

# Rare Earth Elements (REE) in Al- and Fe- (Oxy)-Hydroxides in Bauxites of Provence and Languedoc (Southern France): Implications for the Potential Recovery of REEs as by-Products of Bauxite Mining

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**Table S1.** Element menu and ICP-MS dwell time settings employed to obtain the compositions of the various minerals with LA-ICP-MS.

|                              |                              |
|------------------------------|------------------------------|
| <b>Investigated minerals</b> | Boehmite, goethite, hematite |
| <b>Method name</b>           | FeOxHOx3                     |
| <b>Internal standard</b>     | <sup>57</sup> Fe             |
| <b>External standard</b>     | GSD-1g                       |
| <b>2nd standard</b>          | NIST 612                     |
| <b>3rd standard</b>          | NIST 2782                    |
| <b>4th standard</b>          | BC_28*                       |

| <b>Element</b>   | <b>Quadrupole dwell time (ms)</b> | <b>Element</b>    | <b>Quadrupole dwell time (ms)</b> |
|------------------|-----------------------------------|-------------------|-----------------------------------|
| <sup>24</sup> Mg | 10                                | <sup>115</sup> In | 10                                |
| <sup>27</sup> Al | 10                                | <sup>139</sup> La | 20                                |
| <sup>29</sup> Si | 5                                 | <sup>140</sup> Ce | 20                                |
| <sup>39</sup> K  | 5                                 | <sup>141</sup> Pr | 10                                |
| <sup>43</sup> Ca | 10                                | <sup>146</sup> Nd | 10                                |
| <sup>45</sup> Sc | 10                                | <sup>147</sup> Sm | 10                                |
| <sup>47</sup> Ti | 10                                | <sup>153</sup> Eu | 10                                |
| <sup>51</sup> V  | 10                                | <sup>157</sup> Gd | 10                                |
| <sup>53</sup> Cr | 10                                | <sup>159</sup> Tb | 10                                |
| <sup>55</sup> Mn | 10                                | <sup>163</sup> Dy | 10                                |
| <sup>57</sup> Fe | 10                                | <sup>165</sup> Ho | 10                                |
| <sup>59</sup> Co | 10                                | <sup>166</sup> Er | 10                                |
| <sup>60</sup> Ni | 10                                | <sup>169</sup> Tm | 10                                |
| <sup>66</sup> Zn | 10                                | <sup>172</sup> Yb | 20                                |
| <sup>69</sup> Ga | 10                                | <sup>175</sup> Lu | 10                                |
| <sup>71</sup> Ga | 10                                | <sup>208</sup> Pb | 10                                |
| <sup>88</sup> Sr | 10                                | <sup>232</sup> Th | 10                                |
| <sup>89</sup> Y  | 10                                | <sup>238</sup> U  | 10                                |

\* in-house magnetite standard [36].

Table S2. Major (EDS) and trace (LA-ICP-MS) element composition of Al-hydroxides.

| Laser ablation spot  | Al <sub>2</sub> O <sub>3</sub> | SiO <sub>2</sub> | TiO <sub>2</sub> | Fe <sub>2</sub> O <sub>3</sub> | Total | Sc    | V   | Cr   | Mn   | Co   | Ni   | Ga   | Y    | La   | Ce   | Pr   | Nd   | Sm   | Eu    | Gd   | Tb    | Dy   | Ho    | Er    | Tm    | Yb   | Lu    |
|----------------------|--------------------------------|------------------|------------------|--------------------------------|-------|-------|-----|------|------|------|------|------|------|------|------|------|------|------|-------|------|-------|------|-------|-------|-------|------|-------|
|                      | wt.%                           |                  |                  |                                |       | mg/kg |     |      |      |      |      |      |      |      |      |      |      |      |       |      |       |      |       |       |       |      |       |
| LBP7_Site_28_Sp_1    | 78.1                           | 0.3              | 0.5              | 6.9                            | 85.8  | 20.9  | 209 | 221  | 68.1 | 7.59 | 35.9 | 131  | 9.23 | 70.9 | 134  | 15.7 | 54.7 | 8.35 | 1.28  | 3.56 | 0.328 | 1.92 | 0.352 | 1.07  | 0.177 | 1.26 | 0.185 |
| LBP7_Site_28_Sp_2    | 76.8                           | 0.3              | 0.7              | 6.7                            | 84.5  | 20.5  | 201 | 210  | 64.5 | 7.52 | 33.6 | 125  | 9.05 | 69.2 | 131  | 15.0 | 53.9 | 8.09 | 1.27  | 3.53 | 0.353 | 1.84 | 0.361 | 1.10  | 0.179 | 1.12 | 0.203 |
| LBP7_Site_28_Sp_3    | 69.6                           | 0.3              | 0.3              | 7.4                            | 77.7  | 23.3  | 214 | 230  | 74.4 | 8.45 | 50.8 | 124  | 14.3 | 111  | 184  | 23.8 | 83.6 | 13.0 | 2.04  | 6.03 | 0.603 | 3.02 | 0.544 | 1.63  | 0.254 | 1.81 | 0.296 |
| LBP7_Site_28_Sp_4    | 72.3                           | 0.6              | 1.0              | 7.1                            | 81.0  | 20.7  | 202 | 227  | 72.5 | 8.23 | 44.1 | 109  | 10.9 | 103  | 188  | 23.2 | 79.4 | 12.5 | 1.96  | 4.82 | 0.478 | 2.16 | 0.373 | 1.28  | 0.193 | 1.23 | 0.196 |
| LBP7_Site_28_Sp_5    | 70.4                           | 1.1              | 2.3              | 5.8                            | 79.6  | 20.7  | 172 | 192  | 58.7 | 8.25 | 58.1 | 87.0 | 14.7 | 118  | 195  | 25.6 | 91.0 | 15.0 | 2.18  | 5.75 | 0.660 | 3.05 | 0.561 | 1.66  | 0.238 | 1.73 | 0.242 |
| LBP7_Site_28_Sp_7    | 73.1                           | 0.3              | 0.5              | 4.6                            | 78.5  | 16.2  | 145 | 147  | 56.9 | 5.81 | 30.6 | 112  | 9.02 | 87.2 | 146  | 19.0 | 77.5 | 10.2 | 1.52  | 4.14 | 0.401 | 1.84 | 0.289 | 0.960 | 0.159 | 1.11 | 0.202 |
| Vil_IV5_Site_20_Sp_2 | 74.2                           | 6.0              | 1.7              | 4.5                            | 86.4  | 18.2  | 197 | 133  | 17   | 9.3  | 64.8 | 68   | 42.8 | 43   | 131  | 10.0 | 36.7 | 8.15 | 1.74  | 7.22 | 1.16  | 7.10 | 1.54  | 4.56  | 0.700 | 4.77 | 0.648 |
| Vil_IV5_Site_20_Sp_3 | 71.2                           | 1.7              | 1.3              | 5.4                            | 79.5  | 16.6  | 136 | 125  | 19   | 6.2  | 23.0 | 80   | 26.2 | 17   | 44   | 4.0  | 14.0 | 3.95 | 0.93  | 3.30 | 0.55  | 4.58 | 1.08  | 3.65  | 0.554 | 4.90 | 0.705 |
| Vil_IV5_Site_20_Sp_4 | 72.4                           | 6.0              | 4.2              | 5.0                            | 87.6  | 13.8  | 142 | 140  | 17   | 6.5  | 34.9 | 64   | 17.8 | 22   | 50   | 4.5  | 15.5 | 2.61 | 0.76  | 2.93 | 0.46  | 3.47 | 0.61  | 2.34  | 0.374 | 2.38 | 0.387 |
| LUP_A4_Site_6_Sp_2   | 76.4                           | 0.4              | 2.4              | 4.8                            | 83.9  | 25.6  | 265 | 164  | 71.3 | 10.2 | 31.2 | 102  | 35.0 | 20.0 | 57.5 | 3.49 | 10.0 | 2.35 | 0.745 | 3.23 | 0.586 | 4.70 | 1.16  | 4.57  | 0.645 | 5.39 | 0.701 |
| LUP_A4_Site_6_Sp_3   | 78.6                           | 0.7              | 1.7              | 2.2                            | 83.1  | 20.3  | 225 | 159  | 112  | 6.10 | 66.5 | 113  | 37.3 | 106  | 312  | 17.5 | 55.6 | 8.85 | 1.82  | 6.69 | 0.925 | 6.01 | 1.22  | 3.87  | 0.592 | 4.88 | 0.778 |
| LUP_A4_Site_7_Sp_1   | 75.1                           | 0.2              | 2.6              | 2.3                            | 80.2  | 21.8  | 206 | 117  | 497  | 9.11 | 68.7 | 139  | 28.4 | 15.3 | 65.6 | 3.80 | 12.9 | 2.47 | 0.657 | 3.13 | 0.461 | 3.71 | 0.812 | 2.98  | 0.488 | 3.41 | 0.526 |
| LUP_A4_Site_7_Sp_2   | 77.0                           | 0.3              | 1.0              | 2.0                            | 80.4  | 15.9  | 166 | 91.9 | 485  | 7.60 | 54.2 | 106  | 20.9 | 9.57 | 43.4 | 2.33 | 9.59 | 2.20 | 0.517 | 2.38 | 0.376 | 2.63 | 0.618 | 2.21  | 0.332 | 2.48 | 0.375 |
| LUP_A4_Site_7_Sp_3   | 78.7                           | 0.4              | 1.0              | 1.9                            | 81.9  | 17.6  | 175 | 93.6 | 356  | 6.51 | 45.5 | 98.2 | 24.3 | 9.18 | 42.1 | 2.14 | 8.34 | 2.19 | 0.466 | 2.60 | 0.469 | 2.68 | 0.765 | 2.89  | 0.418 | 3.39 | 0.522 |
| LUP_A4_Site_8_Sp_3   | 82.4                           | 0.5              | 2.2              | 3.3                            | 88.3  | 24.7  | 239 | 139  | 66.5 | 3.64 | 26.3 | 98.7 | 28.1 | 12.9 | 32.7 | 2.49 | 8.27 | 2.29 | 0.486 | 2.25 | 0.495 | 4.06 | 0.971 | 3.27  | 0.479 | 3.48 | 0.609 |
| LUP_A4_Site_8_Sp_4   | 81.4                           | 0.5              | 2.0              | 3.3                            | 87.1  | 19.5  | 209 | 126  | 43.6 | 5.12 | 19.7 | 86.8 | 23.1 | 7.45 | 38.8 | 1.62 | 6.29 | 1.44 | 0.385 | 1.62 | 0.382 | 3.19 | 0.774 | 2.52  | 0.403 | 3.14 | 0.462 |
| LUP_A4_Site_9_Sp_4   | 83.5                           | 0.7              | 2.1              | 2.7                            | 89.0  | 25.9  | 252 | 196  | 46.2 | 3.79 | 29.0 | 111  | 31.0 | 4.07 | 15.9 | 1.01 | 3.85 | 1.26 | 0.392 | 1.71 | 0.460 | 3.90 | 1.08  | 3.71  | 0.662 | 5.28 | 0.778 |
| LUP_A4_Site_9_Sp_5   | 77.9                           | 0.7              | 2.6              | 2.7                            | 83.9  | 24.4  | 274 | 196  | 86.8 | 4.30 | 29.4 | 88.7 | 35.3 | 20.3 | 63.6 | 3.23 | 10.9 | 2.64 | 0.687 | 2.78 | 0.539 | 5.02 | 1.08  | 3.74  | 0.634 | 4.40 | 0.697 |
| LUP_A4_Site_9_Sp_6   | 79.4                           | 0.3              | 1.4              | 2.8                            | 83.8  | 24.9  | 214 | 197  | 126  | 3.48 | 27.1 | 98.6 | 27.9 | 47.6 | 84.3 | 7.03 | 19.5 | 3.33 | 0.868 | 3.17 | 0.526 | 4.20 | 0.866 | 2.98  | 0.521 | 3.38 | 0.633 |
| LUP_A4_Site_14_Sp_1  | 81.1                           | 0.4              | 0.3              | 2.0                            | 83.8  | 11.5  | 134 | 66.2 | 164  | 7.45 | 54.2 | 71.9 | 21.8 | 120  | 254  | 18.4 | 52.8 | 7.42 | 1.51  | 6.09 | 0.730 | 4.34 | 0.717 | 2.02  | 0.286 | 2.06 | 0.336 |
| LUP_A4_Site_15_Sp_1  | 80.1                           | 0.3              | 0.5              | 2.8                            | 83.7  | 14.8  | 222 | 108  | 273  | 9.58 | 80.8 | 139  | 30.2 | 178  | 419  | 28.4 | 81.4 | 11.7 | 2.25  | 8.42 | 0.973 | 6.40 | 1.16  | 3.64  | 0.366 | 2.96 | 0.497 |
| LUP_A4_Site_15_Sp_2  | 82.5                           | 0.3              | 1.5              | 1.8                            | 86.0  | 12.2  | 158 | 94.6 | 199  | 6.29 | 54.3 | 96.0 | 19.9 | 112  | 283  | 18.7 | 52.1 | 7.76 | 1.59  | 4.96 | 0.802 | 3.73 | 0.680 | 2.34  | 0.289 | 1.90 | 0.371 |
| LUP_A4_Site_15_Sp_3  | 79.8                           | 0.5              | 0.6              | 2.8                            | 83.6  | 16.6  | 198 | 94.8 | 241  | 8.99 | 77.9 | 114  | 28.1 | 164  | 390  | 26.7 | 70.9 | 12.1 | 1.95  | 7.55 | 0.959 | 6.13 | 0.874 | 2.90  | 0.455 | 3.23 | 0.705 |
| LUP_A4_Site_16_Sp_3  | 80.1                           | 0.8              | 0.6              | 2.2                            | 83.7  | 16.5  | 214 | 97.6 | 260  | 9.00 | 83.2 | 123  | 35.3 | 191  | 423  | 32.2 | 82.0 | 12.4 | 2.31  | 8.96 | 1.09  | 6.07 | 1.16  | 2.98  | 0.559 | 3.63 | 0.527 |
| LUP_A4_Site_19_Sp_1  | 82.5                           | 0.1              | 0.3              | 2.0                            | 84.9  | 8.01  | 176 | 117  | 298  | 8.00 | 79.3 | 142  | 11.5 | 54.7 | 128  | 8.96 | 22.7 | 3.65 | 0.678 | 2.58 | 0.293 | 2.04 | 0.429 | 1.16  | 0.152 | 1.26 | 0.180 |
| LUP_A4_Site_19_Sp_2  | 79.8                           | 0.1              | 0.3              | 2.0                            | 82.1  | 9.02  | 180 | 126  | 293  | 8.21 | 77.2 | 137  | 14.4 | 76.5 | 170  | 12.4 | 32.7 | 4.39 | 0.900 | 3.39 | 0.426 | 2.25 | 0.379 | 1.29  | 0.210 | 1.46 | 0.188 |
| LUP_A4_Site_19_Sp_3  | 78.4                           | 1.0              | 1.0              | 2.0                            | 82.4  | 11.3  | 198 | 126  | 271  | 7.62 | 72.8 | 127  | 22.6 | 152  | 340  | 24.2 | 64.9 | 9.19 | 1.96  | 6.38 | 0.835 | 4.17 | 0.782 | 2.08  | 0.320 | 2.30 | 0.339 |
| LUP_A4_Site_20_Sp_1  | 83.7                           | 1.6              | 1.3              | 2.0                            | 88.5  | 15.2  | 201 | 116  | 247  | 8.64 | 74.3 | 111  | 30.1 | 181  | 395  | 28.3 | 79.2 | 12.4 | 2.25  | 8.15 | 1.04  | 5.77 | 0.966 | 2.79  | 0.457 | 3.07 | 0.456 |
| LUP_A4_Site_20_Sp_3  | 77.7                           | 0.5              | 1.8              | 1.8                            | 81.8  | 14.0  | 196 | 115  | 244  | 7.99 | 72.7 | 110  | 29.6 | 170  | 398  | 26.7 | 75.5 | 11.3 | 2.29  | 7.79 | 1.06  | 5.44 | 0.972 | 3.14  | 0.388 | 2.83 | 0.472 |
| LUP_A4-Site_6_Sp_1   | 78.6                           | 1.3              | 2.0              | 1.9                            | 83.7  | 21.2  | 222 | 182  | 124  | 6.05 | 70.1 | 119  | 47.2 | 119  | 335  | 20.6 | 56.7 | 9.22 | 1.99  | 7.80 | 1.17  | 7.96 | 1.62  | 5.08  | 0.782 | 5.67 | 0.864 |
| LUP_A4-Site_6_Sp_2   | 78.9                           | 1.2              | 1.8              | 2.0                            | 83.9  | 31.3  | 232 | 204  | 120  | 6.65 | 80.9 | 110  | 171  | 120  | 327  | 20.7 | 62.3 | 10.1 | 2.36  | 12.6 | 2.42  | 20.0 | 5.10  | 19.7  | 3.17  | 20.2 | 2.99  |
| LUP_A4-Site_7_Sp_1   | 79.8                           | 0.6              | 0.8              | 3.1                            | 84.3  | 23.5  | 184 | 305  | 301  | 9.45 | 122  | 132  | 33.1 | 14.0 | 30.2 | 3.14 | 12.0 | 2.71 | 0.729 | 3.25 | 0.556 | 4.09 | 0.995 | 3.22  | 0.444 | 3.78 | 0.529 |
| LUP_A4-Site_7_Sp_2   | 79.2                           | 0.4              | 0.4              | 3.0                            | 83.0  | 20.2  | 162 | 282  | 252  | 11.0 | 111  | 113  | 28.7 | 10.8 | 27.4 | 2.53 | 10.2 | 2.61 | 0.585 | 2.84 | 0.486 | 3.57 | 0.876 | 2.79  | 0.444 | 3.06 | 0.470 |
| LUP_A4-Site_7_Sp_3   | 75.1                           | 0.5              | 0.5              | 2.6                            | 78.7  |       |     |      |      |      |      |      |      |      |      |      |      |      |       |      |       |      |       |       |       |      |       |

|                      |      |     |     |     |      |      |      |      |      |      |      |      |      |      |      |       |      |       |       |       |       |       |       |       |       |       |       |
|----------------------|------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| LUP_A15_Site_6_Sp_1  | 78.9 | 0.8 | 1.3 | 2.8 | 83.8 | 11.9 | 85.5 | 49.3 | 91.7 | 6.05 | 34.7 | 37.2 | 10.3 | 58.7 | 160  | 12.3  | 27.1 | 3.86  | 0.731 | 2.56  | 0.321 | 1.68  | 0.321 | 1.04  | 0.134 | 1.13  | 0.158 |
| LUP_A15_Site_6_Sp_3  | 79.9 | 0.8 | 1.9 | 3.8 | 86.3 | 16.3 | 106  | 65.4 | 496  | 12.7 | 23.6 | 38.7 | 7.80 | 7.56 | 22.4 | 1.63  | 4.66 | 1.11  | 0.222 | 0.935 | 0.188 | 1.33  | 0.298 | 0.939 | 0.140 | 1.15  | 0.189 |
| LUP_A15_Site_9_Sp_5  | 78.0 | 0.7 | 0.4 | 3.3 | 82.3 | 14.6 | 167  | 89.5 | 251  | 11.4 | 67.7 | 124  | 10.6 | 56.9 | 97.1 | 9.24  | 21.3 | 2.76  | 0.646 | 1.81  | 0.272 | 1.70  | 0.368 | 1.11  | 0.170 | 1.28  | 0.201 |
| LUP_A15_Site_11_Sp_1 | 75.2 | 0.6 | 2.2 | 3.3 | 81.3 | 19.1 | 187  | 88.6 | 193  | 9.78 | 60.9 | 99.6 | 19.0 | 102  | 232  | 15.6  | 37.3 | 5.85  | 1.12  | 3.79  | 0.530 | 3.36  | 0.645 | 2.16  | 0.341 | 2.34  | 0.310 |
| LUP_A15_Site_11_Sp_3 | 77.0 | 0.9 | 1.2 | 3.2 | 82.4 | 19.3 | 189  | 87.5 | 190  | 9.90 | 62.0 | 95.4 | 18.7 | 91.7 | 208  | 13.7  | 34.5 | 5.16  | 0.998 | 3.71  | 0.460 | 2.84  | 0.637 | 2.15  | 0.326 | 2.57  | 0.426 |
| LUP_A15_Site_11_Sp_4 | 79.5 | 0.5 | 1.4 | 4.8 | 86.1 | 26.6 | 272  | 130  | 262  | 14.1 | 88.9 | 140  | 29.8 | 136  | 308  | 20.7  | 50.5 | 7.29  | 1.47  | 5.35  | 0.736 | 4.84  | 0.980 | 3.12  | 0.522 | 3.47  | 0.541 |
| LUP_A15_Site_11_Sp_6 | 78.0 | 0.5 | 1.3 | 3.1 | 82.8 | 18.5 | 189  | 89.7 | 169  | 9.35 | 61.6 | 91.0 | 21.3 | 84.3 | 190  | 12.6  | 30.5 | 4.49  | 0.857 | 3.55  | 0.508 | 3.47  | 0.721 | 2.34  | 0.329 | 2.81  | 0.411 |
| LUP_A15_Site_12_Sp_1 | 78.7 | 0.5 | 0.7 | 4.2 | 84.1 | 10.1 | 103  | 65.1 | 37.9 | 3.86 | 11.6 | 14.5 | 8.18 | 5.22 | 19.1 | 1.21  | 3.13 | 0.651 | 0.227 | 0.843 | 0.169 | 1.27  | 0.281 | 0.968 | 0.145 | 1.06  | 0.159 |
| LUP_A15_Site_12_Sp_3 | 76.2 | 0.4 | 1.6 | 3.0 | 81.2 | 7.12 | 74.4 | 50.1 | 32.1 | 2.39 | 6.89 | 7.71 | 5.39 | 4.13 | 13.6 | 0.909 | 2.36 | 0.425 | 0.112 | 0.500 | 0.100 | 0.784 | 0.186 | 0.645 | 0.100 | 0.785 | 0.120 |
| LUP_A15_Site_12_Sp_5 | 78.1 | 0.3 | 0.8 | 4.5 | 83.6 | 10.6 | 94.8 | 59.8 | 35.7 | 3.85 | 10.0 | 8.82 | 8.61 | 4.33 | 16.2 | 0.997 | 2.63 | 0.511 | 0.128 | 0.700 | 0.145 | 1.19  | 0.304 | 1.07  | 0.174 | 1.40  | 0.217 |
| LUP_A15_Site_12_Sp_6 | 77.1 | 0.5 | 2.0 | 4.8 | 84.5 | 10.5 | 107  | 73.8 | 37.6 | 3.99 | 9.52 | 11.8 | 7.40 | 8.57 | 37.9 | 2.29  | 5.35 | 0.932 | 0.209 | 1.00  | 0.190 | 1.27  | 0.291 | 0.894 | 0.132 | 0.929 | 0.135 |
| LUP_A15_Site_19_Sp_2 | 77.1 | 0.7 | 1.3 | 4.0 | 83.0 | 33.3 | 292  | 145  | 144  | 11.2 | 48.1 | 178  | 23.2 | 18.1 | 36.3 | 2.69  | 7.41 | 1.92  | 0.524 | 2.17  | 0.451 | 3.03  | 0.745 | 2.68  | 0.412 | 3.38  | 0.471 |
| LUP_A15_Site_25_Sp_3 | 83.3 | 0.3 | 0.2 | 1.0 | 84.8 | 9.33 | 173  | 137  | 17.6 | 4.14 | 40.6 | 45.0 | 10.9 | 1.74 | 4.40 | 0.308 | 1.17 | 0.366 | 0.134 | 0.674 | 0.166 | 1.48  | 0.369 | 1.39  | 0.210 | 1.52  | 0.178 |
| LUP_A15_Site_25_Sp_4 | 76.3 | 0.5 | 2.1 | 2.3 | 81.1 | 22.2 | 310  | 288  | 46.7 | 9.19 | 84.1 | 90.9 | 24.4 | 5.84 | 14.0 | 0.963 | 3.06 | 0.905 | 0.330 | 1.85  | 0.405 | 3.74  | 0.766 | 2.72  | 0.412 | 2.88  | 0.446 |
| LUP_A15_Site_26_Sp_1 | 77.2 | 0.5 | 0.8 | 3.7 | 82.1 | 13.7 | 184  | 159  | 156  | 7.84 | 47.5 | 77.3 | 8.72 | 30.1 | 43.5 | 3.46  | 7.69 | 1.50  | 0.239 | 1.11  | 0.197 | 1.27  | 0.301 | 0.995 | 0.153 | 1.05  | 0.153 |
| LUP_A15_Site_26_Sp_2 | 81.1 | 1.9 | 0.8 | 2.6 | 86.3 | 16.7 | 172  | 153  | 175  | 10.4 | 64.3 | 91.1 | 24.8 | 61.8 | 93.5 | 8.91  | 22.3 | 3.17  | 0.671 | 2.80  | 0.380 | 3.13  | 0.910 | 2.94  | 0.437 | 3.07  | 0.531 |
| LUP_A15_Site_26_Sp_3 | 77.4 | 1.1 | 2.1 | 2.5 | 83.1 | 35.6 | 201  | 207  | 85.9 | 12.0 | 37.2 | 109  | 23.6 | 26.3 | 38.2 | 3.83  | 10.3 | 2.11  | 0.547 | 2.39  | 0.409 | 3.78  | 0.907 | 3.01  | 0.483 | 3.62  | 0.572 |
| LUP_A15_Site_26_Sp_4 | 74.1 | 0.7 | 3.8 | 2.8 | 81.5 | 46.9 | 200  | 220  | 132  | 13.5 | 45.0 | 119  | 49.3 | 27.6 | 29.6 | 3.33  | 8.86 | 1.95  | 0.652 | 3.28  | 0.708 | 5.84  | 1.53  | 6.44  | 0.959 | 8.15  | 1.31  |
| LUP_A15_Site_28_Sp_1 | 79.0 | 0.2 | 0.8 | 2.3 | 82.3 | 24.5 | 187  | 160  | 158  | 7.27 | 47.4 | 133  | 15.5 | 28.0 | 40.2 | 3.71  | 10.5 | 1.91  | 0.514 | 1.97  | 0.351 | 2.45  | 0.532 | 1.78  | 0.281 | 1.99  | 0.260 |
| LUP_A15_Site_28_Sp_2 | 78.7 | 0.3 | 0.6 | 2.2 | 81.7 | 23.8 | 192  | 163  | 148  | 6.87 | 47.6 | 127  | 14.3 | 26.1 | 38.7 | 3.60  | 10.2 | 1.95  | 0.465 | 1.69  | 0.271 | 2.25  | 0.465 | 1.59  | 0.236 | 1.99  | 0.283 |
| LUP_A15_Site_28_Sp_3 | 78.2 | 0.3 | 0.9 | 1.8 | 81.2 | 20.3 | 111  | 99.0 | 84.8 | 4.69 | 25.1 | 88.1 | 12.4 | 10.9 | 18.8 | 1.57  | 4.85 | 1.02  | 0.276 | 1.21  | 0.231 | 1.89  | 0.387 | 1.23  | 0.191 | 1.48  | 0.205 |
| LUP_A15_Site_29_Sp_4 | 78.3 | 0.4 | 0.6 | 3.2 | 82.5 | 20.0 | 150  | 157  | 241  | 8.54 | 49.5 | 93.2 | 15.6 | 16.9 | 30.2 | 2.33  | 7.05 | 1.43  | 0.406 | 1.43  | 0.292 | 2.24  | 0.477 | 1.68  | 0.270 | 2.04  | 0.295 |
| LUP_A15_Site_31_Sp_1 | 80.8 | 0.5 | 1.5 | 1.7 | 84.5 | 15.8 | 154  | 86.8 | 188  | 9.29 | 57.9 | 118  | 14.2 | 68.8 | 98.9 | 10.7  | 25.2 | 3.14  | 0.658 | 2.61  | 0.361 | 2.30  | 0.466 | 1.71  | 0.289 | 2.01  | 0.305 |

**Table S3.** Major (EDS) and trace (LA-ICP-MS) element composition of Fe-oxy-hydroxides.

| Laser ablation spot  | Al <sub>2</sub> O <sub>3</sub> | SiO <sub>2</sub> | TiO <sub>2</sub> | Fe <sub>2</sub> O <sub>3</sub> | Total | Sc    | V    | Cr   | Mn  | Co   | Ni    | Ga   | Y    | La   | Ce    | Pr    | Nd   | Sm    | Eu    | Gd    | Tb    | Dy    | Ho    | Er    | Tm    | Yb    | Lu    |
|----------------------|--------------------------------|------------------|------------------|--------------------------------|-------|-------|------|------|-----|------|-------|------|------|------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                      | wt.%                           |                  |                  |                                |       | mg/kg |      |      |     |      |       |      |      |      |       |       |      |       |       |       |       |       |       |       |       |       |       |
| LBP7_Site_5_Sp_4     | 3.0                            | 0.7              | 1.5              | 90.5                           | 95.71 | 91.3  | 1567 | 1337 | 233 | 22.3 | 47.6  | 39.1 | 32.9 | 1.88 | 457   | 1.69  | 9.49 | 4.10  | 1.21  | 6.19  | 1.02  | 6.60  | 1.30  | 4.36  | 0.610 | 4.06  | 0.582 |
| LBP7_Site_6_Sp_1     | 3.8                            | 0.3              | 2.2              | 91.6                           | 97.78 | 85.9  | 1125 | 1364 | 158 | 16.8 | 24.0  | 30.3 | 37.3 | 2.64 | 181   | 1.65  | 8.18 | 3.60  | 0.950 | 4.34  | 0.750 | 6.30  | 1.40  | 4.64  | 0.774 | 6.11  | 0.914 |
| LBP7_Site_6_Sp_2     | 3.7                            | 0.3              | 2.3              | 91.2                           | 97.54 | 88.8  | 1655 | 1335 | 202 | 24.1 | 41.1  | 38.8 | 30.9 | 2.15 | 317   | 1.71  | 9.62 | 4.47  | 0.997 | 5.23  | 0.851 | 6.09  | 1.27  | 3.96  | 0.566 | 4.11  | 0.616 |
| LBP7_Site_6_Sp_3     | 3.3                            | 0.5              | 1.9              | 90.9                           | 96.65 | 87.0  | 1104 | 1430 | 222 | 20.7 | 34.1  | 27.9 | 30.9 | 2.42 | 183   | 1.76  | 9.23 | 3.91  | 1.03  | 4.87  | 0.849 | 5.90  | 1.20  | 3.89  | 0.605 | 4.32  | 0.634 |
| LBP7_Site_6_Sp_4     | 3.6                            | 0.3              | 1.9              | 91.8                           | 97.57 | 77.4  | 964  | 1357 | 137 | 13.5 | 18.5  | 26.9 | 24.6 | 2.58 | 119   | 1.39  | 7.21 | 2.86  | 0.723 | 3.68  | 0.638 | 4.40  | 0.949 | 2.99  | 0.478 | 3.60  | 0.531 |
| LBP7_Site_6_Sp_5     | 3.6                            | 0.6              | 4.7              | 88.1                           | 97.01 | 85.7  | 1213 | 1387 | 203 | 20.0 | 33.6  | 28.5 | 127  | 2.35 | 195   | 1.71  | 9.09 | 4.45  | 1.34  | 9.36  | 2.10  | 17.4  | 4.14  | 12.3  | 1.68  | 10.5  | 1.35  |
| LBP7_Site_6_Sp_6     | 3.2                            | 0.5              | 2.0              | 90.1                           | 95.82 | 84.6  | 919  | 1375 | 193 | 17.3 | 24.2  | 28.1 | 27.9 | 2.45 | 144   | 1.70  | 8.62 | 3.51  | 0.893 | 4.48  | 0.778 | 5.09  | 1.08  | 3.57  | 0.526 | 3.80  | 0.581 |
| LBP7_Site_9_Sp_2     | 4.2                            | 0.2              | 0.4              | 91.0                           | 95.89 | 65.6  | 1043 | 1085 | 223 | 11.4 | 30.2  | 46.5 | 9.74 | 1.94 | 154   | 0.964 | 5.17 | 2.08  | 0.496 | 2.44  | 0.379 | 2.27  | 0.407 | 1.35  | 0.190 | 1.32  | 0.200 |
| LBP7_Site_9_Sp_4     | 4.6                            | 0.2              | 0.5              | 91.5                           | 96.72 | 58.5  | 928  | 1203 | 136 | 9.99 | 26.1  | 47.8 | 8.97 | 2.36 | 92.0  | 0.865 | 4.55 | 1.70  | 0.427 | 1.93  | 0.305 | 1.86  | 0.388 | 1.25  | 0.192 | 1.28  | 0.208 |
| LBP7_Site_10_Sp_1    | 3.9                            | 0.4              | 0.5              | 92.8                           | 97.63 | 55.9  | 997  | 1207 | 118 | 9.00 | 26.2  | 21.0 | 9.00 | 6.55 | 93.7  | 1.28  | 4.86 | 1.33  | 0.383 | 1.84  | 0.275 | 1.76  | 0.378 | 1.10  | 0.174 | 1.24  | 0.182 |
| LBP7_Site_10_Sp_2    | 3.9                            | 0.4              | 0.4              | 92.1                           | 96.77 | 57.0  | 1000 | 830  | 118 | 9.05 | 26.0  | 17.0 | 6.29 | 3.70 | 78.7  | 0.960 | 4.20 | 1.39  | 0.322 | 1.38  | 0.200 | 1.25  | 0.342 | 0.822 | 0.122 | 0.881 | 0.120 |
| LBP7_Site_10_Sp_3    | 3.4                            | 0.3              | 0.5              | 88.6                           | 92.84 | 56.3  | 1039 | 781  | 113 | 9.49 | 28.8  | 17.5 | 6.49 | 3.19 | 97.2  | 0.888 | 4.15 | 1.25  | 0.323 | 1.49  | 0.209 | 1.49  | 0.272 | 0.869 | 0.148 | 0.949 | 0.133 |
| LBP7_Site_10_Sp_4    | 3.8                            | 0.5              | 0.4              | 92.8                           | 97.50 | 56.8  | 1008 | 821  | 119 | 9.38 | 27.2  | 17.3 | 6.28 | 4.15 | 81.6  | 0.989 | 4.31 | 1.29  | 0.344 | 1.39  | 0.215 | 1.29  | 0.265 | 0.791 | 0.136 | 0.932 | 0.146 |
| LBP7_Site_10_Sp_5    | 3.6                            | 0.4              | 0.3              | 91.9                           | 96.21 | 58.6  | 1144 | 808  | 124 | 10.1 | 32.4  | 19.8 | 7.81 | 4.94 | 106   | 1.14  | 5.34 | 1.35  | 0.345 | 1.71  | 0.244 | 1.48  | 0.359 | 0.992 | 0.125 | 1.16  | 0.156 |
| LBP7_Site_12_Sp_1    | 3.6                            | 1.2              | 1.9              | 88.6                           | 95.33 | 117   | 2052 | 1585 | 459 | 29.7 | 47.5  | 33.3 | 43.7 | 39.7 | 682   | 7.76  | 30.6 | 8.72  | 2.07  | 9.52  | 1.40  | 8.58  | 1.80  | 5.20  | 0.738 | 5.29  | 0.737 |
| LBP7_Site_13_Sp_2    | 4.1                            | 1.1              | 1.2              | 83.7                           | 90.10 | 99.7  | 1618 | 1410 | 497 | 22.1 | 43.3  | 42.2 | 29.3 | 15.2 | 334   | 4.84  | 20.8 | 6.08  | 1.42  | 6.59  | 0.861 | 5.83  | 1.16  | 3.31  | 0.485 | 3.43  | 0.479 |
| LBP7_Site_13_Sp_3    | 4.5                            | 1.1              | 1.2              | 84.6                           | 91.44 | 103   | 1591 | 1575 | 419 | 22.4 | 46.7  | 54.2 | 29.2 | 12.9 | 308   | 4.42  | 19.3 | 6.13  | 1.48  | 6.41  | 0.977 | 6.29  | 1.13  | 3.52  | 0.487 | 3.67  | 0.511 |
| Vil_IV5_Site_5_Sp_1  | 2.4                            | 1.0              | 1.6              | 90.8                           | 95.71 | 83.1  | 1533 | 819  | 239 | 16.9 | 115.2 | 21.3 | 64.4 | 46.4 | 127.4 | 14.7  | 65.9 | 14.78 | 3.10  | 14.02 | 2.035 | 13.19 | 2.70  | 8.33  | 1.168 | 7.72  | 1.078 |
| Vil_IV5_Site_5_Sp_2  | 2.6                            | 1.0              | 1.9              | 92.1                           | 97.57 | 74.8  | 1501 | 949  | 169 | 19.0 | 120.3 | 22.6 | 69.6 | 45.0 | 163.1 | 15.3  | 71.6 | 16.99 | 3.37  | 15.94 | 2.279 | 14.56 | 2.83  | 8.38  | 1.165 | 7.92  | 1.127 |
| Vil_IV5_Site_5_Sp_3  | 2.0                            | 1.5              | 1.3              | 91.7                           | 96.43 | 68.0  | 1388 | 681  | 163 | 19.9 | 103.2 | 22.9 | 65.4 | 35.1 | 149.4 | 16.5  | 78.9 | 17.33 | 3.90  | 15.84 | 2.322 | 13.90 | 2.81  | 8.08  | 1.115 | 7.71  | 1.146 |
| Vil_IV5_Site_13_Sp_1 | 3.2                            | 1.2              | 3.2              | 88.2                           | 95.75 | 81.3  | 1441 | 977  | 320 | 23.2 | 126.9 | 22.6 | 76.1 | 16.2 | 97.9  | 7.6   | 36.5 | 10.18 | 2.31  | 11.64 | 1.920 | 13.68 | 2.91  | 9.28  | 1.423 | 10.04 | 1.566 |
| Vil_IV5_Site_13_Sp_2 | 4.1                            | 1.7              | 1.7              | 89.1                           | 96.55 | 84.9  | 1683 | 1046 | 305 | 23.8 | 122.2 | 22.1 | 61.4 | 12.3 | 79.0  | 5.8   | 28.7 | 8.30  | 2.18  | 9.86  | 1.687 | 11.84 | 2.54  | 8.02  | 1.160 | 8.29  | 1.193 |
| Vil_IV5_Site_13_Sp_3 | 3.3                            | 1.6              | 1.5              | 88.6                           | 95.07 | 78.1  | 1483 | 1017 | 278 | 21.9 | 122.0 | 22.6 | 63.8 | 10.6 | 64.8  | 4.7   | 22.4 | 6.72  | 1.78  | 8.39  | 1.679 | 11.98 | 2.57  | 7.89  | 1.176 | 8.14  | 1.147 |

|                      |     |     |     |      |       |       |      |      |      |       |       |      |       |      |       |      |      |       |      |       |       |       |      |       |       |      |       |
|----------------------|-----|-----|-----|------|-------|-------|------|------|------|-------|-------|------|-------|------|-------|------|------|-------|------|-------|-------|-------|------|-------|-------|------|-------|
| Vil_IV5_Site_13_Sp_4 | 2.9 | 1.1 | 1.5 | 90.6 | 96.06 | 79.3  | 1708 | 1023 | 278  | 24.2  | 125.5 | 21.1 | 62.7  | 11.8 | 76.8  | 5.6  | 27.8 | 8.04  | 1.93 | 9.97  | 1.786 | 12.40 | 2.53 | 8.23  | 1.229 | 8.53 | 1.216 |
| Vil_IV5_Site_22_Sp_1 | 3.7 | 0.9 | 1.0 | 91.4 | 97.01 | 77.7  | 1305 | 472  | 211  | 26.1  | 106   | 49.6 | 54.1  | 12.1 | 74.6  | 6.75 | 38.3 | 9.88  | 2.18 | 10.1  | 1.65  | 10.5  | 2.19 | 6.05  | 0.900 | 6.55 | 0.867 |
| Vil_IV5_Site_22_Sp_2 | 3.5 | 0.9 | 0.8 | 91.8 | 96.95 | 88.9  | 1469 | 480  | 216  | 24.1  | 127   | 36.3 | 62.4  | 13.5 | 81.7  | 7.25 | 38.2 | 10.4  | 2.30 | 11.3  | 1.96  | 12.9  | 2.70 | 8.33  | 1.07  | 8.13 | 1.29  |
| Vil_IV5_Site_22_Sp_3 | 3.8 | 0.7 | 0.8 | 93.2 | 98.60 | 85.1  | 1301 | 527  | 206  | 24.0  | 109   | 52.9 | 60.4  | 11.6 | 71.4  | 6.40 | 33.8 | 9.17  | 2.30 | 9.27  | 1.64  | 11.9  | 2.53 | 7.65  | 1.16  | 8.38 | 1.25  |
| Vil_IV5_Site_22_Sp_4 | 3.5 | 1.0 | 1.0 | 92.5 | 98.01 | 84.2  | 1483 | 484  | 212  | 26.2  | 123   | 37.5 | 58.6  | 12.9 | 81.0  | 6.97 | 36.2 | 9.65  | 2.28 | 11.8  | 1.87  | 12.5  | 2.50 | 7.52  | 1.11  | 7.49 | 1.10  |
| Vil_IV5_Site_23_Sp_1 | 3.2 | 1.3 | 0.7 | 92.1 | 97.17 | 90.7  | 1728 | 351  | 230  | 22.8  | 135   | 37.4 | 69.9  | 16.5 | 99.8  | 8.74 | 43.6 | 11.1  | 2.71 | 13.0  | 2.10  | 14.3  | 2.97 | 9.51  | 1.39  | 9.22 | 1.31  |
| Vil_IV5_Site_23_Sp_2 | 4.1 | 1.8 | 0.8 | 90.9 | 97.50 | 95.2  | 1616 | 387  | 240  | 21.8  | 131   | 37.7 | 68.2  | 16.9 | 90.2  | 8.74 | 43.9 | 11.8  | 2.74 | 13.7  | 2.12  | 13.8  | 2.99 | 8.86  | 1.25  | 8.82 | 1.28  |
| Vil_IV5_Site_23_Sp_3 | 2.8 | 1.4 | 0.8 | 91.8 | 96.71 | 96.5  | 1674 | 391  | 256  | 20.6  | 129   | 33.1 | 72.9  | 18.8 | 97.7  | 9.04 | 46.6 | 12.1  | 2.85 | 13.5  | 2.18  | 14.6  | 3.04 | 8.97  | 1.35  | 8.95 | 1.35  |
| Vil_IV5_Site_23_Sp_4 | 3.4 | 1.1 | 0.9 | 91.4 | 96.78 | 94.0  | 1614 | 406  | 183  | 21.0  | 128   | 42.6 | 64.9  | 14.7 | 84.9  | 7.69 | 40.9 | 11.0  | 2.58 | 12.3  | 1.99  | 13.1  | 2.77 | 8.48  | 1.22  | 8.66 | 1.17  |
| LUP_A4-Site_10_Sp_1  | 2.3 | 1.0 | 0.3 | 80.6 | 84.16 | 228.2 | 765  | 198  | 652  | 88.1  | 286.1 | 36.1 | 98.3  | 13.0 | 623.2 | 9.2  | 49.9 | 14.93 | 3.24 | 14.85 | 2.526 | 17.51 | 3.53 | 10.44 | 1.452 | 9.89 | 1.322 |
| LUP_A4-Site_10_Sp_2  | 2.3 | 0.8 | 0.2 | 81.0 | 84.26 | 222.1 | 743  | 185  | 641  | 90.8  | 289.0 | 35.2 | 96.7  | 13.0 | 629.6 | 9.5  | 51.4 | 15.53 | 3.37 | 15.37 | 2.521 | 17.19 | 3.46 | 10.13 | 1.397 | 9.62 | 1.296 |
| LUP_A4-Site_10_Sp_3  | 2.0 | 1.1 | 0.3 | 81.7 | 85.05 | 209.8 | 717  | 180  | 552  | 88.6  | 282.2 | 35.0 | 92.1  | 12.4 | 661.7 | 9.3  | 50.3 | 14.99 | 3.22 | 14.84 | 2.395 | 16.38 | 3.33 | 9.78  | 1.369 | 9.37 | 1.246 |
| LUP_A4-Site_10_Sp_6  | 2.7 | 1.4 | 0.3 | 81.4 | 85.73 | 211.8 | 719  | 189  | 616  | 89.4  | 291.1 | 34.8 | 92.2  | 12.3 | 612.5 | 8.9  | 47.9 | 14.28 | 3.19 | 14.28 | 2.369 | 16.29 | 3.34 | 9.70  | 1.380 | 9.33 | 1.256 |
| LUP_A4-Site_10_Sp_8  | 2.6 | 1.1 | 0.4 | 81.2 | 85.28 | 224.8 | 658  | 196  | 794  | 105.9 | 284.2 | 31.7 | 96.3  | 13.3 | 587.2 | 9.5  | 51.6 | 15.02 | 3.31 | 15.04 | 2.485 | 16.76 | 3.39 | 9.92  | 1.387 | 9.43 | 1.253 |
| LUP_A4-Site_10_Sp_9  | 2.6 | 0.8 | 0.3 | 79.1 | 82.81 | 189.1 | 1193 | 456  | 889  | 113.9 | 361.3 | 52.5 | 89.5  | 9.1  | 511.1 | 6.5  | 35.4 | 11.53 | 2.72 | 12.31 | 2.322 | 16.40 | 3.27 | 9.48  | 1.361 | 8.88 | 1.218 |
| LUP_A4-Site_10_Sp_10 | 3.5 | 0.9 | 0.5 | 77.1 | 82.01 | 179.7 | 1138 | 465  | 800  | 113.4 | 346.8 | 54.2 | 88.2  | 9.2  | 518.3 | 6.4  | 33.9 | 11.30 | 2.56 | 12.20 | 2.170 | 15.90 | 3.23 | 9.46  | 1.326 | 9.21 | 1.215 |
| LUP_A4-Site_13_Sp_1  | 1.3 | 1.1 | 0.3 | 81.5 | 84.15 | 163.6 | 1007 | 248  | 854  | 94.3  | 241.6 | 41.3 | 100.2 | 12.2 | 762.9 | 9.9  | 55.1 | 16.87 | 3.61 | 16.10 | 2.609 | 17.70 | 3.50 | 10.03 | 1.378 | 8.94 | 1.193 |
| LUP_A4-Site_13_Sp_2  | 1.7 | 1.1 | 0.2 | 81.5 | 84.47 | 179.0 | 1073 | 259  | 866  | 114.1 | 268.1 | 44.0 | 111.7 | 15.7 | 737.7 | 11.0 | 59.9 | 17.72 | 3.89 | 17.10 | 2.766 | 18.92 | 3.77 | 10.88 | 1.429 | 9.44 | 1.272 |
| LUP_A4-Site_13_Sp_3  | 2.1 | 1.2 | 0.4 | 80.9 | 84.52 | 190.5 | 678  | 175  | 736  | 121.0 | 244.4 | 35.6 | 128.3 | 23.8 | 819.7 | 15.1 | 78.1 | 21.45 | 4.55 | 20.06 | 3.020 | 19.80 | 3.92 | 11.14 | 1.473 | 9.61 | 1.281 |
| LUP_A4-Site_13_Sp_4  | 2.0 | 1.4 | 0.1 | 81.3 | 84.78 | 190.4 | 773  | 193  | 806  | 120.8 | 255.2 | 38.2 | 126.0 | 22.1 | 779.0 | 13.9 | 73.8 | 20.36 | 4.32 | 19.29 | 2.942 | 19.53 | 3.86 | 11.09 | 1.486 | 9.59 | 1.257 |
| LUP_A4-Site_13_Sp_5  | 1.9 | 1.0 | 0.3 | 82.0 | 85.10 | 162.9 | 891  | 213  | 921  | 102.1 | 232.3 | 37.5 | 103.8 | 14.5 | 771.2 | 11.2 | 61.0 | 17.88 | 3.98 | 17.11 | 2.730 | 17.63 | 3.51 | 10.00 | 1.338 | 8.69 | 1.173 |
| LUP_A15_Site_13_Sp_1 | 2.2 | 1.1 | 3.9 | 89.8 | 96.90 | 214   | 1904 | 2955 | 612  | 75.5  | 211   | 66.3 | 108   | 12.4 | 38.1  | 3.04 | 10.0 | 3.93  | 1.57 | 8.61  | 1.95  | 22.2  | 3.93 | 13.0  | 2.41  | 15.3 | 1.66  |
| LUP_A15_Site_13_Sp_2 | 2.5 | 1.0 | 6.3 | 87.3 | 97.10 | 172   | 1954 | 2628 | 568  | 70.1  | 187   | 15.3 | 77.8  | 8.47 | 22.9  | 2.11 | 9.45 | 3.84  | 1.13 | 7.58  | 1.84  | 13.4  | 2.92 | 9.15  | 1.24  | 10.1 | 1.35  |
| LUP_A15_Site_23_Sp_1 | 2.8 | 0.8 | 8.0 | 85.0 | 96.64 | 254   | 1607 | 5093 | 920  | 55.7  | 136   | 12.0 | 376   | 66.5 | 115   | 12.5 | 42.8 | 13.7  | 4.03 | 25.0  | 6.06  | 45.7  | 11.7 | 40.3  | 6.82  | 53.6 | 8.57  |
| LUP_A15_Site_23_Sp_2 | 2.7 | 0.9 | 8.6 | 85.8 | 97.97 | 231   | 1525 | 4931 | 1017 | 56.4  | 145   | 24.6 | 246   | 92.2 | 126   | 13.2 | 46.9 | 10.8  | 3.38 | 17.8  | 3.90  | 37.2  | 8.53 | 28.8  | 3.91  | 33.3 | 5.29  |