**GSA Data Repository item 2007087**

Cenozoic provenance history of synorogenic conglomerates in western Argentina (Famatina belt): Implications for central Andean foreland development, by Federico M. Dávila and Ricardo A. Astini; *GSA Bulletin*; March/April 2007; v. 119; no. 5/6; p. 609–622; doi: 10.1130/B26007.1.

**Appendix 1. (a)** Analytical data for $^{39}$Ar-$^{40}$Ar ages of the ED12 ignimbrite (El Durazno Formation). Amounts of $^{36}$Ar, $^{37}$Ar, $^{38}$Ar, $^{39}$Ar are in ppm. **(b)** Analytical datum for $^{40}$Ar-$^{39}$Ar age of a pyroclastic flow at the base of the El Durazno Formation, Famatina Ranges. Laser age determination was performed by the Isotope Geochronology Laboratory at University of Nevada Las Vegas by Terry Spell. The sample was irradiated at the Nuclear Science Center at Texas A&M University using a neutron fluence monitors (FC-2, Fish Canyon Tuff sanidine). Reliable isochron is based on the MSWD (mean squared weighted deviation) criteria of Wendt and Carl (1991). Analytical datum is reported at the confidence level of 1$\sigma$ (standard deviation). Age calculation was done using LabSPEC software. Laser fusion of individual crystals produced the best results. Individual ages varied widely from ~7-30 Ma, however, all analyses (12, see Appendix 1 for analytical data) define a valid isochron (Appendix 2) which gives an age of 5.20 ± 0.85 Ma, and indicates the presence of excess argon ($^{40}$Ar/$^{36}$Ar = 346). This isochron age is the best estimate of the age of the sample.

**Appendix 2.** $^{40}$Ar/$^{39}$Ar concordia plot for the sample ED12. Data-point error ellipses are at the 68.3% confidence level. See also appendix 1 for additional information.

**Appendix 3.** Clast compositional analysis of Tertiary conglomerates of the Famatina belt. Amounts indicate number of clasts counted by lithology, at a specific stratigraphic level, and in parenthesis is represented the percentage of a lithology respect to the rest, across this level.

**(a)**

ED12 sample, plagioclase, J = 0.001520 ± 0.5%

4 amu discrimination = 1.01651 ± 0.06%, 40/39K = 0.00 ± 0.0002%, 36/37Ca = 0.0002674 ± 2.70%, 39/37Ca = 0.0006820 ± 1.57%

| step | T (C) | t (min.) | 36Ar | 37Ar | 38Ar | 39Ar | 40Ar | %40Ar* | % 39Ar rlsd | Ca/K | 40Ar*/39ArK | Age (Ma) | 1s.d. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 625 | 12 | 0,526 | 0,078 | 0,109 | 0,045 | 173,975 | 14,1 | 0,03092784 | 6,05669134 | 474,120035 | 983,558 | 61,679 |
| 2 | 700 | 12 | 0,351 | 0,416 | 0,069 | 0,271 | 117,746 | 16,9 | 0,1862543 | 5,36274177 | 59,0282934 | 155,892 | 6,391 |
| 3 | 775 | 12 | 0,303 | 3,998 | 0,098 | 2 | 101,826 | 20,2 | 1,37457045 | 6,98694692 | 7,45653743 | 20,452 | 0,231 |
| 4 | 855 | 12 | 0,146 | 16,636 | 0,129 | 6,531 | 63,078 | 67,1 | 4,48865979 | 8,90828898 | 3,56350084 | 9,803 | 0,108 |
| 5 | 935 | 12 | 0,142 | 34,035 | 0,182 | 12,702 | 67,088 | 100 | 8,72989691 | 9,37214828 | 2,29080731 | 6,308 | 0,135 |
| 6 | 1015 | 12 | 0,111 | 51,119 | 0,266 | 18,835 | 67,897 | 100 | 12,9450172 | 9,4933177 | 1,58687927 | 4,372 | 0,053 |
| 7 | 1090 | 12 | 0,135 | 56,551 | 0,279 | 21,143 | 76,507 | 98,7 | 14,5312715 | 9,35528423 | 1,79696051 | 4,95 | 0,048 |
| 8 | 1150 | 12 | 0,133 | 46,318 | 0,234 | 17,392 | 74,149 | 97,8 | 11,9532646 | 9,3149026 | 0,71710384 | 1,977 | 0,088 |
| 9 | 1210 | 12 | 0,136 | 43,998 | 0,245 | 16,495 | 71,401 | 97,3 | 11,3367698 | 9,32954728 | 0,5904563 | 1,628 | 0,049 |
| 10 | 1275 | 12 | 0,181 | 50,42 | 0,273 | 19,031 | 87,046 | 99,7 | 13,0797251 | 9,266441 | 1,34489679 | 3,706 | 0,064 |
| 11 | 1400 | 12 | 0,309 | 81,183 | 0,452 | 31,052 | 145,59 | 98,6 | 21,3415808 | 9,14389616 | 1,04817239 | 2,889 | 0,059 |
| | | | | | | | | Cumulative % | 99,9979381 | | Total gas age | 4,67380673 | 0,0460828 |
| | | | | | | | | | | | no plateau | | |

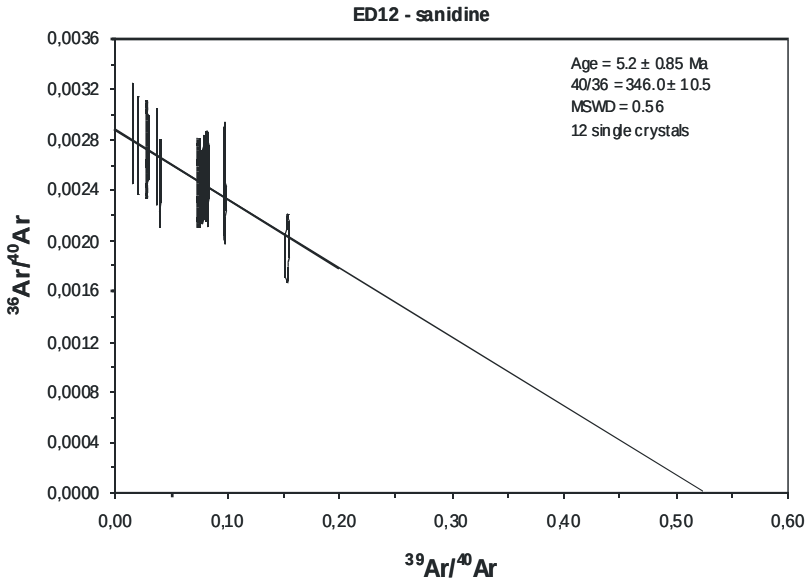
note: isotope beams in mV rlsd = released, error in age includes 0.5% J error, all errors 1 sigma

(Not corrected for decay)

**(b)**

| # | Sample | Rock | Mineral (method) | # Analyses | Isochron (MSDW) | 40Ar/36Ar initial | Age (Ma ± 1σ) |
|---|---|---|---|---|---|---|---|
| 1 | ED12 | Ignimbrite | Sanidine | 12 | 0.56 | 346 ± 10.5 | 5.2 ± 0.85 |

## Appendix 1 (a and b)


ED12 - sanidine
Age = 5.2 ± 0.85 Ma
40/36 = 346.0 ± 10.5
MSWD = 0.56
12 single crystals
0,0036
0,0032
0,0028
0,0024
0,0020
0,0016
0,0012
0,0008
0,0004
0,0000
36Ar/40Ar
0,00
0,10
0,20
0,30
0,40
0,50
0,60
39Ar/40Ar

**Appendix 2.**

Number of grids = 270, 27 each section

Clast measured by grid = ~100

Number of clast analyzed= ~27000

| Unit | Section | MS | Low-grade metamorphic clasts | Granitoid clasts | | Volcanic clasts | | Sedimentary clasts | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Equigranular | Porphyritic | Andesite | Rhyolite/ dacite | Sandstones | | $CO_3^{\#}$ | Black shale |
| | | | | | | | | Green | W&R* | | |
| EDF | 10 | 5 | | 54% | | 13% | 11% | 7% | 13% | <1% | 1% |
| SDF | 9 | 4 | | 47% | | 19% | 17% | 3% | 12% | | 2% |
| DBF | 8 | 4 | | 51% | | 21% | 23% | 1% | 3% | | |
| | 7 | 3 | <1% | | 58% | 12% | 23% | 2% | 4% | | |
| DAF | 6 | 3 | <1% | | >99% | | | | | | |
| | 5 | | 4% | | 96% | | | | | | |
| DCF | 4 | 2 | | 90% | | | 4% | 2% | 3% | | <1% |
| | 3 top | | | 16% | | | 79% | ~3% | 2% | | <1% |
| | 3 bottom | | | 5% | | | 23% | | 72% | | |
| | 2 | 1 | | <1% | | >99% | <1% | <1% | <1% | | <1% |
| | 1 | | | | | | >99% | | <1% | | |

**References**. 1: base of the Del Crestón Formation (DCF) MS1, 2: upper part of the MS1 of the DCF, 3: lower part of the DCF MS2, 4: upper part of the DCF MS2, 5: lower section of the MS3 (Del Abra Formation, DAF), 6: upper section of DAF MS3, 7: lower section of the Del Buey Formation (DBF) MS3, 8: upper section of the DBF MS4, 9: representative for the whole Santo Domingo Formation (SDF) MS4 and 10: representative for the whole El Durazno Formation (EDF) MS5. W&R*: White and red. $CO_3^{\#}$: Limestones. MS: megasequences.

**Appendix 3**