**Supporting Information**

Table S1. Pearson correlation matrix for trace metal and physicochemical parameters in soil samples.

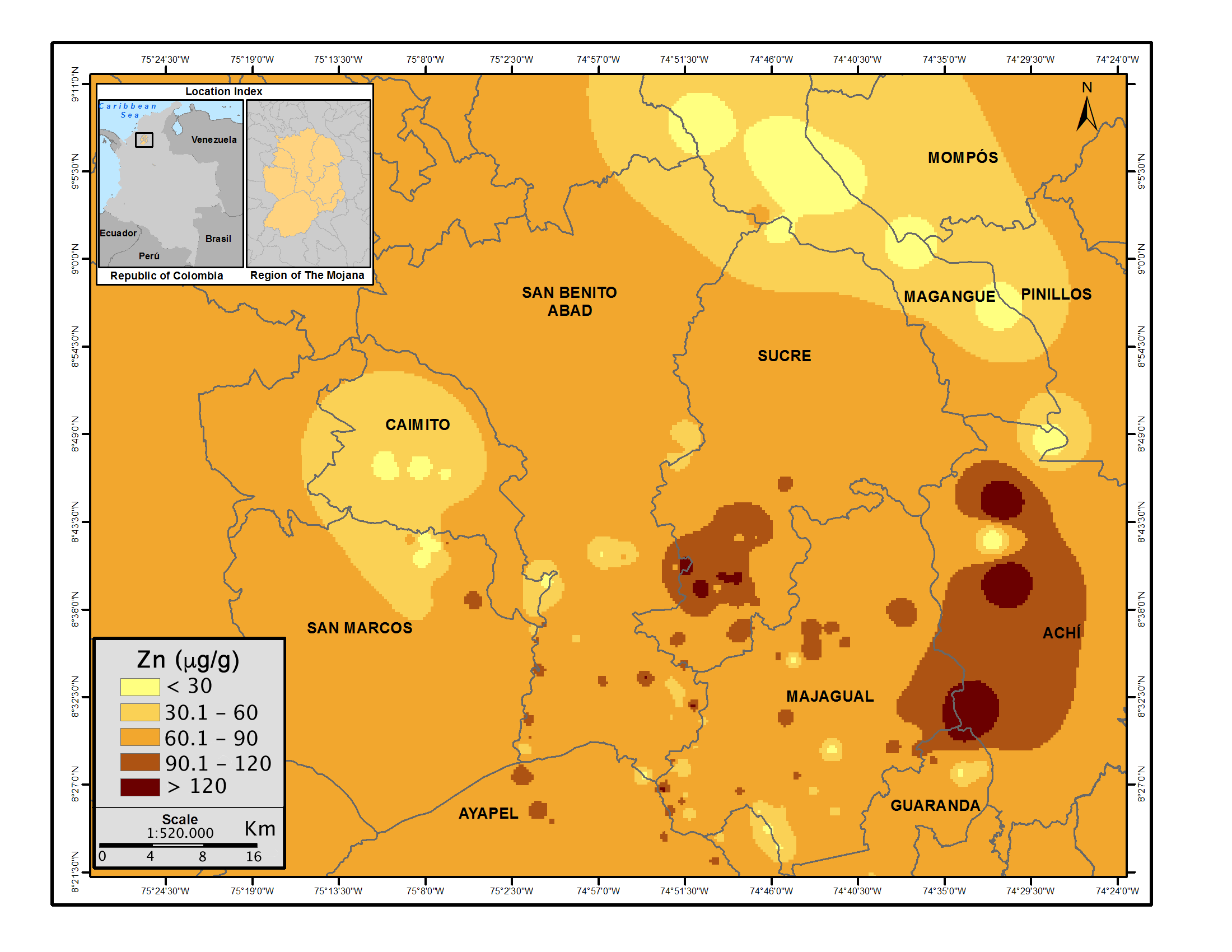
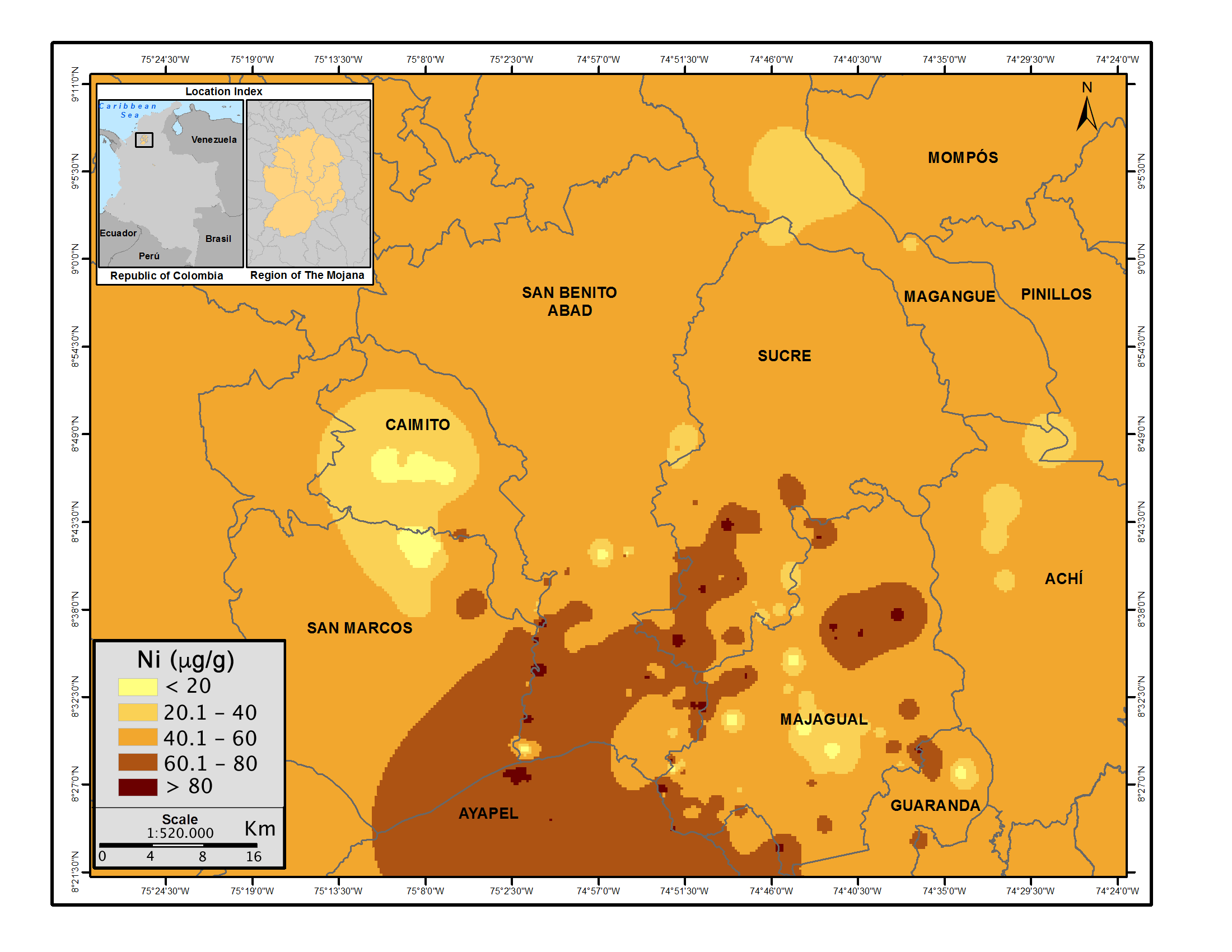
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Cu | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Cu | 1 | | Ni | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Ni | 0.605\*\* | | 1 | | Pb | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Pb | 0.411\*\* | | 0.045 | | 1 | | Cd | |  | |  | |  | |  | |  | |  | |  | |  | |
| Cd | 0.091 | | 0.269\*\* | | 0.089 | | 1 | | Hg | |  | |  | |  | |  | |  | |  | |  | |
| Hg | 0.413\*\* | | 0.130 | | 0.391\*\* | | -0.075 | | 1 | | Zn | |  | |  | |  | |  | |  | |  | |
| Zn | 0.541\*\* | | 0.294\*\* | | 0.455\*\* | | 0.081 | | 0.264\*\* | | 1 | | Mn | |  | |  | |  | |  | |  | |
| Mn | 0.256\*\* | | 0.036 | | 0.137\* | | -0.053 | | 0.090 | | 0.178\*\* | | 1 | | Fe | |  | |  | |  | |  | |
| Fe | 0.461\*\* | | 0.689\*\* | | 0.039 | | 0.150\* | | 0.175\*\* | | 0.265\*\* | | 0.081 | | 1 | | P | |  | |  | |  | |
| P | -0.020 | | 0.086 | | -0.061 | | 0.188\*\* | | -0.005 | | -0.049 | | -0.075 | | 0.027 | | 1 | | OM | |  | |  | |
| OM | 0.092 | | 0.090 | | 0.082 | | 0.163\* | | -0.043 | | 0.150\* | | 0.107 | | 0.116 | | 0.109 | | 1 | | CEC | |  | |
| CEC | 0.257\*\* | | 0.134\* | | 0.102 | | 0.178\*\* | | 0.121 | | 0.234\*\* | | 0.233\*\* | | 0.041 | | 0.030 | | 0.219\*\* | | 1 | | pH | |
| pH | -0.011 | | -0.009 | | -0.001 | | 0.044 | | -0.025 | | 0.017 | | 0.060 | | -0.101 | | 0.083 | | -0.320\*\* | | 0.233\*\* | | 1 | |

\* Correlation is significant at the 0.05 level. \*\* Correlation is significant at the 0.01 level.

Table S2. Rotated component matrix of five-factor model with moderate to strong loadings in bold typeface.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Parameter | PC1 | PC2 | PC3 | PC4 | PC5 |
| Cu | 0.619 | **0.573** | 0.247 | 0.002 | -0.028 | |
| Zn | 0.283 | **0.631** | 0.282 | 0.085 | 0.020 | |
| Ni | **0.904** | 0.084 | 0.052 | -0.012 | 0.179 | |
| Pb | -0.085 | **0.846** | 0.078 | 0.072 | 0.053 | |
| Cd | 0.189 | -0.009 | 0.122 | 0.080 | **0.712** | |
| Mn | 0.078 | 0.078 | **0.700** | 0.057 | -0.325 | |
| Hg | 0.112 | **0.733** | -0.075 | -0.086 | -0.086 | |
| Fe | **0.879** | 0.062 | -0.015 | 0.092 | 0.017 | |
| P | -0.018 | -0.014 | -0.102 | -0.036 | **0.720** | |
| OM | 0.018 | 0.011 | 0.328 | **0.790** | 0.257 | |
| CEC | 0.032 | 0.118 | **0.769** | -0.069 | 0.245 | |
| pH | -0.076 | -0.026 | 0.324 | **-0.818** | 0.190 | |
| Eigenvalues | 3.018 | 1.564 | 1.348 | 1.283 | 1.070 | |
| % variance | 25.148 | 13.031 | 11.237 | 10.689 | 8.919 | |
| Cumulative % | 25.148 | 38.179 | 49.416 | 60.105 | 69.025 | |

Figure S1. Spatial distribution of Zn, Ni, Mn and Cu in surface soils of the study area.



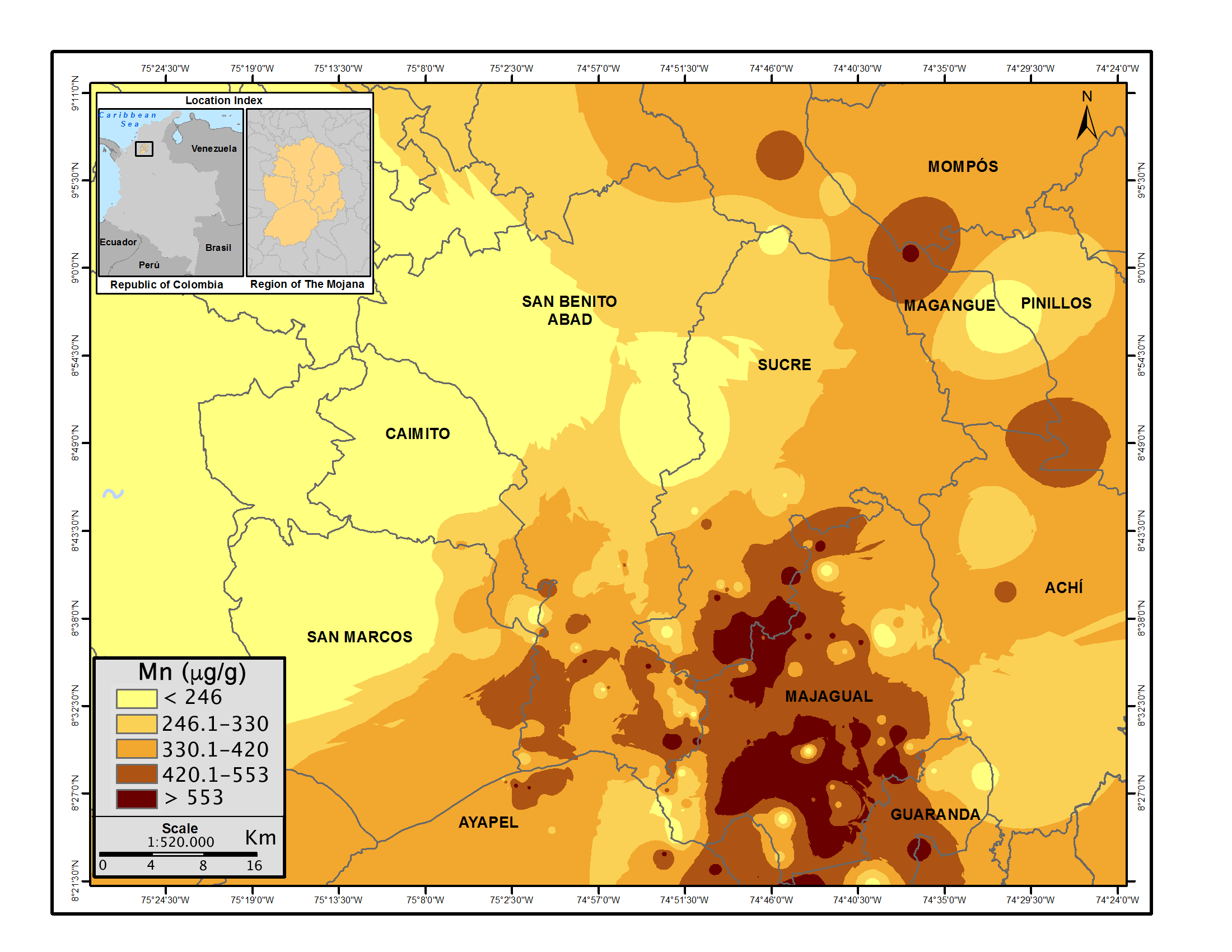
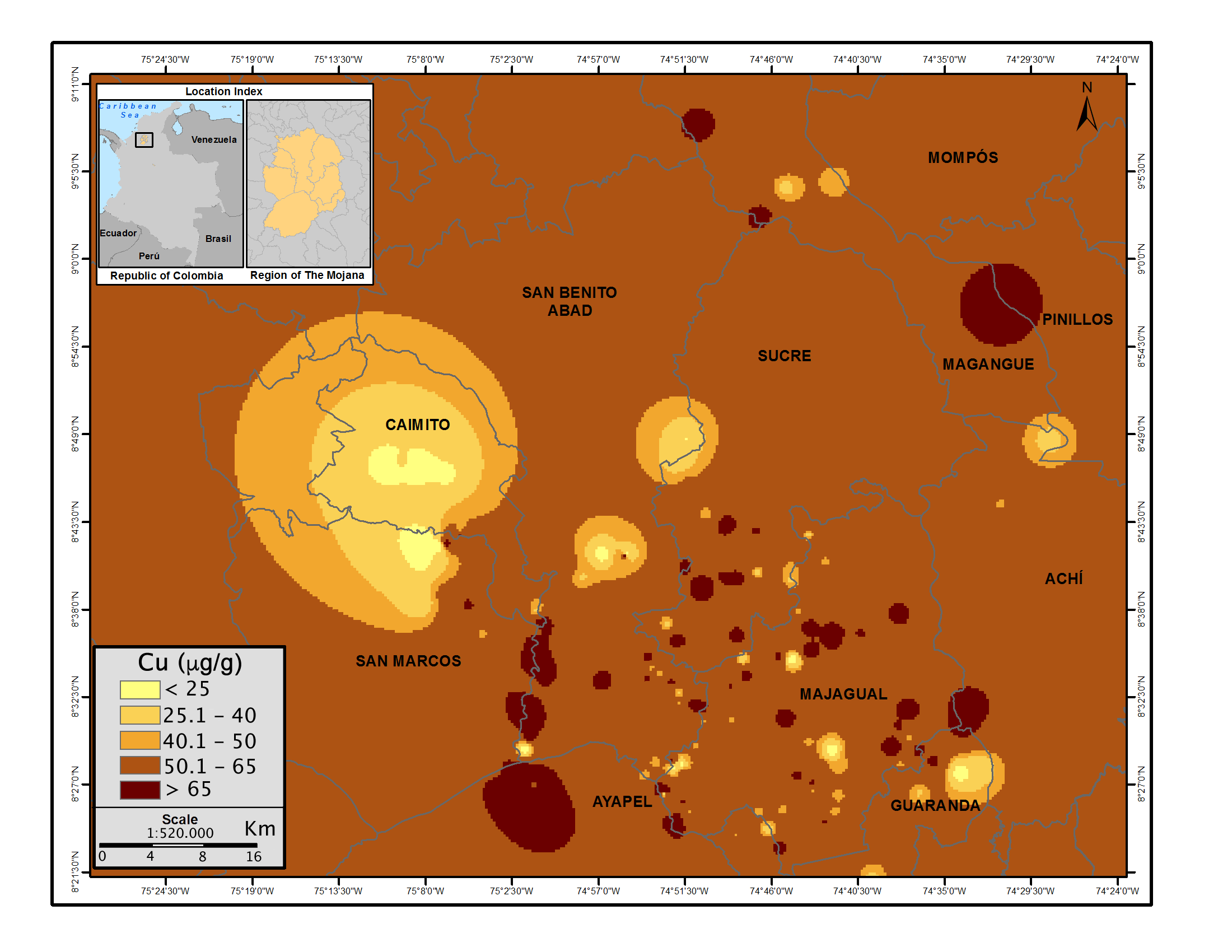


Figure S2. Loading plot of PC1, PC2 and PC3

