**Smith, A.L., Roobol, M.J., Mattioli, G.S., Daly, G.E. and Fryxell, J.E., 2021, Providencia Island: A Miocene Stratovolcano on the Lower Nicaraguan Rise, Western Caribbean—A Geological Enigma Resolved: Geological Society of America Memoir 219,** [**https://doi.org/10.1130/2021.1219(01)**](https://doi.org/10.1130/2021.1219(01))**.**

Supplemental Material. Appendix A: U/Pb geochronologic analyses of zircons from Providencia. Appendix B: Sample list. Appendix C: Chemical composition of some possible basaltic sources for the Providencia subalkaline suite. Appendix D: Chemical composition of volcanic rocks from Haiti. Appendix E: Chemical composition of volcanic rocks from the Dominican Republic. Please visit https://doi.org/10.1130/MWR.S.14489175 to access the supplemental material, and contact editing@geosociety.org with any questions.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Appendix A. U/Pb GEOCHRONOLOGIC ANALYSES OF ZIRCONS FROM PROVIDENCIA | | | | | | | | | | | | | | | | | | | |
| Sample | U (ppm) | 206Pb/  204Pb | U/  Th | 206Pb\*/  207Pb\* | ±  (%) | 207Pb\*/  235U\* | ±  (%) | 206Pb\*/  238U | ±  (%) | Error  corr. | 206Pb\*/  238U\* | ±  (Ma) | 207Pb\*/  235U | ±  (Ma) | 206Pb\*/  207Pb\* | ±  (Ma) | Best age  (Ma) | ±  (Ma) | Conc.  (%) |
| PR-53-1C | 824 | 6333 | 1.7 | 21.3672 | 2.3 | 0.0309 | 3.2 | 0.0048 | 2.3 | 0.70 | 30.8 | 1.4 | 30.9 | 1.0 | 39.1 | 55.4 | 30.8 | 1.4 | NA |
| PR-53-1R | 1372 | 22285 | 3.7 | 21.2733 | 0.6 | 0.0318 | 0.9 | 0.0049 | 0.7 | 0.74 | 31.6 | 0.4 | 31.8 | 0.3 | 49.6 | 14.9 | 31.6 | 0.4 | NA |
| PR-53-3R | 128 | 2903 | 1.5 | 18.9452 | 6.4 | 0.0396 | 6.9 | 0.0054 | 2.8 | 0.40 | 35.0 | 1.9 | 39.4 | 2.7 | 319.5 | 144.7 | 35.0 | 1.9 | NA |
| PR-53-3C | 365 | 5447 | 0.6 | 21.8328 | 2.0 | 0.0350 | 3.1 | 0.0055 | 2.4 | 0.78 | 35.6 | 1.7 | 34.9 | 1.1 | –12.7 | 47.1 | 35.6 | 1.7 | NA |
| PR-53-5R | 170 | 53859 | 1.2 | 17.6151 | 1.0 | 0.5715 | 2.2 | 0.0730 | 2.0 | 0.90 | 454.3 | 8.8 | 459.0 | 8.2 | 482.6 | 21.4 | 454.3 | 8.8 | 94.1 |
| PR-53-5C | 169 | 72521 | 1.1 | 17.6276 | 0.6 | 0.5722 | 1.3 | 0.0732 | 1.2 | 0.90 | 455.1 | 5.3 | 459.4 | 5.0 | 481.0 | 13.0 | 455.1 | 5.3 | 94.6 |
| PR-53-4C | 188 | 56560 | 2.2 | 13.5838 | 0.8 | 1.7073 | 2.4 | 0.1682 | 2.3 | 0.94 | 1002.2 | 21.3 | 1011.3 | 15.6 | 1031.0 | 16.5 | 1031.0 | 16.5 | 97.2 |
| *PR-53-4R* | *451* | *5206* | *8.8* | *13.4820* | *6.5* | *0.7595* | *8.5* | *0.0743* | *5.4* | *0.64* | *461.8* | *24.1* | *573.7* | *37.1* | *1046.2* | *131.2* | *461.8* | *24.1* | *44.1* |
| *PR-53-2C* | *1790* | *656* | *0.3* | *7.1617* | *11.4* | *0.2321* | *11.5* | *0.0121* | *1.9* | *0.16* | *77.2* | *1.4* | *211.9* | *22.0* | *2222.6* | *197.4* | *77.2* | *1.4* | *NA* |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PR-17-4 | 565 | 3389 | 1.4 | 14.9022 | 38.2 | 0.0153 | 38.7 | 0.0017 | 6.8 | 0.17 | 10.7 | 0.7 | 15.4 | 5.9 | 841.0 | 823.5 | 10.7 | 0.7 | NA |
| PR-17-3R | 1976 | 18665 | 1.6 | 21.4426 | 6.4 | 0.0108 | 7.3 | 0.0017 | 3.5 | 0.48 | 10.8 | 0.4 | 10.9 | 0.8 | 30.6 | 153.1 | 10.8 | 0.4 | NA |
| PR-17-7 | 706 | 2807 | 0.6 | 17.1970 | 26.5 | 0.0135 | 27.0 | 0.0017 | 5.0 | 0.19 | 10.8 | 0.5 | 13.6 | 3.6 | 535.4 | 590.3 | 10.8 | 0.5 | NA |
| PR-17-6 | 1067 | 14469 | 1.3 | 20.1329 | 22.7 | 0.0116 | 22.9 | 0.0017 | 3.3 | 0.14 | 10.9 | 0.4 | 11.7 | 2.7 | 179.6 | 534.9 | 10.9 | 0.4 | NA |
| PR-17-20 | 650 | 4891 | 1.1 | 29.2901 | 41.0 | 0.0079 | 41.4 | 0.0017 | 5.5 | 0.13 | 10.9 | 0.6 | 8.0 | 3.3 | –778.2 | NC | 10.9 | 0.6 | NA |
| PR-17-22 | 452 | 8453 | 1.7 | 12.3906 | 152.6 | 0.0189 | 152.8 | 0.0017 | 8.5 | 0.06 | 10.9 | 0.9 | 19.0 | 28.8 | 1214.3 | 484.8 | 10.9 | 0.9 | NA |
| PR-17-16 | 588 | 792 | 1.2 | 19.8022 | 25.1 | 0.0119 | 25.4 | 0.0017 | 3.8 | 0.15 | 11.0 | 0.4 | 12.0 | 3.0 | 218.1 | 590.2 | 11.0 | 0.4 | NA |
| PR-17-12 | 1459 | 9748 | 1.0 | 23.8590 | 13.5 | 0.0099 | 14.1 | 0.0017 | 3.9 | 0.28 | 11.1 | 0.4 | 10.0 | 1.4 | –231.7 | 342.7 | 11.1 | 0.4 | NA |
| PR-17-2 | 572 | 6286 | 1.0 | 25.7137 | 69.7 | 0.0094 | 70.0 | 0.0018 | 5.7 | 0.08 | 11.3 | 0.6 | 9.5 | 6.6 | –424.2 | NC | 11.3 | 0.6 | NA |
| PR-17-21 | 374 | 2680 | 1.5 | 23.1236 | 50.9 | 0.0104 | 51.5 | 0.0017 | 8.0 | 0.16 | 11.3 | 0.9 | 10.5 | 5.4 | –153.4 | NC | 11.3 | 0.9 | NA |
| PR-17-5 | 635 | 1039 | 0.9 | 22.3782 | 25.4 | 0.0110 | 26.4 | 0.0018 | 7.2 | 0.27 | 11.5 | 0.8 | 11.1 | 2.9 | –72.7 | 630.7 | 11.5 | 0.8 | NA |
| PR-17-8 | 650 | 10621 | 0.7 | 26.5716 | 50.3 | 0.0094 | 50.5 | 0.0018 | 3.6 | 0.07 | 11.7 | 0.4 | 9.5 | 4.8 | –511.0 | NC | 11.7 | 0.4 | NA |
| PR17-1 | 175 | 1918 | 1.2 | 17.1088 | 65.9 | 0.0147 | 67.9 | 0.0018 | 16.4 | 0.24 | 11.7 | 1.9 | 14.8 | 10.0 | 546.6 | NC | 11.7 | 1.9 | NA |
| PR-17-14 | 1596 | 1685 | 0.6 | 21.3235 | 12.1 | 0.0119 | 12.3 | 0.0018 | 2.7 | 0.22 | 11.9 | 0.3 | 12.0 | 1.5 | 44.0 | 289.0 | 11.9 | 0.3 | NA |
| PR-17-10 | 635 | 5584 | 0.8 | 22.4428 | 28.6 | 0.0113 | 29.0 | 0.0018 | 2.9 | 0.17 | 11.9 | 0.6 | 11.4 | 3.3 | –79.8 | 711.6 | 11.9 | 0.6 | NA |
| PR-17-17 | 237 | 1589 | 0.7 | 10.5234 | 75.2 | 0.0243 | 77.4 | 0.0019 | 18.1 | 0.23 | 12.0 | 2.2 | 24.4 | 8.7 | 1528.6 | NC | 12.0 | 2.2 | NA |
| PR-17-13 | 1090 | 15875 | 0.3 | 20.4435 | 19.5 | 0.0127 | 19.7 | 0.0019 | 3.2 | 0.16 | 12.1 | 0.4 | 12.8 | 2.5 | 143.8 | 460.9 | 12.1 | 0.4 | NA |
| PR-17-18 | 664 | 5236 | 1.7 | 25.6594 | 49.3 | 0.0101 | 49.8 | 0.0019 | 7.1 | 0.14 | 12.1 | 0.9 | 10.2 | 5.1 | –418.6 | NC | 12.1 | 0.9 | NA |
| PR-17-19 | 333 | 2513 | 1.0 | 23.1056 | 60.2 | 0.0114 | 61.2 | 0.0019 | 11.1 | 0.18 | 12.3 | 1.4 | 11.5 | 7.0 | –151.5 | NC | 12.3 | 1.4 | NA |
| PR-17-9 | 207 | 1974 | 0.9 | 3.9050 | 276.8 | 0.0754 | 277.7 | 0.0021 | 22.3 | 0.08 | 13.7 | 3.1 | 73.8 | 200.1 | 3222.7 | 433.7 | 13.7 | 3.1 | NA |
| PR-17-11R† | 135 | 3819 | 1.3 | –1.8145 | NC | –0.1920 | NC | 0.0025 | 14.9 | 0.01 | 16.3 | 2.4 | –216.5 | NC | NA | NA | 16.3 | 2.4 | NA |
| PR-17-15R† | 3101 | 42344 | 2.8 | 20.9820 | 6.5 | 0.0195 | 6.7 | 0.0030 | 1.6 | 0.24 | 19.1 | 0.3 | 19.6 | 1.3 | 82.4 | 153.6 | 19.1 | 0.3 | NA |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PR-30-1-1 | 130 | 405 | 1.4 | 15.0748 | 13.2 | 0.0151 | 13.4 | 0.0017 | 1.8 | 0.13 | 10.6 | 0.4 | 15.2 | 2.0 | 817.0 | 278.0 | 10.6 | 0.4 | NA |
| PR-30-31 | 124 | 335 | 2.0 | 16.2825 | 7.2 | 0.0143 | 7.3 | 0.0017 | 1.0 | 0.14 | 10.9 | 0.2 | 14.4 | 1.0 | 653.8 | 155.6 | 10.9 | 0.2 | NA |
| PR-30-15 | 360 | 362 | 1.5 | 34.0489 | 6.8 | 0.0069 | 6.9 | 0.0017 | 1.2 | 0.17 | 10.9 | 0.3 | 6.9 | 0.5 | –1224.6 | 211.5 | 10.9 | 0.3 | NA |
| PR-30-6 | 391 | 1510 | 1.3 | 19.8177 | 4.7 | 0.0118 | 5.6 | 0.0017 | 3.1 | 0.54 | 11.0 | 0.7 | 11.9 | 0.7 | 216.3 | 110.0 | 11.0 | 0.7 | NA |
| PR-30-28 | 231 | 5878 | 1.0 | 15.8998 | 6.6 | 0.0151 | 6.8 | 0.0017 | 1.3 | 0.20 | 11.2 | 0.3 | 15.2 | 1.0 | 704.7 | 141.1 | 11.2 | 0.3 | NA |
| PR-30-22 | 269 | 1137 | 1.4 | 20.1085 | 6.4 | 0.0119 | 6.5 | 0.0017 | 1.0 | 0.15 | 11.2 | 0.2 | 12.0 | 0.8 | 182.4 | 149.0 | 11.2 | 0.2 | NA |
| PR-30-16 | 187 | 1080 | 1.3 | 17.5439 | 7.7 | 0.0137 | 8.0 | 0.0017 | 2.3 | 0.29 | 11.2 | 0.5 | 13.8 | 1.1 | 491.5 | 169.2 | 11.2 | 0.5 | NA |
| PR-30-3 | 86 | 357 | 1.6 | 16.1298 | 15.7 | 0.0150 | 15.9 | 0.0018 | 2.7 | 0.17 | 11.3 | 0.6 | 15.1 | 2.4 | 674.0 | 336.6 | 11.3 | 0.6 | NA |
| PR-30-11 | 189 | 812 | 1.2 | 19.5312 | 11.8 | 0.0125 | 12.4 | 0.0018 | 3.9 | 0.32 | 11.4 | 0.9 | 12.6 | 1.6 | 249.9 | 271.4 | 11.4 | 0.9 | NA |
| PR-30-25 | 433 | 2036 | 1.3 | 19.0365 | 4.6 | 0.0129 | 5.1 | 0.0018 | 2.0 | 0.40 | 11.4 | 0.5 | 13.0 | 0.7 | 308.6 | 105.6 | 11.4 | 0.5 | NA |
| PR-30-32 | 274 | 2362 | 1.2 | 18.2237 | 4.0 | 0.0135 | 5.2 | 0.0018 | 3.3 | 0.64 | 11.5 | 0.8 | 13.6 | 0.7 | 407.1 | 90.2 | 11.5 | 0.8 | NA |
| PR-30-26 | 452 | 2177 | 0.6 | 18.9098 | 5.1 | 0.0131 | 5.5 | 0.0018 | 2.00 | 0.36 | 11.5 | 0.5 | 13.2 | 0.7 | 323.8 | 116.5 | 11.5 | 0.5 | NA |
| PR-30-19 | 133 | 1494 | 1.5 | 11.1622 | 5.9 | 0.0221 | 6.1 | 0.0018 | 1.8 | 0.30 | 11.5 | 0.4 | 22.2 | 1.4 | 1416.7 | 112.3 | 11.5 | 0.4 | NA |
| PR-30-14 | 150 | 884 | 1.1 | 19.3682 | 16.7 | 0.0128 | 16.7 | 0.0018 | 1.4 | 0.08 | 11.5 | 0.3 | 12.9 | 2.1 | 269.1 | 384.3 | 11.5 | 0.3 | NA |
| PR-30-2 | 315 | 1791 | 1.4 | 17.9259 | 2.4 | 0.0137 | 3.0 | 0.0018 | 1.9 | 0.62 | 11.5 | 0.4 | 13.8 | 0.4 | 443.8 | 52.7 | 11.5 | 0.4 | NA |
| PR-30-27 | 91 | 359 | 1.3 | 22.3633 | 23.0 | 0.0111 | 23.2 | 0.0018 | 3.3 | 0.14 | 11.6 | 0.8 | 11.2 | 2.6 | –71.1 | 568.2 | 11.6 | 0.8 | NA |
| PR-30-24 | 263 | 1240 | 1.8 | 20.0945 | 6.6 | 0.0124 | 7.0 | 0.0018 | 2.4 | 0.34 | 11.6 | 0.5 | 12.5 | 0.9 | 184.0 | 153.8 | 11.6 | 0.5 | NA |
| PR-30-23 | 107 | 502 | 1.8 | 19.7912 | 11.2 | 0.0126 | 11.3 | 0.0018 | 1.8 | 0.16 | 11.6 | 0.4 | 12.7 | 1.4 | 219.3 | 259.0 | 11.6 | 0.4 | NA |
| PR-30-9 | 368 | 1240 | 0.8 | 20.8363 | 5.8 | 0.0119 | 5.9 | 0.0018 | 1.0 | 0.17 | 11.6 | 0.2 | 12.0 | 0.7 | 98.9 | 137.2 | 11.6 | 0.2 | NA |
| PR-30-29 | 238 | 1188 | 1.2 | 17.9965 | 7.8 | 0.0139 | 7.9 | 0.0018 | 1.2 | 0.15 | 11.7 | 0.3 | 14.0 | 1.1 | 435.1 | 174.7 | 11.7 | 0.3 | NA |
| PR-30-5 | 543 | 2816 | 0.7 | 19.3746 | 3.7 | 0.0129 | 3.8 | 0.0018 | 0.8 | 0.22 | 11.7 | 0.2 | 13.0 | 0.5 | 268.3 | 85.3 | 11.7 | 0.2 | NA |
| PR-30-12 | 130 | 298 | 1.5 | 29.5293 | 9.3 | 0.0085 | 9.5 | 0.0018 | 2.1 | 0.22 | 11.8 | 0.5 | 8.6 | 0.8 | –801.3 | 264.3 | 11.8 | 0.5 | NA |
| PR-30-7 | 101 | 1205 | 1.9 | 14.6373 | 11.5 | 0.0173 | 11.7 | 0.0018 | 1.8 | 0.16 | 11.8 | 0.4 | 17.4 | 2.0 | 878.2 | 239.2 | 11.8 | 0.4 | NA |
| PR-30-1 | 428 | 2697 | 1.4 | 19.3639 | 6.5 | 0.0131 | 6.7 | 0.0018 | 1.9 | 0.28 | 11.8 | 0.4 | 13.2 | 0.9 | 269.6 | 148.7 | 11.8 | 0.4 | NA |
| PR-30-30 | 468 | 1612 | 1.0 | 20.5015 | 3.8 | 0.0124 | 4.0 | 0.0018 | 1.0 | 0.26 | 11.9 | 0.2 | 12.5 | 0.5 | 137.1 | 90.2 | 11.9 | 0.2 | NA |
| PR-30-10 | 353 | 1973 | 1.3 | 18.7665 | 4.5 | 0.0136 | 5.2 | 0.0018 | 2.6 | 0.50 | 11.9 | 0.6 | 13.7 | 0.7 | 341.0 | 101.4 | 11.9 | 0.6 | NA |
| PR-30-13 | 1583 | 5527 | 0.4 | 21.5002 | 1.5 | 0.0119 | 2.0 | 0.0019 | 1.4 | 0.69 | 11.9 | 0.3 | 12.0 | 0.2 | 24.2 | 35.6 | 11.9 | 0.3 | NA |
| PR-30-17 | 233 | 2215 | 1.6 | 17.4508 | 7.3 | 0.0146 | 7.5 | 0.0018 | 1.8 | 0.24 | 11.9 | 0.4 | 14.7 | 1.1 | 503.2 | 160.6 | 11.9 | 0.4 | NA |
| PR-30-21 | 236 | 2265 | 1.5 | 12.9267 | 18.3 | 0.0199 | 18.4 | 0.0019 | 1.6 | 0.09 | 12.0 | 0.4 | 20.0 | 3.6 | 1130.5 | 367.4 | 12.0 | 0.4 | NA |
| PR-30-8 | 2007 | 6052 | 0.3 | 21.4136 | 2.0 | 0.0120 | 2.4 | 0.0019 | 1.3 | 0.55 | 12.0 | 0.3 | 12.1 | 0.3 | 33.9 | 48.7 | 12.0 | 0.3 | NA |
| PR-30-20 | 284 | 4330 | 1.0 | 17.5744 | 6.7 | 0.0153 | 8.1 | 0.0020 | 4.4 | 0.55 | 12.6 | 1.1 | 15.4 | 1.2 | 487.7 | 148.8 | 12.6 | 1.1 | NA |
| *PR-30-18* | *345* | *8478* | *1.0* | *17.5742* | *7.4* | *0.0150* | *7.4* | *0.0019* | *0.8* | *0.11* | *12.3* | *0.2* | *15.2* | *1.1* | *487.7* | *163.2* | *12.3* | *0.2* | *NA* |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PR-16-1C | 310 | 1261 | 0.8 | 18.8666 | 43.7 | 0.0122 | 45.1 | 0.0017 | 10.9 | 0.24 | 10.7 | 1.2 | 12.3 | 5.5 | 329.0 | NC | 10.7 | 1.2 | NA |
| PR-16-2 | 912 | 7767 | 0.9 | 22.0452 | 17.8 | 0.0105 | 18.3 | 0.0017 | 4.0 | 0.22 | 10.8 | 0.4 | 10.6 | 1.9 | –36.2 | 435.6 | 10.8 | 0.4 | NA |
| PR-16-4 | 127 | 441 | 0.9 | 14.8381 | 65.3 | 0.0165 | 74.9 | 0.0018 | 36.8 | 0.49 | 11.4 | 4.2 | 16.6 | 12.3 | 850.0 | NC | 11.4 | 4.2 | NA |
| PR-16-3B† | 367 | 119848 | 1.5 | 12.6559 | 0.5 | 2.2532 | 1.5 | 0.2068 | 1.5 | 0.95 | 1211.9 | 16.1 | 1197.8 | 10.8 | 1172.5 | 10.0 | 1172.5 | 10.0 | 103.4 |
| PR-16-3A† | 420 | 313530 | 1.4 | 12.5517 | 0.3 | 2.2219 | 5.2 | 0.2023 | 5.2 | 1.00 | 1187.5 | 56.3 | 1188.0 | 36.5 | 1188.9 | 5.9 | 1188.9 | 5.9 | 99.9 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PR-43-5 | 68 | 718 | 1.6 | 2.1876 | 406.6 | 0.0766 | 414.3 | 0.0012 | 79.9 | 0.19 | 7.8 | 6.3 | 75.0 | 308.6 | 4108.5 | 715.3 | 7.8 | 6.3 | NA |
| PR-43-12 | 45 | 221 | 1.9 | 0.5239 | 380.9 | 0.3279 | 389.1 | 0.0012 | 79.4 | 0.20 | 8.0 | 6.4 | 287.9 | NC | NA | NA | 8.0 | 6.4 | NA |
| PR-43-13 | 92 | 818 | 1.1 | 5.6470 | 107.1 | 0.0346 | 123.4 | 0.0014 | 61.4 | 0.50 | 9.1 | 5.6 | 34.5 | 41.9 | 2625.8 | 663.7 | 9.1 | 5.6 | NA |
| PR-43-23 | 123 | 1653 | 0.8 | 0.0260 | NC | 7.5558 | NC | 0.0014 | 37.2 | 0.00 | 9.2 | 3.4 | 2179.6 | NC | NA | NA | 9.2 | 3.4 | NA |
| PR-43-14 | 105 | 935 | 0.8 | 2.8545 | 301.1 | 0.0718 | 304.3 | 0.0015 | 43.8 | 0.14 | 9.6 | 4.2 | 70.4 | 209.8 | 3708.4 | 684.0 | 9.6 | 4.2 | NA |
| PR-43-20 | 81 | 1085 | 2.0 | 0.6867 | 761.9 | 0.3279 | 763.7 | 0.0016 | 53.0 | 0.07 | 10.5 | 5.6 | 288.0 | NC | NA | NA | 10.1 | 2.3 | NA |
| PR-43-22 | 115 | 804 | 0.9 | 1.0148 | NC | 0.2133 | NC | 0.0016 | 22.4 | 0.02 | 10.1 | 2.3 | 196.3 | NC | NA | NA | 10.1 | 2.3 | NA |
| PR-43-19 | 1243 | 11629 | 1.4 | 21.8990 | 22.1 | 0.0105 | 22.2 | 0.0017 | 2.2 | 0.10 | 10.8 | 0.2 | 10.6 | 2.4 | –20.1 | 540.4 | 10.8 | 0.2 | NA |
| PR-43-18 | 255 | 2826 | 0.6 | 11.3671 | 179.1 | 0.0205 | 179.9 | 0.0017 | 16.9 | 0.09 | 10.9 | 1.8 | 20.6 | 36.8 | 1381.9 | 504.5 | 10.9 | 1.8 | NA |
| PR-43-11 | 537 | 3455 | 1.5 | 16.8567 | 40.5 | 0.0139 | 41.6 | 0.0017 | 9.8 | 0.24 | 10.9 | 1.1 | 14.0 | 5.8 | 579.0 | 914.8 | 10.9 | 1.1 | NA |
| PR-43-10 | 448 | 2962 | 1.6 | 23.4623 | 39.0 | 0.0099 | 39.4 | 0.0017 | 5.4 | 0.14 | 10.9 | 0.6 | 10.1 | 3.9 | –189.6 | NC | 10.9 | 0.6 | NA |
| PR-43-21 | 160 | 1834 | 0.7 | –13.6397 | 123.4 | –0.0173 | 125.9 | 0.0017 | 25.1 | 0.20 | 11.0 | 2.8 | –17.7 | –22.5 | NA | NA | 11.0 | 2.8 | NA |
| PR-43-9C | 678 | 5993 | 1.7 | 18.1650 | 27.2 | 0.0130 | 27.5 | 0.0017 | 4.3 | 0.16 | 11.1 | 0.5 | 13.2 | 3.6 | 414.3 | 617.7 | 11.1 | 0.5 | NA |
| PR-43-3 | 131 | 833 | 0.9 | –4.2075 | 390.4 | –0.0574 | 390.8 | 0.0018 | 17.4 | 0.04 | 11.3 | 2.0 | –60.0 | NC | NA | NA | 11.3 | 2.0 | NA |
| PR-43-4 | 110 | 607 | 0.9 | 2.8079 | 315.2 | 0.0876 | 316.3 | 0.0018 | 25.9 | 0.08 | 11.5 | 3.0 | 85.3 | 264.5 | 3733.4 | 666.5 | 11.5 | 3.0 | NA |
| PR-43-15 | 66 | 738 | 2.1 | 2.7761 | 162.1 | 0.0900 | 173.0 | 0.0018 | 60.5 | 0.35 | 11.7 | 7.1 | 87.5 | 146.0 | 3750.8 | NC | 11.7 | 7.1 | NA |
| PR-43--2 | 77 | 715 | 1.6 | 0.9875 | 521.1 | 0.2561 | 523.5 | 0.0018 | 49.3 | 0.09 | 11.8 | 5.8 | 231.5 | NC | NA | NA | 11.8 | 5.8 | NA |
| PR-43-17 | 77 | 1339 | 1.4 | 5.2055 | 149.8 | 0.0598 | 154.0 | 0.0023 | 35.9 | 0.23 | 14.5 | 5.2 | 59.0 | 88.5 | 2760.3 | 559.4 | 14.5 | 5.2 | NA |
| PR-43-16 | 106 | 884 | 0.9 | 2.6673 | 329.4 | 0.1206 | 330.2 | 0.0023 | 23.8 | 0.07 | 15.0 | 3.6 | 115.6 | 377.4 | 3811.4 | 683.7 | 15.0 | 3.6 | NA |
| PR-43-8 | 216 | 2342 | 1.3 | 21.8032 | 42.0 | 0.0154 | 43.1 | 0.0024 | 9.6 | 0.22 | 15.7 | 1.5 | 15.5 | 6.6 | –9.5 | NC | 15.7 | 1.5 | NA |
| PR-43-7 | 211 | 1752 | 0.9 | –4.4724 | 631.2 | –0.0787 | 631.2 | 0.0026 | 9.1 | 0.01 | 16.4 | 1.5 | –83.2 | NC | NA | NA | 16.4 | 1.5 | NA |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PR-14-3C | 58 | 469 | 2.1 | 20.2252 | 9.3 | 0.0122 | 9.5 | 0.0018 | 1.6 | 0.17 | 11.5 | 0.4 | 12.3 | 1.2 | 168.9 | 218.7 | 11.5 | 0.4 | NA |
| PR-14-1C | 85 | 915 | 1.1 | 18.8554 | 7.3 | 0.0134 | 7.6 | 0.0018 | 2.4 | 0.31 | 11.8 | 0.6 | 13.6 | 1.0 | 330.3 | 164.8 | 11.8 | 0.6 | NA |
| PR-14-1R | 88 | 332 | 1.2 | 25.4263 | 22.1 | 0.0099 | 22.2 | 0.0018 | 1.3 | 0.06 | 11.8 | 0.3 | 10.0 | 2.2 | –394.8 | 582.3 | 11.8 | 0.3 | NA |
| PR-14-5R | 161 | 452 | 1.1 | 20.1753 | 3.5 | 0.0126 | 3.8 | 0.0018 | 1.4 | 0.38 | 11.9 | 0.3 | 12.7 | 0.5 | 174.6 | 82.2 | 11.9 | 0.3 | NA |
| PR-14-3R | 199 | 642 | 1.4 | 27.9635 | 3.9 | 0.0091 | 4.2 | 0.0019 | 1.5 | 0.36 | 11.9 | 0.4 | 9.2 | 0.4 | –649.2 | 108.1 | 11.9 | 0.4 | NA |
| PR-14-4C | 122 | 1043 | 1.5 | 20.2276 | 4.4 | 0.0133 | 4.9 | 0.0020 | 2.1 | 0.44 | 12.6 | 0.5 | 13.4 | 0.6 | 168.6 | 101.7 | 12.6 | 0.5 | NA |
| PR-14-2C | 117 | 1037 | 1.6 | 21.7485 | 5.3 | 0.01`25 | 5.5 | 0.0020 | 1.7 | 0.30 | 12.7 | 0.4 | 12.6 | 0.7 | –3.4 | 127.5 | 12.7 | 0.4 | NA |
| PR-14-4R | 107 | 519 | 1.6 | 22.7116 | 20.8 | 0.0120 | 21.8 | 0.0020 | 6.5 | 0.30 | 12.7 | 1.7 | 12.1 | 2.6 | –109.0 | 516.4 | 12.7 | 1.7 | NA |
| PR-21-4 | 208 | 35263 | 5.4 | 15.1627 | 0.7 | 1.1606 | 1.8 | 0.1276 | 1.7 | 0.93 | 774.3 | 12.2 | 782.2 | 9.8 | 804.8 | 14.0 | 774.3 | 12.2 | 96.2 |
| PR-21-2 | 88 | 97604 | 1.4 | 12.5948 | 0.6 | 2.1618 | 2.2 | 0.1975 | 2.1 | 0.96 | 1161.7 | 22.4 | 1168.9 | 15.2 | 1182.1 | 11.9 | 1182.1 | 11.9 | 98.3 |
| PR-21-3 | 241 | 106544 | 2.4 | 9.8645 | 0.6 | 4.1542 | 1.5 | 0.2972 | 1.3 | 0.90 | 1677.5 | 19.5 | 1665.0 | 12.0 | 1649.4 | 11.7 | 1649.4 | 11.7 | 101.7 |
| PR-21-1 | 55 | 19839 | 0.9 | 9.7993 | 0.8 | 4.1703 | 2.0 | 0.2964 | 1.9 | 0.91 | 1673.4 | 27.5 | 1668.2 | 16.7 | 1661.7 | 15.4 | 1661.7 | 15.4 | 100.7 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PR-6-1C | 210 | 1496 | 1.1 | –2.2891 | 579.9 | –0.1041 | 580.5 | 0.0017 | 27.9 | 0.05 | 11.1 | 3.1 | –111.7 | NC | NA | NA | 11.1 | 3.1 | NA |
| PR-6-1R | 94 | 697 | 1.6 | 2.5989 | 234.6 | 0.0914 | 241.1 | 0.0017 | 55.6 | 0.23 | 11.1 | 6.2 | 88.8 | 207.8 | 3850.6 | 939.8 | 11.1 | 6.2 | NA |
| PR-6-2 | 752 | 8775 | 1.1 | 20.2053 | 14.8 | 0.0126 | 15.6 | 0.0018 | 4.9 | 0.32 | 11.9 | 0.6 | 12.7 | 2.0 | 171.2 | 347.2 | 11.9 | 0.6 | NA |
| PR-6-3R† | 193 | 293134 | 2.5 | 9.8760 | 0.4 | 4.2557 | 2.3 | 0.3048 | 2.2 | 0.99 | 1715.2 | 33.6 | 1684.8 | 18.6 | 1647.3 | 7.0 | 1647.3 | 7.0 | 104.1 |
| PR-6-3C† | 70 | 101262 | 1.2 | 9.8284 | 0.7 | 4.0979 | 1.2 | 0.2921 | 1.0 | 0.82 | 1652.1 | 14.1 | 1653.9 | 9.6 | 1656.2 | 12.5 | 1656.2 | 12.5 | 99.7 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PR-12-3 | 1035 | 13054 | 0.9 | 28.1587 | 29.1 | 0.0080 | 29.4 | 0.0016 | 4.3 | 0.15 | 10.5 | 0.5 | 8.1 | 2.4 | –668.3 | 815.7 | 10.5 | 0.5 | NA |
| PR-12-17 | 333 | 2511 | 1.1 | 12.7539 | 133.9 | 0.0178 | 134.2 | 0.0016 | 9.5 | 0.07 | 10.6 | 1.0 | 17.9 | 23.8 | 1157.2 | 415.1 | 10.6 | 1.0 | NA |
| PR-12-10C | 463 | 2284 | 1.2 | 27.2992 | 39.6 | 0.0084 | 40.4 | 0.0017 | 7.9 | 0.19 | 10.7 | 0.8 | 8.5 | 3.4 | –583.6 | NC | 10.7 | 0.8 | NA |
| PR-12-6 | 509 | 6052 | 1.3 | 16.4394 | 38.4 | 0.0142 | 41.0 | 0.0017 | 14.3 | 0.35 | 10.9 | 1.6 | 14.3 | 5.8 | 633.2 | 856.9 | 10.9 | 1.6 | NA |
| PR-12-9R | 1175 | 7523 | 1.1 | 22.5554 | 14.0 | 0.0104 | 15.2 | 0.0017 | 5.8 | 0.38 | 10.9 | 0.6 | 10.5 | 1.6 | –92.0 | 345.1 | 10.9 | 0.6 | NA |
| PR-12-14 | 938 | 2796 | 1.0 | 20.2321 | 27.5 | 0.0116 | 28.4 | 0.0017 | 7.1 | 0.25 | 10.9 | 0.8 | 11.7 | 3.3 | 168.1 | 654.4 | 10.9 | 0.8 | NA |
| PR-12-19 | 447 | 5691 | 1.1 | 24.6648 | 43.9 | 0.0096 | 44.8 | 0.0017 | 8.7 | 0.20 | 11.0 | 1.0 | 9.7 | 4.3 | –316.2 | NC | 11.0 | 1.0 | NA |
| PR-12-7R | 176 | 431 | 1.6 | 11.6328 | 40.1 | 0.0202 | 42.6 | 0.0017 | 14.4 | 0.34 | 11.0 | 1.6 | 20.3 | 8.6 | 1337.4 | 809.4 | 11.0 | 1.6 | NA |
| PR-12-11 | 1036 | 6314 | 1.2 | 19.9800 | 29.5 | 0.0117 | 29.7 | 0.0017 | 3.4 | 0.12 | 11.0 | 0.4 | 11.9 | 3.5 | 197.3 | 699.3 | 11.0 | 0.4 | NA |
| PR-12-13 | 532 | 3477 | 0.8 | 33.2215 | 88.2 | 0.0071 | 88.3 | 0.0017 | 5.6 | 0.06 | 11.0 | 0.6 | 7.2 | 6.3 | –1148.6 | NC | 11.0 | 0.6 | NA |
| PR-12-1R | 656 | 4944 | 1.9 | 27.1149 | 35.9 | 0.0087 | 36.8 | 0.0017 | 8.0 | 0.22 | 11.0 | 0.9 | 8.8 | 3.2 | –565.3 | 994.4 | 11.0 | 0.9 | NA |
| PR-12-2 | 861 | 6914 | 0.5 | 24.9566 | 48.7 | 0.0094 | 48.8 | 0.0017 | 2.8 | 0.06 | 11.0 | 0.3 | 9.5 | 4.6 | –346.5 | NC | 11.0 | 0.3 | NA |
| PR-12-5R | 819 | 13320 | 0.9 | 19.2150 | 20.7 | 0.0123 | 21.2 | 0.0017 | 4.8 | 0.23 | 11.0 | 0.5 | 12.4 | 2.6 | 287.3 | 477.1 | 11.0 | 0.5 | NA |
| PR-12-20 | 1091 | 1591 | 0.5 | 19.0408 | 21.0 | 0.0124 | 21.5 | 0.0017 | 4.7 | 0.22 | 11.1 | 0.5 | 12.5 | 2.7 | 308.0 | 483.4 | 11.1 | 0.5 | NA |
| PR-12-3C | 430 | 4359 | 1.2 | 15.3260 | 44.6 | 0.0155 | 45.4 | 0.0017 | 8.2 | 0.18 | 11.1 | 0.9 | 15.6 | 7.0 | 782.3 | 986.2 | 11.1 | 0.9 | NA |
| PR-12-5C | 2515 | 33116 | 0.9 | 20.3529 | 9.1 | 0.0117 | 9.3 | 0.0017 | 2.0 | 0.22 | 11.1 | 0.2 | 11.8 | 1.1 | 154.2 | 212.8 | 11.1 | 0.2 | NA |
| PR-12-8 | 713 | 2640 | 0.7 | 25.6992 | 25.7 | 0.0092 | 27.8 | 0.0017 | 10.8 | 0.39 | 11.1 | 1.2 | 9.3 | 2.6 | –422.7 | 681.9 | 11.1 | 1.2 | NA |
| PR-12-16 | 178 | 978 | 1.0 | 38.0557 | 43.3 | 0.0063 | 51.4 | 0.0017 | 27.7 | 0.54 | 11.2 | 3.1 | 6.4 | 3.3 | –1586.3 | NC | 11.2 | 3.1 | NA |
| PR-12-18 | 761 | 6179 | 0.7 | 25.2218 | 28.6 | 0.0102 | 28.9 | 0.0019 | 4.2 | 0.15 | 12.0 | 0.5 | 10.3 | 3.0 | –373.8 | 754.4 | 12.0 | 0.5 | NA |
| PR-12-1C | 157 | 954 | 1.6 | 8.4441 | 84.7 | 0.0317 | 88.8 | 0.0019 | 26.5 | 0.30 | 12.5 | 3.3 | 31.7 | 27.7 | 1932.6 | 372.7 | 12.5 | 3.3 | NA |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PR-22-8C | 100 | 191 | 1.0 | 20.7633 | 14.9 | 0.0094 | 15.2 | 0.0014 | 3.0 | 0.20 | 9.1 | 0.3 | 9.5 | 1.4 | 107.3 | 352.5 | 9.1 | 0.3 | NA |
| PR-22-9 | 77 | 325 | 1.6 | 15.2785 | 9.9 | 0.0129 | 11.3 | 0.0014 | 5.4 | 0.47 | 9.2 | 0.5 | 13.0 | 1.5 | 788.9 | 209.2 | 9.2 | 0.5 | NA |
| PR-22-14 | 141 | 341 | 1.2 | 23.8945 | 13.3 | 0.0085 | 13.6 | 0.0015 | 3.1 | 0.23 | 9.5 | 0.3 | 8.6 | 1.2 | –235.5 | 336.2 | 9.5 | 0.3 | NA |
| PR-22-4 | 63 | 238 | 1.5 | 21.7960 | 25.2 | 0.0093 | 25.6 | 0.0015 | 4.4 | 0.17 | 9.5 | 0.4 | 9.4 | 2.2 | –8.7 | 617.8 | 9.5 | 0.4 | NA |
| PR-22-12 | 77 | 267 | 1.6 | 15.3020 | 18.2 | 0.0135 | 18.5 | 0.0015 | 3.2 | 0.17 | 9.6 | 0.3 | 13.6 | 2.5 | 785.6 | 385.9 | 9.6 | 0.3 | NA |
| PR-22-6 | 95 | 388 | 1.6 | 14.9694 | 10.8 | 0.0138 | 12.2 | 0.0015 | 5.6 | 0.46 | 9.6 | 0.5 | 13.9 | 1.7 | 831.6 | 226.6 | 9.6 | 0.5 | NA |
| PR-22-8R | 81 | 201 | 1.4 | 25.2366 | 18.9 | 0.0081 | 19.0 | 0.0015 | 2.0 | 0.11 | 9.6 | 0.2 | 8.2 | 1.6 | –375.3 | 493.1 | 9.6 | 0.2 | NA |
| PR-22-2 | 95 | 282 | 1.6 | 19.8343 | 12.8 | 0.0105 | 12.9 | 0.0015 | 1.7 | 0.13 | 9.7 | 0.2 | 10.6 | 1.4 | 214.3 | 296.9 | 9.7 | 0.2 | NA |
| PR-22-16 | 88 | 232 | 1. | 19.0757 | 13.4 | 0.0110 | 13.5 | 0.0015 | 1.6 | 0.12 | 9.8 | 0.2 | 11.1 | 1.5 | 303.9 | 307.4 | 9.8 | 0.2 | NA |
| PR-22-22 | 90 | 307 | 1.2 | 21.2481 | 24.5 | 0.0099 | 24.8 | 0.0015 | 3.5 | 0.14 | 9.8 | 0.3 | 10.0 | 2.5 | 52.4 | 592.9 | 9.8 | 0.3 | NA |
| PR-22-1 | 114 | 405 | 1.6 | 20.7883 | 10.8 | 0.0101 | 11.3 | 0.0015 | 3.5 | 0.31 | 9.8 | 0.3 | 10.2 | 1.2 | 104.4 | 255.9 | 9.8 | 0.3 | NA |
| PR-22-11 | 120 | 339 | 1.5 | 17.8918 | 12.2 | 0.0118 | 12.3 | 0.0015 | 2.0 | 0.16 | 9.8 | 0.2 | 11.9 | 1.5 | 448.0 | 271.0 | 9.8 | 0.2 | NA |
| PR-22-13 | 146 | 429 | 1.3 | 20.5250 | 15.2 | 0.0104 | 15.3 | 0.0015 | 1.9 | 0.12 | 9.9 | 0.2 | 10.5 | 1.6 | 134.4 | 359.4 | 9.9 | 0.2 | NA |
| PR-22-18 | 122 | 681 | 1.5 | 15.9382 | 25.0 | 0.0135 | 25.1 | 0.0016 | 2.6 | 0.10 | 10.0 | 0.3 | 13.6 | 3.4 | 699.5 | 540.4 | 10.0 | 0.3 | NA |
| PR-22-24 | 233 | 1047 | 0.9 | 18.8135 | 14.6 | 0.0115 | 14.8 | 0.0016 | 2.2 | 0.15 | 10.1 | 0.2 | 11.6 | 1.7 | 335.3 | 333.2 | 10.1 | 0.2 | NA |
| PR-22-5 | 109 | 431 | 1.6 | 17.4548 | 12.5 | 0.0124 | 12.5 | 0.0016 | 1.3 | 0.11 | 10.1 | 0.1 | 12.6 | 1.6 | 502.8 | 275.5 | 10.1 | 0.1 | NA |
| PR-22-10 | 102 | 724 | 1.6 | 14.7294 | 20.8 | 0.0147 | 20.8 | 0.0016 | 1.1 | 0.05 | 10.1 | 0.1 | 14.8 | 3.1 | 865.3 | 434.8 | 10.1 | 0.1 | NA |
| PR-22-27 | 88 | 383 | 1.6 | 20.1908 | 15.1 | 0.0108 | 15.2 | 0.0016 | 1.8 | 0.12 | 10.2 | 0.2 | 10.9 | 1.6 | 172.9 | 353.2 | 10.2 | 0.2 | NA |
| PR-22-19 | 102 | 524 | 1.7 | 12.7935 | 10.8 | 0.0171 | 12.4 | 0.0016 | 6.2 | 0.49 | 10.2 | 0.6 | 17.2 | 2.1 | 1151.1 | 215.2 | 10.2 | 0.6 | NA |
| PR-22-17 | 93 | 557 | 1.7 | 14.8202 | 5.6 | 0.0149 | 6.7 | 0.0016 | 3.7 | 0.55 | 10.3 | 0.4 | 15.0 | 1.0 | 852.5 | 116.8 | 10.3 | 0.4 | NA |
| PR-22-25 | 150 | 2005 | 1.4 | 15.2098 | 14.5 | 0.0144 | 14.9 | 0.0016 | 3.7 | 0.25 | 10.3 | 0.4 | 14.6 | 2.2 | 798.3 | 304.4 | 10.3 | 0.4 | NA |
| PR-22-7 | 79 | 473 | 1.8 | 16.3606 | 14.4 | 0.0136 | 14.5 | 0.0016 | 1.7 | 0.11 | 10.4 | 0.2 | 13.7 | 2.0 | 643.6 | 312.0 | 10.4 | 0.2 | NA |
| PR-22-23 | 284 | 1166 | 0.8 | 20.5732 | 10.9 | 0.0108 | 11.1 | 0.0016 | 2.2 | 0.20 | 10.4 | 0.2 | 11.0 | 1.2 | 128.9 | 256.3 | 10.4 | 0.2 | NA |
| PR-22-20 | 174 | 506 | 1.3 | 21.3812 | 8.9 | 0.0106 | 9.1 | 0.0016 | 2.1 | 0.23 | 10.6 | 0.2 | 10.7 | 1.0 | 37.5 | 212.6 | 10.6 | 0.2 | NA |
| PR-22-26† | 99 | 442 | 1.5 | 15.2183 | 12.4 | 0.0162 | 12.5 | 0.0018 | 1.5 | 0.12 | 11.5 | 0.2 | 16.3 | 2.0 | 797.1 | 260.7 | 11.5 | 0.2 | NA |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PR-29-12 | 52 | 124 | 1.5 | 25.7546 | 26.8 | 0.0071 | 27.1 | 0.0013 | 3.9 | 0.14 | 8.5 | 0.7 | 7.2 | 1.9 | –428.3 | 713.6 | 8.5 | 0.7 | NA |
| PR-29-5 | 30 | 89 | 2.1 | 83.9575 | 94.1 | 0.0023 | 94.2 | 0.0014 | 4.5 | 0.05 | 9.0 | 0.8 | 2.3 | 2.2 | 0.0 | NC | 9.0 | 0.8 | NA |
| PR-29-15-1 | 107 | 291 | 1.6 | 18.7253 | 15.3 | 0.0105 | 16.0 | 0.0014 | 4.7 | 0.29 | 9.2 | 0.9 | 10.6 | 1.7 | 346.0 | 346.8 | 9.2 | 0.9 | NA |
| PR-29-4 | 59 | 178 | 1.7 | 17.6584 | 18.7 | 0.0112 | 19.0 | 0.0014 | 3.8 | 0.20 | 9.2 | 0.7 | 11.3 | 2.1 | 477.1 | 416.0 | 9.2 | 0.7 | NA |
| PR-29-19 | 72 | 164 | 1.7 | 22.9709 | 9.7 | 0.0087 | 10.3 | 0.0014 | 3.4 | 0.33 | 9.3 | 0.6 | 8.8 | 0.9 | –137.0 | 241.6 | 9.3 | 0.6 | NA |
| PR-29-27 | 78 | 130 | 1.5 | 399.5105 | 92.3 | 0.0005 | 92.3 | 0.0014 | 2.0 | 0.02 | 9.3 | 0.4 | 0.5 | 0.5 | 0.0 | 455.6 | 9.3 | 0.4 | NA |
| PR-29-6 | 77 | 212 | 1.7 | 21.8525 | 11.2 | 0.0092 | 11.5 | 0.0015 | 2.7 | 0.24 | 9.4 | 0.5 | 9.3 | 1.1 | –14.9 | 270.6 | 9.4 | 0.5 | NA |
| PR-29-9 | 90 | 204 | 1.0 | 19.5484 | 20.4 | 0.0103 | 20.5 | 0.0015 | 2.4 | 0.12 | 9.4 | 0.4 | 10.4 | 2.1 | 247.8 | 473.6 | 9.4 | 0.4 | NA |
| PR-29-29 | 99 | 224 | 1.0 | 26.8628 | 9.3 | 0.0075 | 9.4 | 0.0015 | 1.5 | 0.15 | 9.5 | 0.3 | 7.6 | 0.7 | –540.1 | 250.9 | 9.5 | 0.3 | NA |
| PR-29-18 | 72 | 204 | 1.7 | 16.5413 | 13.5 | 0.0123 | 13.7 | 0.0015 | 2.0 | 0.15 | 9.5 | 0.4 | 12.5 | 1.7 | 619.9 | 293.2 | 9.5 | 0.4 | NA |
| PR-29-21 | 110 | 333 | 1.1 | 18.4154 | 12.9 | 0.0112 | 13.0 | 0.0015 | 1.9 | 0.15 | 9.6 | 0.4 | 11.3 | 1.5 | 383.6 | 289.9 | 9.6 | 0.4 | NA |
| PR-29-22 | 84 | 179 | 1.1 | 34.6598 | 15.2 | 0.0059 | 15.3 | 0.0015 | 1.6 | 0.10 | 9.6 | 0.3 | 6.0 | 0.9 | –1280.4 | 482.4 | 9.6 | 0.3 | NA |
| PR-29-1 | 78 | 300 | 1.8 | 16.2523 | 17.8 | 0.0126 | 18.2 | 0.0015 | 3.8 | 0.21 | 9.6 | 0.7 | 12.7 | 2.3 | 657.8 | 385.3 | 9.6 | 0.7 | NA |
| PR-29-8 | 88 | 219 | 1.2 | 23.4513 | 16.3 | 0.0088 | 16.9 | 0.0015 | 4.2 | 0.25 | 9.6 | 0.8 | 8.9 | 1.5 | –188.5 | 410.6 | 9.6 | 0.8 | NA |
| PR-29-14 | 63 | 180 | 1.7 | 24.5204 | 18.8 | 0.0084 | 19.3 | 0.0015 | 4.5 | 0.23 | 9.6 | 0.9 | 8.5 | 1.6 | –301.2 | 483.1 | 9.6 | 0.9 | NA |
| PR-29-25 | 106 | 246 | 1.8 | 20.7903 | 12.7 | 0.0101 | 12.8 | 0.0015 | 1.8 | 0.14 | 9.8 | 0.4 | 10.2 | 1.3 | 104.1 | 301.4 | 9.8 | 0.4 | NA |
| PR-29-26 | 110 | 287 | 1.5 | 23.1821 | 11.2 | 0.0091 | 11.5 | 0.0015 | 2.4 | 0.21 | 9.8 | 0.5 | 9.2 | 1.0 | –159.7 | 280.2 | 9.8 | 0.5 | NA |
| PR-29-10 | 63 | 279 | 1.7 | 16.2274 | 13.9 | 0.0131 | 14.5 | 0.0015 | 4.0 | 0.28 | 9.9 | 0.8 | 13.2 | 1.9 | 661.1 | 299.6 | 9.9 | 0.8 | NA |
| PR-29-15-2 | 84 | 247 | 1.1 | 18.1981 | 11.4 | 0.0116 | 11.5 | 0.0015 | 1.2 | 0.11 | 9.9 | 0.2 | 11.7 | 1.3 | 410.2 | 255.6 | 9.9 | 0.2 | NA |
| PR-29-16 | 115 | 425 | 1.4 | 16.9203 | 8.4 | 0.0125 | 8.5 | 0.0015 | 1.7 | 0.20 | 9.9 | 0.3 | 12.6 | 1.1 | 570.8 | 182.0 | 9.9 | 0.3 | NA |
| PR-29-13 | 73 | 169 | 1.2 | 85.8294 | 33.5 | 0.0025 | 33.5 | 0.0015 | 1.2 | 0.04 | 9.9 | 0.2 | 2.5 | 0.8 | 0.0 | NC | 9.9 | 0.2 | NA |
| PR-29-17 | 149 | 533 | 1.1 | 20.3695 | 13.2 | 0.0105 | 13.3 | 0.0016 | 2.0 | 0.15 | 10.0 | 0.4 | 10.6 | 1.4 | 152.3 | 310.4 | 10.0 | 0.4 | NA |
| PR-29-30 | 87 | 318 | 1.6 | 17.6336 | 17.7 | 0.0122 | 18.0 | 0.0016 | 3.2 | 0.18 | 10.0 | 0.6 | 12.3 | 2.2 | 480.3 | 394.2 | 10.0 | 0.6 | NA |
| PR-29-28 | 119 | 212 | 1.4 | 62.2942 | 23.4 | 0.0035 | 23.4 | 0.0016 | 1.7 | 0.07 | 10.1 | 0.3 | 3.5 | 0.8 | 0.0 | NC | 10.1 | 0.3 | NA |
| PR-29-32 | 142 | 565 | 1.5 | 18.0889 | 13.3 | 0.0121 | 13.4 | 0.0016 | 0.8 | 0.06 | 10.2 | 0.2 | 12.2 | 1.6 | 423.6 | 296.7 | 10.2 | 0.2 | NA |
| PR-29-24 | 124 | 271 | 1.7 | 23.8167 | 9.9 | 0.0092 | 9.9 | 0.0016 | 1.2 | 0.12 | 10.2 | 0.2 | 9.3 | 0.9 | –227.3 | 249.0 | 10.2 | 0.2 | NA |
| PR-29-3 | 73 | 396 | 1.8 | 15.7463 | 17.8 | 0.0139 | 18.9 | 0.0016 | 6.4 | 0.34 | 10.3 | 1.3 | 14.1 | 2.6 | 725.2 | 379.3 | 10.3 | 1.3 | NA |
| PR-29-3C | 542 | 2013 | 1.0 | 12.0881 | 38.2 | 0.0182 | 38.4 | 0.0016 | 4.1 | 0.11 | 10.3 | 0.8 | 18.3 | 7.0 | 1262.8 | 776.1 | 10.3 | 0.8 | NA |
| PR-29-11 | 124 | 410 | 1.5 | 20.6516 | 22.0 | 0.0107 | 22.1 | 0.0016 | 2.4 | 0.11 | 10.3 | 0.5 | 10.8 | 2.4 | 120.0 | 524.1 | 10.3 | 0.5 | NA |
| PR-29-33 | 64 | 413 | 1.7 | 15.0417 | 26.3 | 0.0147 | 26.4 | 0.0016 | 2.4 | 0.09 | 10.4 | 0.5 | 14.8 | 3.9 | 821.6 | 558.4 | 10.4 | 0.5 | NA |
| PR-29-7 | 144 | 1248 | 1.6 | 13.0085 | 6.3 | 0.0173 | 6.4 | 0.0016 | 1.3 | 0.20 | 10.5 | 0.3 | 17.4 | 1.1 | 1117.9 | 125.0 | 10.5 | 0.3 | NA |
| PR-29-23 | 70 | 146 | 1.2 | 32.6859 | 16.9 | 0.0069 | 17.4 | 0.0016 | 4.0 | 0.23 | 10.5 | 0.9 | 7.0 | 1.2 | –1099.0 | 514.9 | 10.5 | 0.9 | NA |
| PR-29-2 | 430 | 1571 | 1.4 | 19.9919 | 6.3 | 0.0113 | 6.5 | 0.0016 | 1.5 | 0.24 | 10.6 | 0.3 | 11.4 | 0.7 | 196.0 | 146.5 | 10.6 | 0.3 | NA |
| PR-29-20 | 2480 | 21620 | 1.8 | 20.8930 | 1.1 | 0.112 | 3.3 | 0.0017 | 3.1 | 0.94 | 11.0 | 0.7 | 11.3 | 0.4 | 92.5 | 26.7 | 11.0 | 0.7 | NA |
| PR-29-2C | 274 | 1529 | 1.5 | 18.8933 | 9.9 | 0.0127 | 10.5 | 0.0017 | 3.2 | 0.31 | 11.2 | 0.7 | 12.8 | 1.3 | 325.7 | 226.2 | 11.2 | 0.7 | NA |
| PR-29-31 | 196 | 1115 | 1.8 | 16.7532 | 13.0 | 0.0149 | 13.2 | 0.0018 | 2.7 | 0.20 | 11.7 | 0.6 | 15.0 | 2.0 | 592.3 | 282.1 | 11.7 | 0.6 | NA |
| *Note*: Analyses were conducted at Arizona LaserChron Center. Data in italics represent discordant ages, e.g., *PR-53-2C.* C—core of grain; R—rim of grain. NC—age not calculated.  \*Radiogenic Pb.  †Not included in weighted mean age given in Table 1, e.g., PR-17-11R†. | | | | | | | | | | | | | | | | | | | |

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| APPENDIX B. SAMPLE LIST | |
| Sample number | Description |
| PR-1 | 1 m clast of black vitric dacite containing vesicles and showing flow banding. Coast road west of Buenavista (breccia unit). |
| PR-2 | Black porphyritic vitric clast (50 cm in diameter) in breccia bed. Associated with weathered clasts colored pink and yellow. 100 m south of location PR-1 (breccia unit). |
| PR-3 | Dacite lava clast from monolithologic breccia bed. West coast road, south of Arroyo San Filipe (breccia unit). |
| PR-4 | Pink-colored rhyolite lava flow showing near-vertical flow banding. West coast road, 200 m south of location PR-3 (felsic unit). |
| PR-5 | Largely devitrified glassy rhyolite from monolithic flow breccia. Coast road near Southwest Bay (felsic unit). |
| PR-6 | Dacite clast from multilithologic breccia bed near Casa Baja (breccia unit). |
| PR-7 | Flow-banded rhyolite from lava dome. Sea cliff just north of Smoothwater Bay (felsic unit). |
| PR-8 | Glassy dacite clast from monolithologic breccia bed, which contains many weathered clasts. Cliffs near Split Rock (breccia unit). |
| PR-9 | Additional clast of glassy dacite from monolithologic breccia bed, which contains many weathered clasts. Cliffs near Split Rock (breccia unit). |
| PR-10 | Glassy dacite clast from breccia bed, inland of Santa Isabel (breccia unit). |
| PR-11 | Dacite clast from dark-colored monolithologic breccia bed. East flank of Sugar Loaf peak, at elevation of 220 m above sea level (breccia unit). |
| PR-12 | Rhyolite lava flow (100 m thick) overlying breccia bed described in PR-11. East side of summit ridge of Sugar Loaf peak (felsic unit). |
| PR-13 | Rhyolite lava flow (100 m thick). East side of summit ridge of Sugar Loaf peak (felsic unit). |
| PR-14 | Dacite clast in black-colored breccia bed occurring beneath rhyolite lava flows on southwest side of Iron Wood Hill (breccia unit). |
| PR-15 | Holohyaline dacite clast from breccia bed, from ridge inland of Alligator Point (breccia unit). |
| PR-16 | Dacite clast from black-colored breccia bed, from ridge inland of Alligator Point (breccia unit). |
| PR-17 | Flat-lying sill of trachyandesite underlying black-colored breccia bed, inland of Punta Negra (intrusive unit). |
| PR-18 | Steeply inclined rhyolite dike cutting breccia bed, inland from Manchioneel Bay (intrusive unit). |
| PR-19 | Red-colored rhyolite, road stone at Casa Baja, source unknown. |
| PR-20 | Gray flow-banded rhyolite lava flow. Fine-grained with biotite phenocrysts. Edges of flow are brecciated. West coast road, inland of Freshwater Bay (felsic unit). |
| PR-21 | 2 m black-colored vitric dacitic block in coarse clast-supported block-and-ash flow (200 cm thick), more matrix supported toward the top of flow. West coast road, north of Arroyo San Felipe (breccia unit). |
| PR-22 | Gray flow-banded block from brecciated lava flow. Block contains phenocrysts of feldspar, and a few phenocrysts of biotite. West coast road, south of Old Town (felsic unit). |
| PR-23 | Somewhat vesicular black vitric dacitic clast in clast-supported block-and-ash flow, just south of location PR-22 (breccia unit). |
| PR-24 | Small fragments of devitrified pumice, from ignimbrite located in quarry inland of airport (pumice unit) |
| PR-25 | 30 cm basic clast from ignimbrite, same locality as PR-24 (pumice unit). |
| PR-26 | Pink-colored rhyolitic lava flow >13 m thick, east coast road, south of Iron Wood Hill (felsic unit). |
| PR-27 | Black-colored vitric basaltic clasts with olivine phenocrysts from block-and-ash flow, found as beach pebbles on east coast (breccia unit). |
| PR-28 | White-colored rhyolite lava flow (>8 m thick) with small glassy feldspars, east coast, just south of locality PR-27 (felsic unit). |
| PR-29 | White-colored partially flow-banded rhyolite lava flow with biotite phenocrysts, inland of Smoothwater Bay (felsic unit). |
| PR-30 | Trachyandesite lava flow, overlying 2 m of bedded pyroclastic deposits with clasts to 10 cm, west coast, inland of Southwest Bay (trachyandesite unit). |
| PR-31 | Block of basalt containing megacrysts of plagioclase, olivine, and augite in breccia bed, west coast, just south of location PR-30 (breccia unit). |
| PR-32 | Limestone clast from ignimbrite that overlies limestone with corals in growth position, height above sea level 25 m, west coast, just inland of Alligator Point (pumice unit). |
| PR-33 | Limestone clast in limestone deposit at 12 m above sea level, just north of Alligator Point (limestone unit). |
| PR-34 | Limestone clast from Alligator Point (limestone unit). |
| PR-35 | Dacitic clast in conglomerate bed, west coast, inland of Punta Negra on flanks of South Hill (conglomerate unit). |
| PR-36 | Feldspar porphyritic trachyandesite lava flow, outcropping below conglomerate bed, west flank of South Hill (trachyandesite unit). |
| PR-37 | Dacitic block from conglomerate bed, west flank of South Hill (conglomerate unit). |
| PR-38 | Fine-grained basaltic clast with sparse feldspars, from conglomerate bed, west flank of South Hill (conglomerate unit). |
| PR-39 | Dacitic clast rich in phenocrysts, in multilithologic conglomerate bed, west flank of South Hill (conglomerate unit). |
| PR-40 | Flow-banded rhyolite breccia from margin of Murray Hill dome (felsic unit). |
| PR-41 | Black vitrophyric dacitic clast in matrix-supported block-and-ash flow (>200 cm thick), east flank of North-East Hill (breccia unit). |
| PR-42 | Aphanitic basaltic clast in block-and-ash flow, from east flank of North-East Hill (breccia unit). |
| PR-43 | Basaltic clasts in block-and-ash flow, northern flank of North-East Hill (breccia unit). |
| PR-44 | Red and green reworked pyroclastic deposits, clasts to 50 cm, on shore of Garet Bay, north of North-East Hill (mafic unit). |
| PR-45 | Basaltic lava flow containing peridotite inclusions, Jones Point (mafic unit). |
| PR-46 | Basic lava flow, Jones Point (mafic unit). |
| PR-47 | Flow-banded rhyolite lava flow, west coast, inland of Southwest Bay (felsic unit). |
| PR-48 | Vitric dacitic clasts in breccia bed, southern flank of Ironwood Hill (breccia unit). |
| PR-49 | Basaltic clasts, containing megacrysts of olivine, in conglomerate bed, road to Manchioneel Bay, on west flank of Murray Hill (conglomerate unit). |
| PR-50 | Basaltic block in conglomerate bed, road to Manchioneel Bay, on west flank of Murray Hill (conglomerate unit). |
| PR-51 | Vitrophyric dacite clast in matrix-supported block-and-ash flow; unit also contains clasts of jasper, south flank of Iron Wood Hill (breccia unit). |
| PR-52 | Dike, showing columnar jointing, cutting breccia bed on east side of Iron Wood Hill (intrusive unit). |
| PR-53 | Basalt lava flow with peridotite inclusions, Jones Point (mafic unit). |
| PR-54 | Dacite clast in breccia bed, Split Rock (breccia unit). |
| PR-55 | Vitric dacite clast in block-and-ash flow, Split Rock (breccia unit). |
| PR-56 | Dacitic clast in block-and-ash flow, Split Rock (breccia unit). |
| PR-57 | Vitric dacite clast in block-and-ash flow, Split Rock (breccia unit). |
| PR-58 | Dacitic clasts from breccia bed, Split Rock (breccia unit). |
| PR-59 | Trachyandesite lava flow (6 m thick) on south side of Catalina Bay (trachyandesite unit). |
| PR-60 | Dike (1.5 m thick) cutting hyaloclastite deposits at Punta Negra (intrusive unit). |
| PR-61 | Basaltic pillow lava? in hyaloclastite deposits, Punta Negra (mafic unit). |
| PR-62 | Shells collected from base-surge deposits, Punta Negra (mafic unit). |
| PR-63 | Basalt lava flow underlying base-surge deposits, Punta Negra (mafic unit). |
| *Note*: See Figure 21 for location of samples. | |

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| APPENDIX C. POSSIBLE BASALTIC SOURCES FOR PROVIDENCIA SUBALKALINE SUITE | | | | | | | | | | | | |
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|  | NC 19 | NC 21 | NC 20 | 53R2,  75-80 | 53R-3  68-71 | 54R-5  81-84 | 55R-1  72-75 | 55R-2  81-83 | 146-1 | 150-1 | 152-1 | 153-1 |
| Major oxides (wt%) | |  |  |  |  |  |  |  |  |  |  |  |
| SiO2 | 50.54 | 50.91 | 51.17 | 50.23 | 49.66 | 49.40 | 49.90 | 49.00 | 48.06 | 48.27 | 48.88 | 48.15 |
| TiO2 | 3.17 | 2.99 | 3.03 | 1.41 | 1.29 | 1.25 | 1.37 | 1.58 | 1.07 | 1.24 | 1.67 | 1.47 |
| Al2O3 | 16.62 | 14.12 | 14.09 | 16.11 | 14.89 | 15.00 | 15.70 | 14.30 | 14.53 | 16.20 | 14.89 | 14.07 |
| Fe2O3 | 5.16 | 2.90 | 2.16 | 10.59 | 12.1 | 11.38 | 10.40 | 12.30 | 11.01 | 10.05 | 12.76 | 12.69 |
| FeO | 5.39 | 7.87 | 8.61 |  |  |  |  |  |  |  |  |  |
| MnO | 0.16 | 0.15 | 0.15 | 0.18 | 0.20 | 0.19 | 0.20 | 0.23 | 0.17 | 0.10 | 0.12 | 0.22 |
| MgO | 4.75 | 6.21 | 6.19 | 8.53 | 7.20 | 7.20 | 7.86 | 7.42 | 8.14 | 8.37 | 7.32 | 7.36 |
| CaO | 8.56 | 8.22 | 8.27 | 11.28 | 12.98 | 13.03 | 12.56 | 12.37 | 13.01 | 9.63 | 7.20 | 11.35 |
| Na2O | 3.37 | 3.32 | 3.29 | 1.29 | 2.08 | 2.14 | 2.28 | 2.22 | 1.87 | 2.54 | 3.05 | 2.31 |
| K2O | 1.04 | 0.24 | 0.26 | 0.10 | 0.11 | 0.09 | 0.08 | 0.20 | 0.03 | 0.13 | 0.92 | 0.05 |
| P2O5 | 0.28 | 0.28 | 0.56 | 0.09 | 0.11 | 0.09 | 0.09 | 0.11 | 0.08 | 0.10 | 0.11 | 0.11 |
| Trace elements (ppm) | | |  |  |  |  |  |  |  |  |  |  |
| Sc | 19 | 21 | 21 | 52 | 48 | 48 | 54 | 54 |  |  |  |  |
| V | 231 | 192 | 196 | 368 | 355 | 343 | 378 | 396 |  |  |  |  |
| Cr | 59 | 179 | 154 | 289 | 296 | 299 | 272 | 195 | 341 | 373 | 229 | 133 |
| Ni | 28 | 22 | 31 | 108 | 116 | 108 | 94 | 104 | 128 | 127 | 45 | 73 |
| Ga | 24 | 21 | 21 | 17 | 16 | 16 | 17 | 17 |  |  |  |  |
| Rb | 7 | <1 | 2 | 0.2 | 0.2 | 0.3 | 0.1 | 4.2 | 0.35 | 1.0 | 12 | 0.31 |
| Sr | 662 | 343 | 348 | 99 | 99 | 98 | 98 | 92 | 124 | 117 | 114 | 123 |
| Y | 33 | 31 | 31 | 31 | 33 | 31.5 | 32.5 | 37.7 | 19.2 | 16.4 | 27.4 | 27.4 |
| Zr | 221 | 166 | 168 | 66 | 65 | 62 | 69 | 75 | 49 | 68 | 77 | 72 |
| Nb | 36 | 21 | 36 | 1.73 | 1.60 | 1.51 | 1.69 | 1.66 | 2.82 | 3.59 | 1.77 | 3.84 |
| Ba | 393 | 59 | 66 | 7.8 | 5.7 | 6.0 | 6.9 | 5.8 | 7.0 | 16 | 11 | 13 |
| La | 27.0 | 9.06 | 9.46 | 1.58 | 1.57 | 1.48 | 1.62 | 1.75 | 2.52 | 3.16 | 1.94 | 3.40 |
| Ce | 60.1 | 22.4 | 23.4 | 5.44 | 5.51 | 5.20 | 5.61 | 6.34 | 7.04 | 8.85 | 6.00 | 9.50 |
| Nd | 32.7 | 17.8 | 17.9 | 7.15 | 7.08 | 6.74 | 7.29 | 8.46 | 6.14 | 6.94 | 6.46 | 8.15 |
| Sm | 7.64 | 5.72 | 5.60 | 2.72 | 2.80 | 2.64 | 2.87 | 3.30 | 2.12 | 2.32 | 2.76 | 2.88 |
| Eu | 2.93 | 2.37 | 2.38 | 1.08 | 1.08 | 1.04 | 1.12 | 1.27 | 0.81 | 0.89 | 1.02 | 1.07 |
| Tb | 1.21 | 1.13 | 1.09 | 0.80 | 0.81 | 0.77 | 0.81 | 0.95 | 0.54 | 0.52 | 0.75 | 0.74 |
| Yb | 2.20 | 2.14 | 2.14 | 3.42 | 3.35 | 3.24 | 3.31 | 3.92 | 2.09 | 1.82 | 3.07 | 3.11 |
| Lu | 0.30 | 0.29 | 0.30 | 0.54 | 0.55 | 0.53 | 0.54 | 0.63 | 0.31 | 0.26 | 0.45 | 0.47 |
| Hf | 5.5 | 4.7 | 4.6 | 1.95 | 1.93 | 1.82 | 2.02 | 2.24 | 1.60 | 1.92 | 2.41 | 2.20 |
| Pb | 0.4 | 0.3 | 0.1 | 1.14 | 1.59 | 0.44 | 0.43 | 0.56 | 0.41 | 0.23 | 0.87 | 0.44 |
| Th | 1.71 | 0.5 | 0.52 | 0.09 | 0.08 | 0.07 | 0.09 | 0.09 | 0.20 | 0.26 | 0.11 | 0.27 |
| U | 0.46 | 0.16 | 0.28 | 0.03 | 0.03 | 0.02 | 0.05 | 0.08 | 0.08 | 0.09 | 0.14 | 0.11 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| 87Sr/86Sr |  | 0.7037 | 0.7038 | 0.702673 | 0.702661 | 0.702665 | 0.702758 | 0.702831 | 0.703009 | 0.703546 | 0.703220 | 0.702961 |
| 143Nd/144Nd |  | 0.5130 | 0.5130 | 0.513266 | 0.513232 | 0.513235 | 0.513237 | 0.513251 | 0.513061 | 0.513012 | 0.513170 | 0.513027 |
| 206Pb/204Pb |  | 18.934 | 18.991 | 18.381 | 18.512 | 18.387 | 18.504 | 18.542 | 18.982 | 19.069 | 18.983 | 18.898 |
| 207Pb/204Pb |  | 15.538 | 15.547 | 15.428 | 15.471 | 15.428 | 15.518 | 15.465 | 15.591 | 15.600 | 15.597 | 15.587 |
| 208Pb/204Pb |  | 38.531 | 38.574 | 37.750 | 37.850 | 37.647 | 37.919 | 37.789 | 38.549 | 38.703 | 38.354 | 38.518 |
| *Note*: Analyses 1–3 are from Great Corn Island after Janoušek et al. (2010); analyses 4–8 are from Ocean Drilling Program (ODP) Site 1001 after Kerr et al. (2009); analyses 9–12 are from ODP Sites 146, 150, 152 and 153 after Hauff et al. (2000). | | | | | | | | | | | | |

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| APPENDIX D. CHEMICAL COMPOSITION OF VOLCANIC ROCKS FROM HAITI | | | | | |
|  | HI-1 | HI-2 | HI-3 | HI-4 | HI-5 |
| Major oxides (wt%) | | |  |  |  |
| SiO2 | 40-39 | 42.18 | 40.77 | 46.33 | 40.95 |
| TiO2 | 4.30 | 2.81 | 2.30 | 2.15 | 2.32 |
| Al2O3 | 9.26 | 10.32 | 10.02 | 8.09 | 10.65 |
| Fe2O3 | 13.05 | 11.92 | 12.00 | 13.47 | 11.98 |
| MnO | 0.17 | 0.16 | 0.17 | 0.22 | 0.17 |
| MgO | 11.80 | 11.07 | 13.42 | 20.56 | 12.37 |
| CaO | 14.52 | 14.76 | 14.63 | 8.21 | 13.79 |
| Na2O | 3.29 | 3.52 | 3.28 | 0.51 | 4.10 |
| K2O | 0.80 | 1.23 | 2.01 | 0.26 | 2.28 |
| P2O5 | 2.45 | 2.02 | 1.39 | 0.20 | 1.40 |
| Trace Elements (ppm) | | |  |  |  |
| Sc | 24.7 | 22.1 | 24.0 | 27.4 | 24.1 |
| V | 248 | 213 | 220 | 264 | 222 |
| Cr | 358 | 297 | 460 | 1660 | 392 |
| Ni | 254 | 221 | 302 | 838 | 280 |
| Ga | 15 | 15 |  | 9 | 16 |
| Rb | 16 | 11 | 44 | 4 | 51 |
| Sr | 2028 | 2478 | 1445 | 59 | 1630 |
| Y | 29 | 26 | 21 | 18 | 21 |
| Zr | 469 | 350 | 190 | 114 | 215 |
| Nb | 126 | 75 |  | 14 | 89 |
| Ba | 1660 | 1808 | 1146 | 38 | 967 |
| La | 269 | 270 | 146 | 12.1 | 150 |
| Ce | 424 | 422 | 252 | 30 | 262 |
| Nd | 190 | 169 | 88 | 19 | 86 |
| Sm | 24.70 | 20.90 | 12.50 | 4.76 | 12.60 |
| Eu | 6.55 | 5.35 | 3.69 | 1.19 | 3.84 |
| Tb | 1.3 | 1.5 | 0.9 | 0.6 | 1.1 |
| Yb | 1.80 | 1.63 | 1.28 | 1.63 | 1.41 |
| Lu | 0.27 | 0.26 | 0.19 | 0.25 | 0.23 |
| Hf | 10.1 | 7.2 | 4.8 | 3.1 | 4.4 |
| Pb | 19 | 23 | 15 | <5 | 15 |
| Th | 29.3 | 33.1 | 18.2 | 0.9 | 20.6 |
| U | 5.1 | 5.6 | 3.0 | 0.4 | 2.9 |
| Ta | 6.5 | 3.4 | 3.8 | 0.6 | 4.1 |
| CIPW normative mineral compositions (wt%) | | | | |  |
| Or | 4.73 | 4.29 |  | 1.54 |  |
| Ab | 1.49 |  |  | 4.32 |  |
| An | 8.14 | 8.73 | 6.68 | 19.02 | 3.92 |
| Ne | 14.27 | 16.14 | 15.04 |  | 18.79 |
| Lc |  |  | 9.31 |  | 10.56 |
| Di | 38.46 | 41.35 | 27.48 | 16.30 | 27.72 |
| Hy |  |  |  | 31.16 |  |
| Ol | 15.59 | 13.93 | 23.66 | 19.49 | 21.65 |
| Mt | 3.78 | 3.45 | 3.48 | 3.90 | 3.48 |
| Il | 8.17 | 5.34 | 4.37 | 4.08 | 4.41 |
| Ap | 5.68 | 4.68 | 3.22 | 0.46 | 3.24 |
| CS |  |  | 7.00 |  | 6.47 |
| *Note*: Analyzed at Activation Labs. Major-element analyses were recalculated to 100% volatile-free basis. Fe2O3/FeO ratio for norms = 0.2. HI-1—basanite from Thomaseau, Haiti; HI-2—tephrite/basanite from Thomaseau, Haiti; HI-3—tephrite/basanite from Saut d’Eau, Haiti; HI-4—basalt from Saut d’Eau, Haiti; HI-5—nephelinite from Saut d’Eau, Haiti. CS—calcium silicate. | | | | | |

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| APPENDIX E. CHEMICAL COMPOSITION OF VOLCANIC ROCKS FROM DOMINICAN REPUBLIC | | | | | | | | | | | |
|  | DR-2 | DR-3 | DR-4 | DR-6 | DR-7 | DR-11 | DR-12 | DR-13 | DR-14 | DR-15 | DR-16 |
| Major oxides (wt%) | | |  |  |  |  |  |  |  |  |  |
| SiO2 | 60.31 | 44.53 | 45.59 | 59.01 | 64.23 | 51.87 | 60.54 | 80.88 | 51.96 | 53.46 | 53.58 |
| TiO2 | 0.51 | 2,79 | 3.20 | 0.57 | 0.39 | 0.64 | 0.55 | 0.09 | 0.63 | 0.61 | 0.66 |
| Al2O3 | 16.82 | 10.89 | 11.37 | 17.36 | 18.01 | 12.74 | 15.12 | 8.97 | 12.56 | 13.64 | 13.01 |
| Fe2O3 | 4.97 | 11.86 | 12.00 | 5.53 | 3.33 | 9.54 | 5.84 | 1.79 | 9.43 | 9.23 | 8.87 |
| MnO | 0.10 | 0.16 | 0.16 | 0.10 | 0.07 | 0.14 | 0.11 | 0.02 | 0.15 | 0.15 | 0.14 |
| MgO | 2.61 | 10.94 | 9.97 | 2.82 | 1.02 | 11.70 | 4.43 | 0.10 | 11.88 | 9.32 | 10.10 |
| CaO | 5.88 | 12.19 | 11.58 | 5.99 | 3.33 | 9.07 | 6.28 | 0.04 | 9.14 | 9.19 | 8.90 |
| Na2O | 4.89 | 4.07 | 2.68 | 4.66 | 5.68 | 2.34 | 3.82 | 0.20 | 2.35 | 2.29 | 2.61 |
| K2O | 3.61 | 0.88 | 1.92 | 3.70 | 3.73 | 1.79 | 3.00 | 7.89 | 1.74 | 1.87 | 1.89 |
| P2O5 | 0.29 | 1.70 | 1.55 | 0.26 | 0.21 | 0.18 | 0.30 | 0.03 | 0.19 | 0.25 | 0.24 |
| Trace elements (ppm) | | |  |  |  |  |  |  |  |  |  |
| Sc | 12.1 | 22.1 | 21.7 | 13.0 | 3.98 | 36.5 | 17.3 | 6.47 | 34.2 | 35.6 | 31.3 |
| V | 133 | 209 | 223 | 153 | 78 | 206 | 139 | <5 | 209 | 216 | 124 |
| Cr | 57 | 395 | 357 | 35 | 15 | 835 | 210 | 12 | 768 | 509 | 552 |
| Ni | 12 | 261 | 222 | 9 | 5 | 228 | 55 | 2 | 243 | 136 | 135 |
| Ga | 19 | 15 | 16 | 20 | 21 | 10 | 12 | 8 | 9 | 10 | 12 |
| Rb | 67 | 49 | 46 | 59 | 77 | 22 | 66 | 40 | 24 | 28 | 27 |
| Sr | 2351 | 1944 | 1749 | 2660 | 2035 | 1146 | 1681 | 10 | 1189 | 1042 | 1080 |
| Y | 11 | 23 | 23 | 11 | 11 | 13 | 9 | 16 | 17 | 12 | 11 |
| Zr | 138 | 376 | 374 | 137 | 185 | 68 | 116 | 121 | 69 | 64 | 81 |
| Nb | 15 | 76 | 76 | 13 | 30 | 4 | 10 | 15 | 4 | 3 | 3 |
| Ba | 4288 | 1662 | 1493 | 3578 | 4989 | 1188 | 2655 | 385 | 1238 | 1140 | 1070 |
| La | 78.6 | 19.8 | 177 | 72.3 | 80.7 | 20.8 | 41.0 | 12.6 | 25.2 | 17.1 | 19.9 |
| Ce | 121 | 322 | 314 | 124 | 117 | 40 | 69 | 19 | 36 | 33 | 40 |
| Nd | 43 | 118 | 125 | 43 | 34 | 19 | 27 | 12 | 19 | 18 | 14 |
| Sm | 5.44 | 18.00 | 16.60 | 5.10 | 3.83 | 3.41 | 3.80 | 3.12 | 3.94 | 3.25 | 3.35 |
| Eu | 1.37 | 4.48 | 4.37 | 1.56 | 1.22 | 1.11 | 1.08 | 0.42 | 1.07 | 0.95 | 1.05 |
| Tb | 1.1 | 1.3 | 1.3 | 0.6 | 0.5 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| Yb | 1.3 | 1.45 | 1.63 | 1.03 | 1.00 | 1.47 | 0.91 | 2.23 | 2.09 | 1.67 | 1.13 |
| Lu | 0.22 | 0.22 | 0.21 | 0.15 | 0.15 | 0.25 | 0.14 | 0.35 | 0.31 | 0.26 | 0.20 |
| Hf | 2.8 | 7.4 | 8.5 | 4.0 | 4.4 | 1.5 | 3.3 | 4.0 | 1.9 | 0.8 | 2.2 |
| Pb | 31 | 23 | 16 | 19 | 24 | 16 | 18 | 7 | <5 | 7 | <5 |
| Th | 28.2 | 23.5 | 21.3 | 24.4 | 33.3 | 3.7 | 11.6 | 3.1 | 3.4 | 3.3 | 3.5 |
| U | 8.1 | 3.4 | 3.5 | 5.0 | 8.6 | 1.0 | 3.7 | 0.8 | 0.8 | 0.9 | 0.8 |
| Ta | 1.2 | 3.5 | 3.4 | 0.5 | 1.4 | 0.3 | 0.6 | 1.1 | 0.7 | 0.4 | <0.3 |
| CIPW normative mineral compositions (wt%) | | | | | |  |  |  |  |  |  |
| Q | 2.66 |  |  | 1.10 | 7.60 |  | 7.39 | 48.33 |  |  |  |
| Or | 21.33 | 5.20 | 11.35 | 21.86 | 22.04 | 10.58 | 17.73 | 46.63 | 10.28 | 11.05 | 11.17 |
| Ab | 41.38 | 12.06 | 13.78 | 39.43 | 48.06 | 19.80 | 32.32 | 1.69 | 19.89 | 19.38 | 22.09 |
| An | 13.28 | 8.85 | 13.32 | 15.52 | 12.63 | 18.97 | 15.25 |  | 18.58 | 21.42 | 18.20 |
| Ne |  | 12.12 | 4.82 |  |  |  |  |  |  |  |  |
| C |  |  |  |  |  |  |  | 0.10 |  |  |  |
| Di | 11.55 | 32.67 | 27.44 | 10.32 | 2.12 | 20.01 | 11.38 |  | 20.54 | 18.25 | 19.67 |
| Hy | 6.81 |  |  | 8.59 | 5.43 | 13.33 | 12.61 | 2.54 | 13.56 | 24.82 | 19.33 |
| Ol |  | 16.68 | 16.41 |  |  |  |  |  | 12.99 | 0.87 | 5.34 |
| Mt | 1.44 | 3.44 | 3.48 | 1.61 | 0.96 | 2.77 | 1.70 | 0.52 | 2.74 | 2.68 | 2.58 |
| Il | 0.97 | 5.30 | 6.08 | 1.08 | 0.74 | 1.22 | 1.04 | 0.17 | 1.20 | 1.16 | 1.25 |
| Ap | 0.67 | 3.94 | 3.59 | 0.60 | 0.49 | 0.42 | 0.70 | 0.07 | 0.44 | 0.58 | 0.56 |
| *Note*: Analyzed at Activation Labs. Major-element analyses were recalculated to 100% volatile-free basis. Fe2O3/FeO ratio for norms set at 0.20. DR-2—trachyandesite from Dos Hermanos, Dominican Republic; DR-3—basalt from San Juan, Dominican Republic; DR-4—basalt from San Juan, Dominican Republic; DR-6—trachyandesite, Dos Hermanos, Dominican Republic; DR-7—trachyte from Dos Hermanos, Dominican Republic; DR-11—basalt from Constanza, Dominican Republic; DR-12—trachyandesite from Constanza, Dominican Republic; DR-13—rhyolite from Constanza, Dominican Republic; DR-14—basalt from Constanza, Dominican Republic; DR-15—basaltic andesite, Constanza, Dominican Republic; DR-16—basaltic andesite, Constanza, Dominican Republic. | | | | | | | | | | | |