

**A Summary of the Results from Analysis of Obsidian  
Artifacts and Source Specimens  
submitted by Marisa Lazzari**

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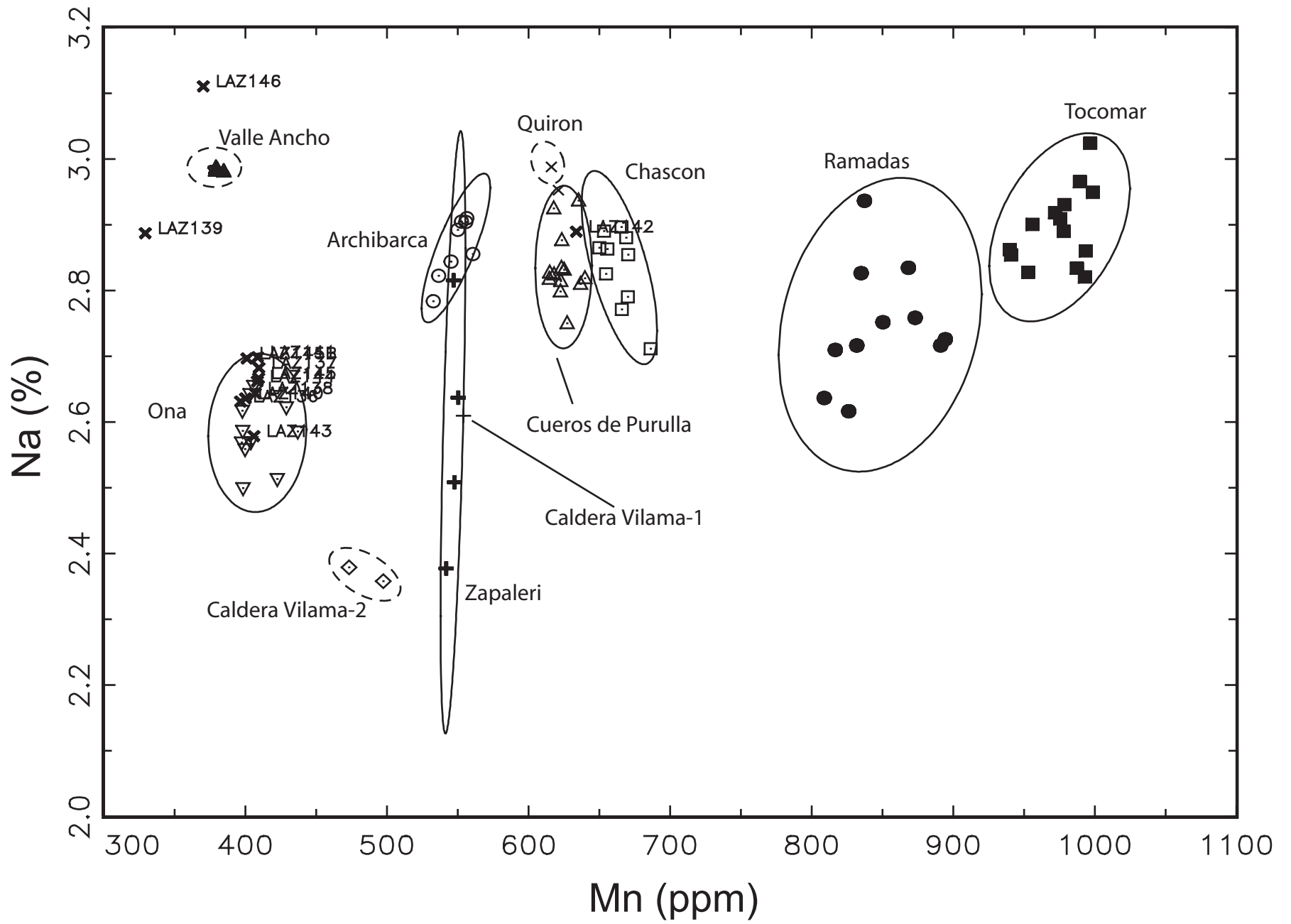
A total of 12 obsidian artifacts were submitted to MURR for INAA with samples anids ranging from LAZ136 through LAZ146. Note that two samples were labeled LAZ145; the second one was renamed LAZ145B. Two NAA analytical procedures were employed to measure the elemental concentrations. All of the samples were submitted to the first procedure which uses a short irradiation and short decay to measure seven short-lived elements (Al, Ba, Cl, Dy, K, Mn, and Na). After examination of the data for the short-lived elements to identify possible chemical groups, two samples were selected for long irradiation. The specimens selected for long irradiation were either uncertain from the short-irradiation results or were from unknown groups. The long irradiation procedure measures 22 long-lived elements (Ba, La, Lu, Nd, Sm, U, Yb, Ce, Co, Cs, Eu, Fe, Hf, Rb, Sb, Sc, Sr, Ta, Tb, Th, Zn and Zr). If the long-lived concentration for Ba was measured, it was preferred over the short-lived value.

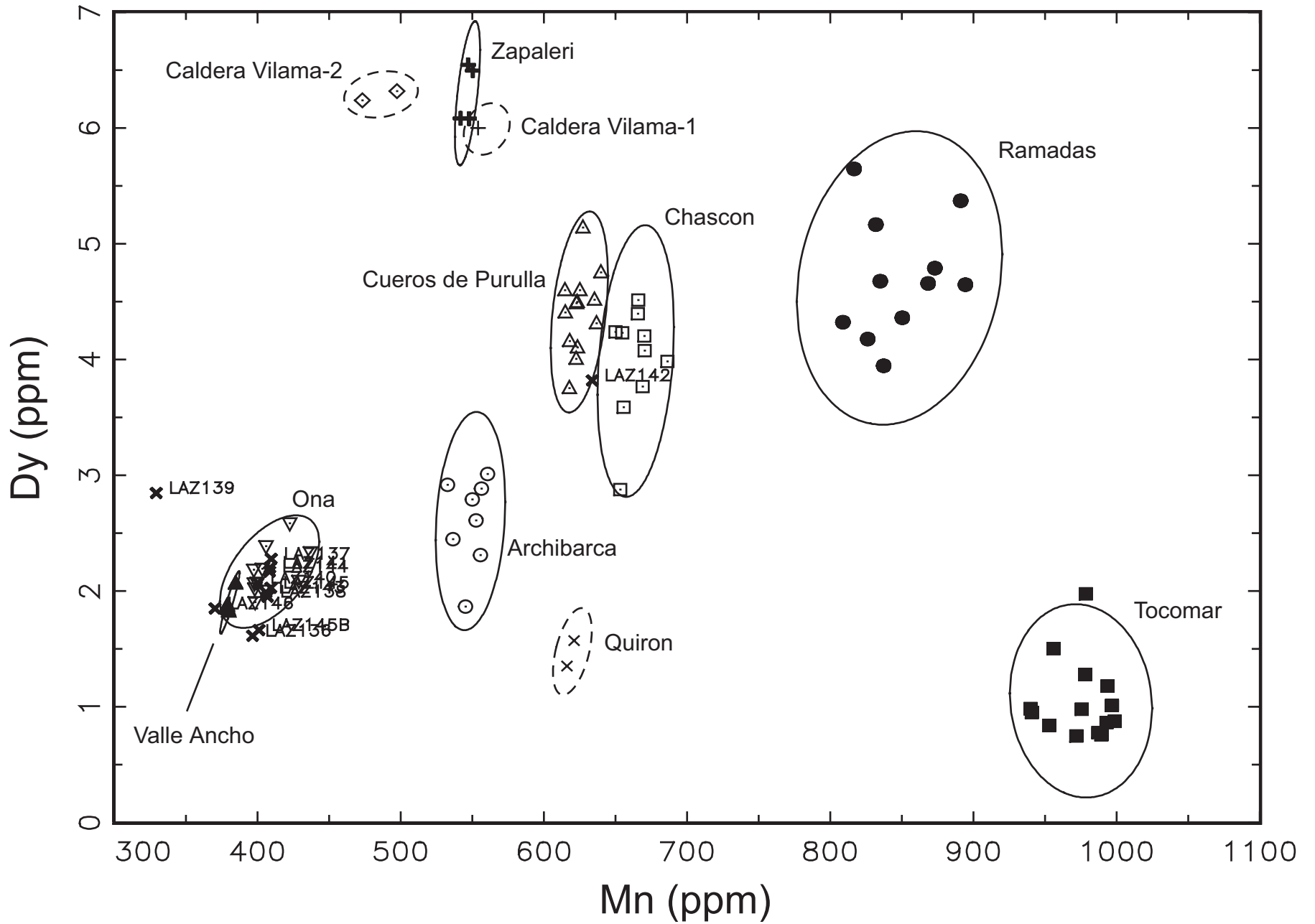
The source groups and the number of artifacts assigned to each group are as follows:

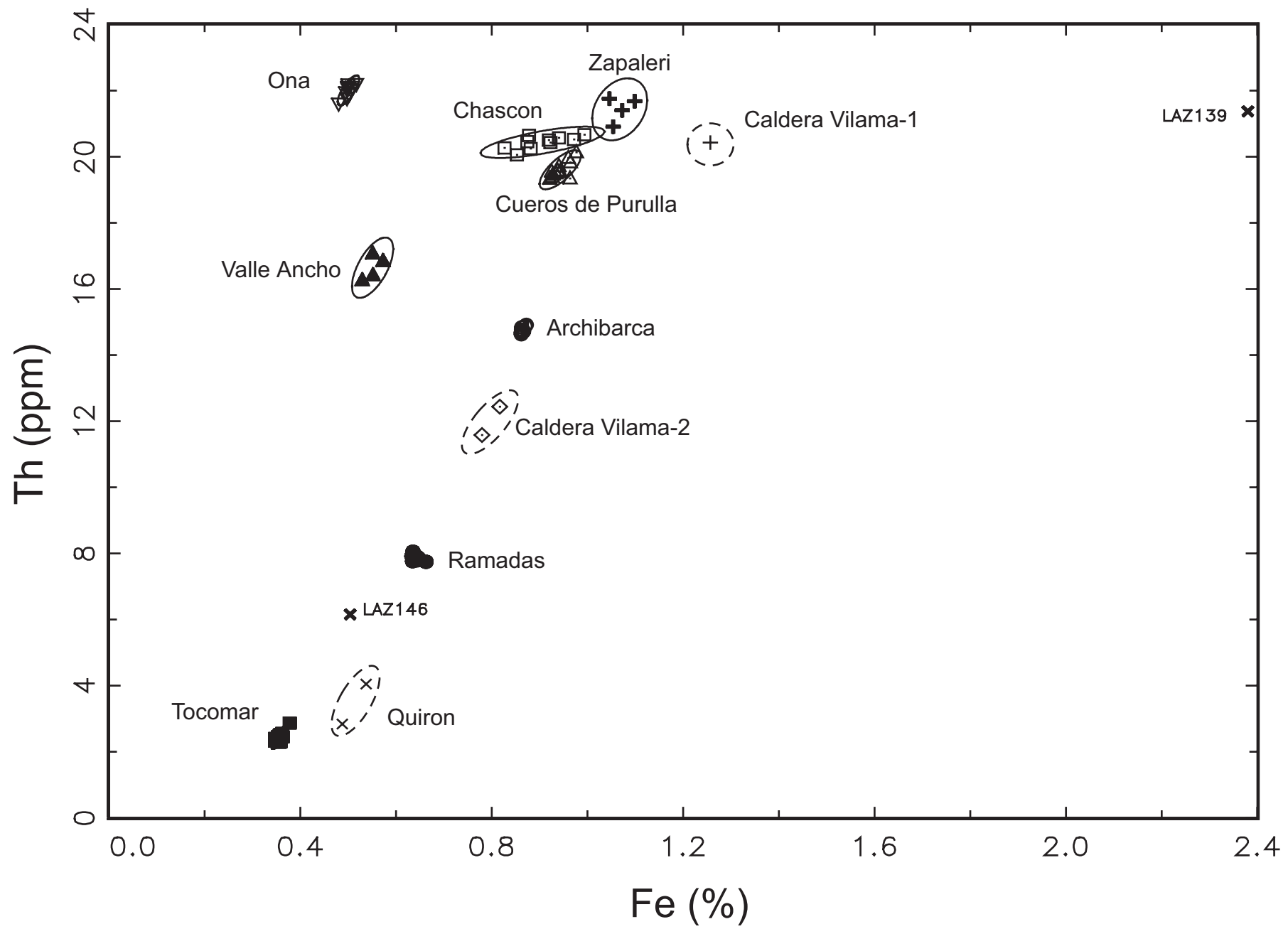
|                    |   |
|--------------------|---|
| Ona                | 9 |
| Cueros de Purulla  | 1 |
| Unknown Source D   | 1 |
| Unknown Source G-2 | 1 |

A spreadsheet listing all of the NAA data collected on these artifacts enclosed.

The short-lived elements are shown on the plots of Mn versus Na and Mn versus Dy. The long-lived elements are shown on a plot of Fe versus Th. The chemical groups are surrounded by 95 percent confidence ellipses. Groups with fewer than four specimens have dashed ellipses which are estimated.







Concentrations of elements measured in obsidian artifacts from Marisa Lazzari

| ANID    | FIELD_ID | SOURC_CO | SITE_NAME                                   | SOURC_NAME         |
|---------|----------|----------|---|--------------------|
| LAZ136  | 625/7    | ONA      | Antigal de Tesoro, Catamarca, Argentina     | Ona                |
| LAZ137  | 542      | ONA      | Antigal de Tesoro, Catamarca, Argentina     | Ona                |
| LAZ138  | 657/1    | ONA      | Antigal de Tesoro, Catamarca, Argentina     | Ona                |
| LAZ139  | 575      | unk-G-2  | Tesoro 1, Catamarca, Argentina              | Unknown Source G-2 |
| LAZ140  | 553      | ONA      | Tesoro 1, Catamarca, Argentina              | Ona                |
| LAZ141  | 515/2    | ONA      | Tesoro 1, Catamarca, Argentina              | Ona                |
| LAZ142  | 805/51   | CPA      | Ingenio Arenal-Faidas, Catamarca, Argentina | Cueros de Purulla  |
| LAZ143  | 810/4    | ONA      | Ingenio Arenal-Faidas, Catamarca, Argentina | Ona                |
| LAZ144  | 828/24   | ONA      | Ingenio Arenal-Faidas, Catamarca, Argentina | Ona                |
| LAZ145  | 806/4    | ONA      | Ingenio Arenal-Faidas, Catamarca, Argentina | Ona                |
| LAZ145B |          | ONA      | Socaire, San Pedro de Atacama, Chile        | Ona                |
| LAZ146  |          | unk-D    | Tulan 54, San Pedro de Atacama, Chile       | unknown D          |

Concentrations of elements measured in obsidian artifacts from Marisa Lazzari

| ANID    | BA     | LA      | LU     | ND      | SM     | U      | YB     | CE      | CO     | CS      | EU     | FE      | HF     | RB     |
|---------|--------|---------|--------|---------|--------|--------|--------|---------|--------|---------|--------|---------|--------|--------|
| LAZ136  | 531.1  | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0     | 0.0000 | 0.00   |
| LAZ137  | 535.5  | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0     | 0.0000 | 0.00   |
| LAZ138  | 521.5  | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0     | 0.0000 | 0.00   |
| LAZ139  | 607.5  | 41.6601 | 0.2824 | 31.6695 | 5.5133 | 5.1494 | 1.1617 | 78.8429 | 8.8453 | 10.1494 | 1.0289 | 23793.3 | 5.3187 | 189.23 |
| LAZ140  | 496.3  | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0     | 0.0000 | 0.00   |
| LAZ141  | 554.2  | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0     | 0.0000 | 0.00   |
| LAZ142  | 561.9  | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0     | 0.0000 | 0.00   |
| LAZ143  | 482.3  | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0     | 0.0000 | 0.00   |
| LAZ144  | 545.9  | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0     | 0.0000 | 0.00   |
| LAZ145  | 536.6  | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0     | 0.0000 | 0.00   |
| LAZ145B | 478.1  | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0000 | 0.0000 | 0.0000  | 0.0000 | 0.0000  | 0.0000 | 0.0     | 0.0000 | 0.00   |
| LAZ146  | 1034.6 | 22.3240 | 0.0739 | 16.3890 | 3.3259 | 3.2434 | 0.5541 | 43.2012 | 0.3400 | 2.5781  | 0.6868 | 5041.8  | 2.4115 | 97.17  |

Concentrations of elements measured in obsidian artifacts from Marisa Lazzari

| ANID    | SB     | SC     | SR     | TA     | TB     | TH      | ZN    | ZR     | AL      | CL    | DY     | K       | MN     | NA      |
|---------|--------|--------|--------|--------|--------|---------|-------|--------|---------|-------|--------|---------|--------|---------|
| LAZ136  | 0.0000 | 0.0000 | 0.00   | 0.0000 | 0.0000 | 0.0000  | 0.00  | 0.00   | 68389.3 | 441.5 | 1.6127 | 38537.0 | 396.46 | 26309.2 |
| LAZ137  | 0.0000 | 0.0000 | 0.00   | 0.0000 | 0.0000 | 0.0000  | 0.00  | 0.00   | 70425.0 | 460.5 | 2.2784 | 39061.2 | 409.57 | 26823.9 |
| LAZ138  | 0.0000 | 0.0000 | 0.00   | 0.0000 | 0.0000 | 0.0000  | 0.00  | 0.00   | 68129.1 | 570.9 | 1.9516 | 38192.8 | 406.87 | 26434.4 |
| LAZ139  | 0.2041 | 6.9707 | 364.90 | 0.7880 | 0.4572 | 21.3674 | 77.22 | 230.36 | 85531.7 | 389.9 | 2.8464 | 31081.5 | 329.24 | 28870.4 |
| LAZ140  | 0.0000 | 0.0000 | 0.00   | 0.0000 | 0.0000 | 0.0000  | 0.00  | 0.00   | 66541.8 | 541.3 | 2.0712 | 39404.6 | 400.05 | 26360.1 |
| LAZ141  | 0.0000 | 0.0000 | 0.00   | 0.0000 | 0.0000 | 0.0000  | 0.00  | 0.00   | 73869.7 | 497.6 | 2.2001 | 41020.5 | 408.50 | 26984.6 |
| LAZ142  | 0.0000 | 0.0000 | 0.00   | 0.0000 | 0.0000 | 0.0000  | 0.00  | 0.00   | 77602.1 | 483.9 | 3.8194 | 39718.1 | 633.54 | 28894.5 |
| LAZ143  | 0.0000 | 0.0000 | 0.00   | 0.0000 | 0.0000 | 0.0000  | 0.00  | 0.00   | 66629.7 | 433.3 | 1.9858 | 41945.4 | 405.95 | 25786.6 |
| LAZ144  | 0.0000 | 0.0000 | 0.00   | 0.0000 | 0.0000 | 0.0000  | 0.00  | 0.00   | 71850.4 | 598.6 | 2.1689 | 41277.4 | 408.30 | 26619.1 |
| LAZ145  | 0.0000 | 0.0000 | 0.00   | 0.0000 | 0.0000 | 0.0000  | 0.00  | 0.00   | 73129.9 | 536.2 | 2.0280 | 42466.1 | 409.15 | 26663.1 |
| LAZ145B | 0.0000 | 0.0000 | 0.00   | 0.0000 | 0.0000 | 0.0000  | 0.00  | 0.00   | 75252.5 | 591.3 | 1.6630 | 40213.0 | 400.97 | 26964.4 |
| LAZ146  | 0.1555 | 1.4764 | 318.85 | 1.4776 | 0.3073 | 6.1487  | 58.06 | 78.30  | 72512.5 | 205.3 | 1.8487 | 31345.5 | 370.20 | 31107.1 |