|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sample** | **Zr (ppm)** | **Zr\_Error** | **Sr (ppm)** | **Sr\_Error** | **Rb (ppm)** | **Rb\_Error** | **K (ppm)** | **K\_Error** |
| ANG2V0 | 148.08 | 3.95 | 148.35 | 3.65 | 152.01 | 4.3 | 36957.21 | 443.64 |
| CA3V1b | 68.53 | 2.87 | 24.05 | 1.77 | 311.6 | 6.09 | 37208.43 | 406 |
| Arbolar 3 | 80.9 | 2.98 | 38.36 | 2.03 | 300.43 | 5.84 | 34474.18 | 386.48 |
| CA2V0 | 81 | 2.98 | 45.55 | 2.15 | 289.54 | 5.68 | 31363.78 | 357.79 |
| CA3V2 | 415.15 | 6.53 | 372.44 | 5.95 | 122.49 | 4.13 | 26832.11 | 429.19 |
| CA2V1 | 244.07 | 5.32 | 407.49 | 6.15 | 120.59 | 4.09 | 27682.64 | 430.19 |
| Z6V2 | 175.04 | 4.62 | 344.53 | 5.59 | 156.3 | 4.53 | 30714.13 | 422.2 |
| ANG2V1 | 69.26 | 2.74 | 19.95 | 1.6 | 325.35 | 5.93 | 31576.25 | 353.25 |
| CA3V1a | 74.88 | 2.87 | 21.06 | 1.66 | 326.93 | 6.07 | 32858.61 | 363.95 |
| Z7V2 | 199.47 | 4.99 | 336.56 | 5.74 | 145.99 | 4.55 | 30447.92 | 428.79 |
| RI2V0 | 67.76 | 2.74 | 12.95 | 1.44 | 324.02 | 6.01 | 32511.31 | 358.81 |
| CA1V1 | 74.14 | 2.84 | 26.65 | 1.77 | 311.01 | 5.86 | 31449.29 | 385.68 |
| ElPaso3 | 201.95 | 4.85 | 354.16 | 5.66 | 156.46 | 4.48 | 33922.48 | 482.81 |
| Cara1Vx | 199.22 | 4.5 | 158.44 | 3.84 | 176.41 | 4.68 | 24517.8 | 401.67 |
| Cara2Vx | 65.78 | 2.55 | 16.89 | 1.45 | 274.91 | 5.2 | 28804.09 | 355.91 |
| ElPaso2V2 | 147.18 | 4.27 | 302.19 | 5.2 | 164.27 | 4.54 | 33299.53 | 467.27 |
| Cara4Vx | 83.12 | 2.94 | 31.28 | 1.85 | 299.28 | 5.69 | 32713.89 | 379.69 |
| Puerta4V1 | 90.14 | 3.1 | 43.86 | 2.14 | 312.68 | 5.93 | 40134.78 | 445.85 |
| Cant11V2 | 179.89 | 4.66 | 359.52 | 5.68 | 154.38 | 4.47 | 34147.52 | 462.12 |
| Cant11V1 | 94.85 | 3.26 | 78.33 | 2.73 | 292.14 | 5.8 | 35163.87 | 408.18 |
| Puerta3V2 | 197.38 | 4.99 | 374.29 | 5.99 | 151.07 | 4.56 | 35958.94 | 490.02 |
| ANG3V0 | 80.2 | 7.89 | 23.84 | 3.87 | 297.8 | 12.73 | 32195.91 | 1044.38 |
| Salas1V1 | 95.01 | 8.39 | 35.57 | 4.46 | 272.77 | 12.31 | 30378.97 | 1021.66 |
| CB8V1b | 96.14 | 8.52 | 50.38 | 5.1 | 272.73 | 12.27 | 32035.78 | 1055.83 |
| Tolombón1 | 191.7 | 11.64 | 177.8 | 9.15 | 156.32 | 9.66 | 33442.44 | 1091.8 |
| CB3V1 | 91.44 | 8.25 | 27.04 | 4.03 | 302.3 | 12.82 | 28847.62 | 999.62 |
| AMA4V1 | 129.38 | 10.09 | 149.8 | 8.42 | 255.39 | 12.2 | 29655.81 | 1027.56 |
| Punco2V2 | 87.23 | 8.53 | 65.8 | 5.81 | 262.41 | 12.33 | 26066.15 | 960.3 |
| CB5V1 | 103.83 | 8.7 | 47.22 | 4.96 | 260.79 | 11.98 | 30672.15 | 1035.9 |
| CB8V1a | 441.89 | 16.15 | 234.51 | 10.42 | 111.52 | 8.29 | 21887.23 | 916.51 |
| Salas2V1b | 385.18 | 16.38 | 352.01 | 13.24 | 103.49 | 8.46 | 17644.42 | 847.94 |
| AMA1V2 | 158.58 | 10.4 | 80.93 | 6.36 | 243.01 | 11.99 | 29287.98 | 1011.8 |
| CB7V1 | 245.6 | 13.79 | 325.52 | 12.67 | 131.03 | 9.41 | 27931.22 | 1032.58 |
| AMA2V1 | 242.85 | 12.86 | 194.44 | 9.64 | 109.04 | 8.52 | 24027.57 | 950.05 |
| Ri03V1 | 126.77 | 9.34 | 42.6 | 4.82 | 284.24 | 12.62 | 31578.75 | 1051.28 |
| Salas1 | 90.75 | 8.23 | 24.39 | 3.88 | 283.96 | 12.53 | 33490.86 | 1071.3 |
| Salada1V2 | 98.02 | 8.52 | 33.82 | 4.39 | 296.93 | 12.76 | 28403.27 | 987.82 |
| Pichao1V1 | 124.35 | 9.32 | 41.28 | 4.79 | 284.76 | 12.7 | 30604.43 | 1036.01 |
| AMA3V1 | 105.11 | 8.87 | 54.47 | 5.31 | 303 | 12.93 | 32183.63 | 1060.51 |
| Bañado1V1 | 98.02 | 8.51 | 38.22 | 4.59 | 277.4 | 12.39 | 29428.68 | 1016.65 |
| Blan1V1 | 99.06 | 8.48 | 23.51 | 3.88 | 307.22 | 12.99 | 28555.03 | 995.35 |
| Punco2V1 | 109.05 | 9.06 | 70.16 | 5.9 | 258.46 | 12 | 25780.55 | 955.05 |
| Quebradita2V1 | 111.1 | 8.9 | 22.79 | 3.87 | 314.38 | 13.26 | 29929.81 | 1017.92 |
| Ri03V0 | 79.71 | 7.75 | 22.8 | 3.78 | 286.17 | 12.38 | 26778.06 | 964.21 |
| CANT3V0 | 120.35 | 9.24 | 39 | 4.68 | 274.75 | 12.44 | 30975.06 | 1044.5 |
| Z11V1 | 91.67 | 8.3 | 26.56 | 4.04 | 309.86 | 13.12 | 29534.55 | 1011.08 |
| Z8V1a1 | 123.9 | 9.41 | 64.11 | 5.72 | 278.77 | 12.58 | 28726.59 | 1008.72 |
| INF2V2 | 218.38 | 12.83 | 331.86 | 12.37 | 157.31 | 9.76 | 30874.51 | 1081.51 |
| CA7V1 | 112.44 | 9.08 | 68.36 | 5.83 | 267.99 | 12.28 | 31328.37 | 1047.34 |
| CA1V1 | 88.91 | 8.18 | 28.66 | 4.11 | 314.81 | 13 | 30606.1 | 1025.22 |
| LB1Vx | 273.4 | 13.87 | 252.76 | 11.11 | 152.1 | 9.88 | 23947.65 | 962.25 |
| Z8V1b | 86.86 | 8.08 | 24.58 | 3.9 | 296.3 | 12.73 | 28918.48 | 995.55 |
| Ro1V1 | 99.47 | 8.52 | 21.54 | 3.79 | 327.73 | 13.42 | 33187.24 | 1067.52 |
| Z8V1a2 | 127.07 | 9.71 | 86.99 | 6.6 | 246.67 | 11.91 | 28570.85 | 1016.09 |
| BlancoV1b | 82.71 | 7.93 | 17.49 | 3.51 | 311.22 | 13.06 | 32046.05 | 1046.66 |
| CA4V1 | 98.51 | 8.23 | 30.48 | 4.11 | 263.2 | 11.83 | 29190.13 | 1007.96 |
| Blanco1V1a | 89.71 | 8.14 | 39.13 | 4.54 | 286.1 | 12.31 | 34292.06 | 1097.63 |
| Ri01V1 | 125.51 | 9.43 | 54.35 | 5.35 | 256.58 | 12.12 | 29721.01 | 1021.65 |
| CA8V0 | 155.48 | 10.45 | 95.85 | 6.94 | 105.57 | 8.2 | 26688.41 | 969.74 |
| CA7V0 | 127.44 | 9.36 | 83.39 | 6.25 | 220.77 | 10.96 | 27010.66 | 994.02 |
| Quebradita1V1 | 101.65 | 8.74 | 22.09 | 3.88 | 318.41 | 13.6 | 33696.7 | 1077.44 |
| Pinar1V1 | 130.46 | 9.63 | 87.16 | 6.47 | 215.77 | 11.06 | 32830.84 | 1072.58 |
| Z8V0 | 86.76 | 8.22 | 38.59 | 4.63 | 292.93 | 12.81 | 29093.38 | 1004.23 |
| CANT7V1 | 97.16 | 8.44 | 31.87 | 4.29 | 289.57 | 12.64 | 30745.16 | 1031.48 |
| LaPuerta4V0 | 97.35 | 8.81 | 88.94 | 6.59 | 117.03 | 8.37 | 29142.79 | 1011.51 |
| CANT5V1 | 90.5 | 8.24 | 18.14 | 3.58 | 312.13 | 13.15 | 30842.1 | 1031.32 |
| Ri4V1b | 102.03 | 8.56 | 24.6 | 3.94 | 281.41 | 12.54 | 30753.23 | 1029.65 |
| CANT4V0 | 223.62 | 14.77 | 681.6 | 18.25 | 74.94 | 7.52 | 20402.14 | 875.52 |
| LB V1 | 96.36 | 8.5 | 30.7 | 4.24 | 310.47 | 13.19 | 31480.77 | 1044.83 |
| Sauces1V1 | 102.66 | 8.65 | 23.97 | 3.9 | 289.12 | 12.75 | 34654.41 | 1088.48 |
| CA3V0 | 271.39 | 13.97 | 260.65 | 11.34 | 144.97 | 9.71 | 27627.39 | 1015.03 |
| Ri4V1a | 100.74 | 8.41 | 26.87 | 3.97 | 296.72 | 12.55 | 30955.49 | 1044.67 |
| Salas2V1b2 | 350.73 | 16 | 423.2 | 14.42 | 105.69 | 8.4 | 17680.05 | 839.7 |
| Salas2V1q | 106.31 | 9.68 | 180.87 | 9.17 | 219.57 | 11.31 | 24343.34 | 922.54 |
| Salas1V1 | 98.96 | 8.5 | 37.46 | 4.53 | 266.61 | 12.16 | 31323.35 | 1036.48 |
| RI01V0 | 84.25 | 3.29 | 169.08 | 3.83 | 171.55 | 4.48 | 37386.42 | 421.2 |
| Blanco4V1a | 93.21 | 8.24 | 14.35 | 3.31 | 330.39 | 13.29 | 32552.51 | 1058.87 |
| CB10V2 | 103.87 | 8.64 | 30.63 | 4.23 | 287.76 | 12.55 | 29917.14 | 1030.37 |
| Ri03V2 | 83.16 | 7.72 | 19.35 | 3.49 | 266.58 | 11.7 | 29732.08 | 1004.67 |
| Blanco2V1 | 90.46 | 7.98 | 18.39 | 3.49 | 304.77 | 12.61 | 28662.83 | 992.84 |
| Blanco3V1 | 92.13 | 8.08 | 16.65 | 3.41 | 321.88 | 13.08 | 30844.4 | 1028.96 |
| CA11V1 | 114.95 | 9.32 | 75.21 | 6.16 | 270.58 | 12.44 | 28963.3 | 1016.19 |
| Salas3 | 236.29 | 12.94 | 270.74 | 11.22 | 143.31 | 9.29 | 35746.91 | 1122.94 |
| CB11V1 | 115.16 | 9.12 | 67.39 | 5.78 | 266.46 | 12.14 | 29186.26 | 1020.51 |
| EncalillaVx | 233.88 | 14.28 | 398.83 | 14.43 | 125.23 | 9.39 | 25485.58 | 997.07 |
| Salas2V1a | 126 | 9.27 | 98.16 | 6.59 | 229.76 | 11.04 | 26606.68 | 967.13 |
| Salas2V1b | 380.95 | 16.18 | 329.93 | 12.76 | 117.26 | 8.78 | 19137.49 | 880.21 |
| CANT12V02 | 359.65 | 15.48 | 238.16 | 10.93 | 129.63 | 9.29 | 30483.46 | 1083.62 |
| Salas2Vxx | 105.57 | 8.57 | 58.28 | 5.27 | 271.6 | 11.92 | 32920.18 | 1066.78 |
| Salas2Vx | 393.57 | 16.57 | 478.11 | 15 | 52.6 | 6.28 | 9130.84 | 608.11 |
| Blanco4V1b | 97.67 | 8.59 | 40.96 | 4.75 | 274.97 | 12.53 | 31992.72 | 1051.34 |

**Supplementary Table 2.** Portable XRF spectrometer data from different ash layers.