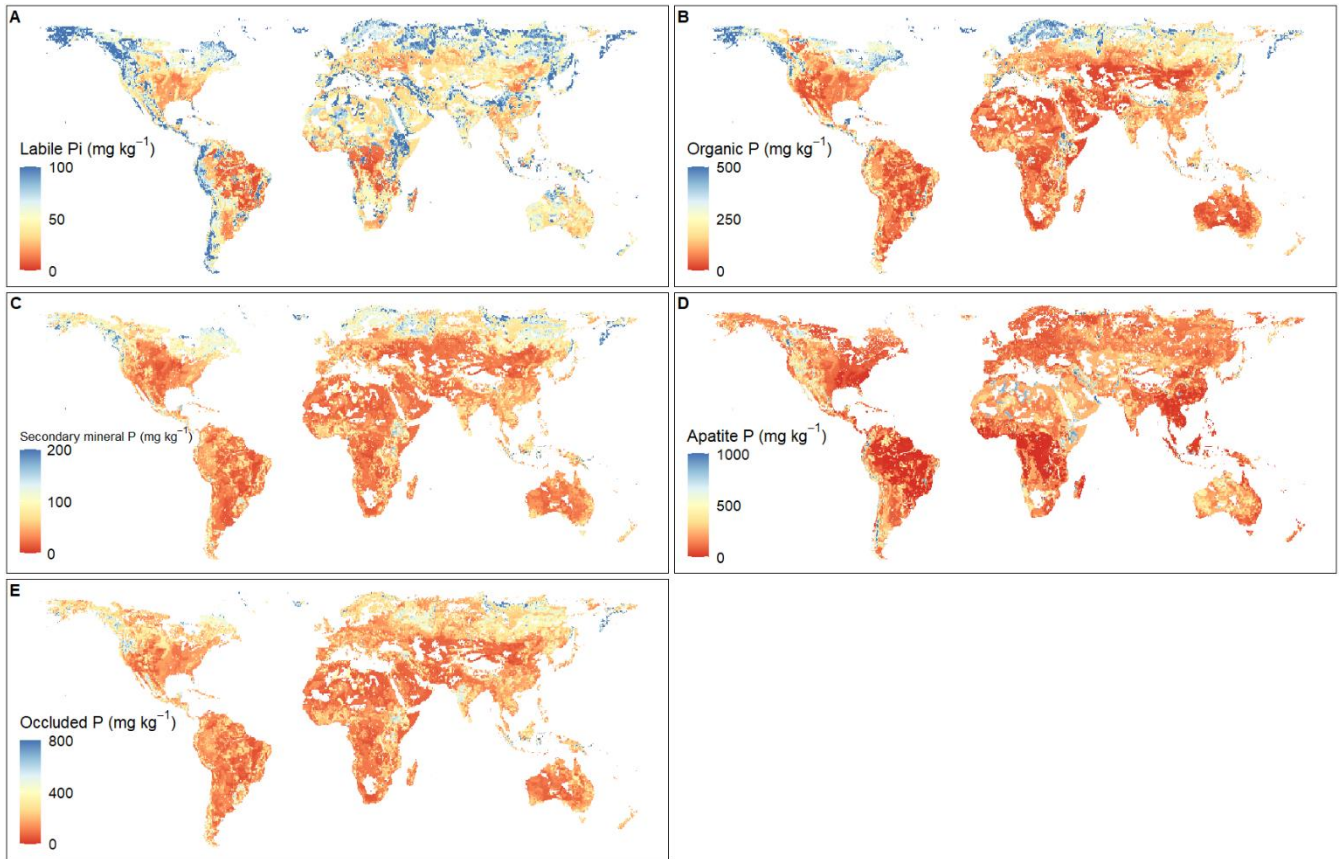
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42 **Figure S5. Average P pool concentrations and proportions of total P concentration across weathering stage and biome.**
 43 Labile Po and moderately labile Po are combined into the organic pool. Results based on 1857 observations.



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48 **Figure S6. Yang et al. (2013)'s predictions of different P pool concentrations.**



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51 **Supplementary Text 1 Data source references**

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