

**Sample ID POL 13-01** Lab#N1297-01/N1297-18 J = 0.00024170 ± 0.00000145  
 Samidine Irradiation # 77 reactor OSIRIS  
 Flux standard ACS-2 1.194 Ma **Single crystal total fusion**

N	<sup>40</sup> Ar (moles)	<sup>36</sup> Ar V	±σ <sub>36</sub> V	<sup>37</sup> Ar V	±σ <sub>37</sub> V	<sup>38</sup> Ar V	±σ <sub>38</sub> V	<sup>39</sup> Ar V	±σ <sub>39</sub> V	<sup>40</sup> Ar V	±σ <sub>40</sub> V	D <sup>(1)</sup> ±%σ <sub>D</sub>	% <sup>40</sup> Ar*	Age (ka)	±σ (ka)	K/Ca ± 1σ
N1297-01	4,873E-15	1,202E-06	1,683E-08	1,140E-08	1,140E-08	5,382E-05	2,153E-07	3,424E-03	3,424E-06	3,571E-03	3,392E-06	1,0118	0,15	94,24	431,3 ± 1,4	11,4 ± 0,3
N1297-02	3,749E-15	9,251E-07	7,678E-09	1,494E-08	1,494E-08	4,388E-05	1,843E-07	2,786E-03	2,229E-06	2,751E-03	2,751E-06	1,0116	0,15	95,24	412,1 ± 1,4	50,5 ± 6,4
N1297-03	3,386E-15	1,407E-06	1,759E-08	1,279E-06	2,046E-08	3,792E-05	1,138E-07	2,388E-03	1,672E-06	2,485E-03	1,988E-06	1,0114	0,15	90,07	410,5 ± 1,3	6,7 ± 0,1
N1297-04	2,655E-15	1,570E-06	1,727E-08	8,687E-07	2,259E-08	2,949E-05	1,032E-07	1,761E-03	1,233E-06	1,951E-03	2,341E-06	1,0113	0,15	84,89	411,3 ± 1,7	7,6 ± 0,2
N1297-05	5,188E-15	8,419E-07	1,600E-08	1,321E-06	2,642E-08	5,919E-05	1,361E-07	3,756E-03	3,380E-06	3,800E-03	3,040E-06	1,0118	0,15	97,71	434,0 ± 1,0	10,2 ± 0,2
N1297-06	1,158E-15	8,241E-07	1,937E-08	5,310E-07	1,168E-08	1,308E-05	7,194E-08	8,218E-04	1,397E-06	8,588E-04	1,031E-06	1,011	0,15	90,18	408,4 ± 3,4	6,4 ± 0,2
N1297-07	1,235E-15	9,739E-07	1,091E-08	4,663E-07	1,539E-08	1,346E-05	8,073E-08	8,339E-04	1,334E-06	9,125E-04	9,125E-07	1,0111	0,15	86,69	412,6 ± 2,9	8,6 ± 0,5
N1297-08	1,204E-15	1,042E-06	1,375E-08	4,081E-07	4,081E-09	1,201E-05	8,407E-08	7,591E-04	1,518E-06	8,877E-04	8,877E-07	1,011	0,15	81,02	413,1 ± 3,1	8,9 ± 0,5
N1297-09	1,551E-15	6,413E-07	8,529E-09	5,910E-07	1,596E-08	1,901E-05	5,513E-08	1,161E-03	1,277E-06	1,141E-03	1,141E-06	1,0111	0,15	95,32	409,4 ± 1,7	8,2 ± 0,4
N1297-10	1,521E-15	1,893E-06	2,782E-08	4,593E-07	1,608E-08	1,243E-05	4,972E-08	7,649E-04	9,179E-07	1,120E-03	1,456E-06	1,0111	0,15	63,91	408,6 ± 5,7	7,6 ± 0,5
N1297-11	1,276E-15	7,488E-07	1,939E-08	6,196E-07	1,797E-08	1,454E-05	4,653E-08	9,178E-04	2,111E-06	9,409E-04	1,317E-06	1,0111	0,15	91,76	410,0 ± 3,8	6,2 ± 0,3
N1297-12	1,558E-15	7,541E-07	1,885E-08	5,676E-07	2,043E-08	1,796E-05	5,747E-08	1,135E-03	1,588E-06	1,147E-03	1,376E-06	1,0111	0,15	93,08	410,9 ± 3,0	8,5 ± 0,5
N1297-13	1,142E-15	6,101E-07	1,281E-08	3,872E-07	1,859E-08	1,366E-05	5,191E-08	8,525E-04	1,108E-06	8,433E-04	1,012E-06	1,011	0,15	95,37	410,7 ± 3,3	10,9 ± 1,0
N1297-14	1,209E-15	4,794E-07	1,294E-08	4,052E-07	1,135E-08	1,437E-05	5,748E-08	9,287E-04	1,022E-06	8,906E-04	1,514E-06	1,011	0,15	98,54	412,3 ± 3,6	11,1 ± 0,8
N1297-15	1,590E-15	2,423E-06	2,569E-08	5,349E-07	1,712E-08	1,070E-05	5,348E-08	6,446E-04	1,096E-06	1,169E-03	1,402E-06	1,0111	0,15	51,61	409,3 ± 7,1	5,2 ± 0,3
N1297-16	9,390E-16	7,047E-07	2,678E-08	1,922E-07	1,883E-08	1,016E-05	5,183E-08	6,474E-04	1,101E-06	7,000E-04	7,700E-07	1,0111	0,15	87,31	407,4 ± 7,7	25,8 ± 61,8
N1297-17	9,282E-16	4,044E-07	3,882E-08	2,712E-07	2,430E-08	1,080E-05	6,046E-08	6,841E-04	1,231E-06	6,898E-04	1,448E-06	1,0111	0,15	98,39	429,2 ± 9,4	3,3 ± 0,9
N1297-18	1,036E-15	4,794E-07	2,301E-08	1,986E-07	2,681E-08	1,209E-05	7,617E-08	7,771E-04	1,632E-06	7,688E-04	9,994E-07	1,0111	0,15	95,48	409,4 ± 6,6	9,1 ± 5,9

Results	40Ar*/39ArK ± 1σ	Age ± 1σ (Ka)	MSWD	39Ar(k) (n)	K/Ca ± 1σ
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Weighted mean 0,9425 ± 0,0014 ± 0,15% 410,9 ± 2,5 ± 0,62% 0,26 68,60 6,9 ± 0,3

Full External Error ± 4,7 0,97 Statistical T ratio

Analytical Error ± 0,6

Results	40(a)/36(a) ± 1σ	40(r)/39(k) ± 1σ	Age ± 1σ (Ka)
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Inverse Isochron 295,1019 ± 4,3235 ± 1,47% 0,9426 ± 0,0021 ± 0,22% 411,0 ± 2,6 ± 0,64% MSWD 0,28

Full External Error ± 4,7  
Analytical Error ± 0,9

Statistics Statistical F ratio 1,10 Convergence #####  
Error Magnification 1,0000 Number of Iterations 2  
Number of Data Points 15 Calculated Line Weighted York-2

Table S1- 40Ar/39Ar detailed data for level 13-01

**Sample ID POL 12-02** Lab#N1276-01/N1276-15 J = 0.00037885 ± 0.00000189  
 Sandline Irradiation # 77 reactor OSIRIS  
 Flux standard ACS-2 1.194 Ma **Single crystal total fusion**

N	<sup>40</sup> Ar (moles)	<sup>36</sup> Ar V	<sup>36</sup> Ar ±σ <sub>36</sub> V	<sup>37</sup> Ar V	<sup>37</sup> Ar ±σ <sub>37</sub> V	<sup>38</sup> Ar V	<sup>38</sup> Ar ±σ <sub>38</sub> V	<sup>39</sup> Ar V	<sup>39</sup> Ar ±σ <sub>39</sub> V	<sup>40</sup> Ar V	<sup>40</sup> Ar ±σ <sub>40</sub> V	D <sup>(1)</sup> V	±%σ <sub>D</sub> V	% <sup>40</sup> Ar* V	Age ±σ (ka) (ka)	K/Ca ± 1σ
N1276-01	1,846E-15	1,119E-06	1,566E-08	2,007E-07	2,047E-08	3,165E-05	1,266E-07	2,003E-03	2,203E-06	1,355E-03	1,220E-06	1,0112	0,15	85,42	397,1 ± 2,6	25,2 ± 21,3
N1276-02	2,252E-15	8,465E-07	2,032E-08	2,273E-07	1,682E-08	4,135E-05	1,654E-07	2,645E-03	2,910E-06	1,651E-03	1,981E-06	1,0113	0,15	92,88	398,9 ± 2,3	18,7 ± 8,1
N1276-03	1,585E-15	1,040E-06	1,769E-08	1,970E-07	1,300E-08	2,960E-05	8,880E-08	1,896E-03	1,517E-06	1,165E-03	2,098E-06	1,0111	0,15	84,91	358,1 ± 2,9	26,7 ± 21,2
N1276-04	1,601E-15	9,870E-07	2,171E-08	2,040E-07	1,999E-08	2,799E-05	8,397E-08	1,753E-03	1,928E-06	1,176E-03	1,411E-06	1,0111	0,15	86,42	398,1 ± 3,4	20,1 ± 15,3
N1276-05	9,394E-16	6,626E-07	1,988E-08	1,830E-07	2,269E-08	1,742E-05	6,968E-08	1,086E-03	1,521E-06	6,922E-04	7,614E-07	1,011	0,15	92,24	402,3 ± 6,4	6,5 ± 3,4
N1276-06	1,163E-15	5,475E-07	2,354E-08	1,721E-07	1,377E-08	2,285E-05	9,140E-08	1,426E-03	2,567E-06	8,551E-04	1,625E-06	1,011	0,15	97,40	400,4 ± 5,2	10,1 ± 5,5
N1276-07	5,125E-16	7,100E-07	1,846E-08	1,827E-07	1,407E-08	9,310E-06	1,024E-07	5,870E-04	1,761E-06	3,810E-04	1,715E-06	1,0109	0,15	80,55	354,6 ± 11,2	4,7 ± 2,1
N1276-08	1,105E-15	9,499E-07	1,805E-08	2,000E-07	1,540E-08	1,900E-05	2,090E-07	1,305E-03	1,436E-06	8,131E-04	1,301E-06	1,011	0,15	82,71	352,9 ± 5,0	7,9 ± 2,7
N1276-09	1,067E-15	9,400E-07	2,726E-08	1,677E-07	2,012E-08	1,961E-05	1,177E-07	1,220E-03	2,928E-06	7,860E-04	1,415E-06	1,011	0,15	82,01	361,8 ± 6,4	13,7 ± 10,0
N1276-10	9,722E-16	6,745E-07	1,416E-08	1,677E-07	2,012E-08	1,878E-05	9,390E-08	1,206E-03	1,688E-06	7,170E-04	1,147E-06	1,01	0,15	89,57	363,8 ± 4,1	431,5 #####
N1276-11	1,969E-15	1,100E-06	1,320E-08	2,383E-07	1,620E-08	2,974E-05	6,543E-08	1,897E-03	2,846E-06	1,443E-03	1,010E-06	1,0112	0,15	90,03	471,4 ± 3,4	8,1 ± 2,2
N1276-12	1,119E-15	7,491E-07	1,498E-08	1,691E-07	1,150E-08	2,144E-05	1,286E-07	1,342E-03	1,745E-06	8,224E-04	1,480E-06	1,011	0,15	93,62	393,7 ± 4,7	25,5 ± 26,8
N1276-13	1,927E-15	7,727E-07	1,777E-08	2,267E-07	1,836E-08	3,221E-05	1,611E-07	2,061E-03	2,885E-06	1,412E-03	2,541E-06	1,0112	0,15	96,29	454,0 ± 3,4	10,1 ± 3,3
N1276-14	9,215E-16	6,775E-07	1,626E-08	1,675E-07	1,893E-08	1,662E-05	9,972E-08	1,046E-03	1,883E-06	6,866E-04	1,373E-06	1,011	0,15	90,87	403,9 ± 5,5	74,6 ± 669,9
N1276-15	1,411E-15	1,416E-06	1,983E-08	1,927E-07	1,387E-08	2,134E-05	1,280E-07	1,317E-03	1,976E-06	1,044E-03	1,148E-06	1,0111	0,15	74,18	401,0 ± 4,6	11,2 ± 10,8

Results	40Ar/39ArK ± 1σ	Age ± 1σ (Ka)	MSWD	39Ar(k) (n)	K/Ca ± 1σ
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Weighted mean 0,5239 ± 0,0029 ± 0,55% 358,9 ± 2,7 ± 0,75% 0,82 27,27 5 6,2 ± 1,6

Full External Error ± 4,0 1,06 Statistical T ratio

Analytical Error ± 2,0

Results	40(a)/36(a) ± 1σ	40(r)/39(k) ± 1σ	Age ± 1σ (Ka)
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Inverse Isochron 249,0300 ± 40,5900 ± 16,30% 0,5381 ± 0,0122 ± 2,27% 368,6 ± 8,6 ± 2,33% 0,78 MSWD

Full External Error ± 9,1  
Analytical Error ± 8,4

Statistics Statistical F ratio 1,09 Convergence #####  
Error Magnification 1,0000 Number of Iterations 3  
Number of Data Points 5 Calculated Line Weighted York-2

Table S2- 40Ar/39Ar detailed data for level 12-02

**Sample ID POL 12-03** Lab#N1288-02/N1288-15 J = 0.00036470 ± 0.00000182  
 Sanidine Irradiation # 66 reactor OSIRIS  
 Flux standard ACS-2 1.194 Ma **Single crystal total fusion**

N	<sup>40</sup> Ar (moles)	<sup>36</sup> Ar	<sup>36</sup> Ar	$\pm\sigma_{36}$	<sup>37</sup> Ar	<sup>37</sup> Ar	$\pm\sigma_{37}$	<sup>38</sup> Ar	<sup>38</sup> Ar	$\pm\sigma_{38}$	<sup>39</sup> Ar	<sup>39</sup> Ar	$\pm\sigma_{39}$	<sup>40</sup> Ar	<sup>40</sup> Ar	$\pm\sigma_{40}$	D <sup>(1)</sup>	$\pm\% \sigma_D$	% <sup>40</sup> Ar*	Age (ka)	$\pm\sigma$	K/Ca $\pm 1\sigma$
	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V				(ka)		
N1288-02	1,399E-15	8,815E-07	2,600E-08	1,628E-07	1,237E-08	2,898E-05	1,449E-07	1,846E-03	2,400E-06	1,032E-03	1,858E-06	1,011	0,15	88,91	327,0 ± 3,5	32,4 ± 51,6						
N1288-03	1,065E-15	1,127E-06	2,328E-08	1,661E-07	1,379E-08	1,984E-05	9,722E-08	1,245E-03	1,681E-06	7,898E-04	9,478E-07	1,011	0,15	76,49	317,6 ± 5,2	24,8 ± 42,8						
N1288-04	7,064E-16	1,128E-06	2,481E-08	2,010E-07	1,286E-08	1,126E-05	6,756E-08	7,121E-04	1,780E-06	5,279E-04	1,214E-06	1,0109	0,15	65,88	317,3 ± 9,3	3,7 ± 1,6						
N1288-05	1,013E-14	2,225E-05	1,090E-07	1,767E-07	1,237E-08	4,642E-05	1,253E-07	2,632E-03	3,159E-06	7,409E-03	5,927E-06	1,0128	0,15	17,18	321,6 ± 12,1	28,4 ± 25,3						
N1288-06	1,550E-15	8,056E-07	2,175E-08	1,855E-07	1,892E-08	2,903E-05	7,838E-08	1,771E-03	2,302E-06	1,144E-03	1,372E-06	1,0111	0,15	92,19	391,6 ± 3,4	13,8 ± 10,8						
N1288-07	1,055E-15	8,445E-07	2,449E-08	1,622E-07	1,249E-08	2,151E-05	1,076E-07	1,374E-03	2,472E-06	7,828E-04	1,174E-06	1,011	0,15	87,01	324,3 ± 5,0	13,5 ± 12,7						
N1288-08	2,210E-15	2,403E-06	4,085E-08	1,960E-07	1,568E-08	3,571E-05	6,785E-08	2,213E-03	2,434E-06	1,626E-03	1,789E-06	1,0112	0,15	66,80	323,9 ± 4,3	9,3 ± 4,0						
N1288-09	1,238E-15	8,686E-07	1,277E-08	1,750E-07	9,625E-09	2,647E-05	7,941E-08	1,640E-03	1,968E-06	9,168E-04	1,742E-06	1,0111	0,15	88,43	324,1 ± 3,4	10,7 ± 6,3						
N1288-10	8,452E-16	7,289E-07	1,822E-08	1,750E-07	1,488E-08	1,815E-05	1,089E-07	1,115E-03	1,561E-06	6,299E-04	1,008E-06	1,011	0,15	89,54	329,5 ± 5,5	7,3 ± 4,8						
N1288-11	7,474E-16	8,589E-07	2,139E-08	1,703E-07	2,043E-08	1,446E-05	7,230E-08	9,097E-04	1,183E-06	5,567E-04	1,169E-06	1,011	0,15	80,48	320,9 ± 6,8	10,6 ± 13,3						
N1288-12	1,515E-15	9,286E-07	2,043E-08	1,604E-07	1,219E-08	3,128E-05	8,758E-08	1,958E-03	2,350E-06	1,115E-03	1,450E-06	1,011	0,15	87,85	329,8 ± 2,9	15,6 ± 10,1						
N1288-13	1,553E-15	1,460E-06	1,606E-08	1,683E-07	1,212E-08	2,303E-05	1,013E-07	1,425E-03	1,853E-06	1,143E-03	1,372E-06	1,0111	0,15	75,06	397,0 ± 3,7	9,1 ± 4,6						
N1288-14	2,154E-15	1,719E-06	4,985E-08	1,702E-07	2,042E-08	3,000E-05	1,320E-07	2,490E-03	1,743E-06	1,586E-03	3,013E-06	1,0112	0,15	77,30	324,7 ± 4,3	101,0 ± 521,4						
N1288-15	1,152E-15	7,593E-07	1,291E-08	1,700E-07	1,819E-08	2,529E-05	1,012E-07	1,561E-03	2,342E-06	8,549E-04	2,052E-06	1,011	0,15	89,95	322,4 ± 3,4	65,9 ± 338,3						

Results	40Ar*/39ArK ± 1σ	Age ± 1σ (Ka)	MSWD	39Ar(k) (n)	K/Ca ± 1σ
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Weighted mean 0,4928 ± 0,0019 ± 0,39% 325,0 ± 2,1 ± 0,63% 0,69 86,03 5,5 ± 1,4  
12

Full External Error ± 3,4 0,98 Statistical T ratio

Analytical Error ± 1,3

Results	40(a)/36(a) ± 1σ	40(r)/39(k) ± 1σ	Age ± 1σ (Ka)
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Inverse Isochron 294,3372 ± 2,3311 ± 0,79% 0,4933 ± 0,0021 ± 0,43% 325,3 ± 2,2 ± 0,66% 0,74

Full External Error ± 3,4  
Analytical Error ± 1,4

Statistics Statistical F ratio 1,11 Convergence #####  
Error Magnification 1,0000 Number of Iterations 3  
Number of Data Points 12 Calculated Line Weighted York-2

Table. S3- 40Ar/39Ar detailed data for level 12-03

**Sample ID POL 12-01** Lab#N1287-01/N1287-15 J = 0.00038070 ± 0.00000190  
 Samidine Irradiation # 66 reactor OSIRIS  
 Flux standard ACS-2 1.194 Ma **Single crystal total fusion**

N	<sup>40</sup> Ar (moles)	<sup>36</sup> Ar ±σ <sub>36</sub>	<sup>37</sup> Ar ±σ <sub>37</sub>	<sup>39</sup> Ar ±σ <sub>39</sub>	<sup>39</sup> Ar ±σ <sub>39</sub>	<sup>40</sup> Ar ±σ <sub>40</sub>	D <sup>(1)</sup> ±%σ <sub>D</sub>	% <sup>40</sup> Ar*	Age (ka) ±σ	K/Ca ± 1σ					
N1287-01	2,386E-15	3,137E-06	3,859E-08	1,799E-07	1,547E-08	2,568E-05	1,181E-07	1,578E-03	1,735E-06	1,756E-03	1,0113	0,15	58,72	450,0 ± 6,1	338,7 #####
N1287-02	1,936E-15	1,843E-06	2,967E-08	1,825E-07	1,506E-08	2,641E-05	1,056E-07	1,655E-03	2,152E-06	1,428E-03	1,0112	0,15	75,08	445,0 ± 4,7	112,2 ± 681,8
N1287-03	2,212E-15	2,534E-06	3,041E-08	1,725E-07	1,725E-08	3,569E-05	1,321E-07	2,248E-03	2,248E-06	1,628E-03	1,0112	0,15	64,68	322,9 ± 3,7	8,4 ± 2,9
N1287-04	1,076E-15	7,621E-07	1,753E-08	1,829E-07	1,481E-08	2,375E-05	9,500E-08	1,538E-03	2,153E-06	7,983E-04	1,011	0,15	91,59	324,7 ± 3,8	5,0 ± 1,4
N1287-05	1,485E-15	2,052E-06	3,140E-08	1,588E-07	1,890E-08	2,101E-05	1,051E-07	1,341E-03	2,012E-06	1,097E-03	1,011	0,15	58,54	328,4 ± 6,2	38,9 ± 112,2
N1287-06	1,794E-15	1,681E-06	2,353E-08	1,631E-07	1,680E-08	2,645E-05	1,217E-07	1,653E-03	2,645E-06	1,323E-03	1,0112	0,15	73,77	405,8 ± 4,2	32,1 ± 58,2
N1287-07	1,827E-15	2,076E-06	3,114E-08	1,847E-07	9,235E-09	2,962E-05	9,775E-08	1,899E-03	2,469E-06	1,347E-03	1,0112	0,15	66,14	322,5 ± 4,1	13,9 ± 7,6
N1287-08	2,506E-15	4,040E-06	1,252E-08	1,807E-07	1,030E-08	2,901E-05	6,382E-08	1,823E-03	2,370E-06	1,843E-03	1,0113	0,15	46,56	324,3 ± 4,1	383,7 #####
N1287-09	1,606E-15	1,946E-06	5,838E-08	1,837E-07	8,267E-09	2,420E-05	9,679E-08	1,541E-03	2,465E-06	1,187E-03	1,0111	0,15	67,24	355,2 ± 8,4	92,6 ± 393,2
N1287-10	1,465E-15	1,991E-06	1,434E-08	1,805E-07	1,643E-08	2,230E-05	1,004E-07	1,411E-03	1,270E-06	1,083E-03	1,0111	0,15	62,82	330,5 ± 4,7	356,2 #####
N1287-11	2,482E-15	3,500E-06	1,750E-08	1,797E-07	1,042E-08	3,214E-05	1,414E-07	2,091E-03	1,464E-06	1,826E-03	1,0113	0,15	54,46	327,6 ± 3,6	####
N1287-12	1,563E-15	1,427E-06	1,756E-08	1,789E-07	1,056E-08	2,950E-05	1,475E-07	1,938E-03	2,904E-06	1,157E-03	1,0111	0,15	79,03	323,3 ± 3,1	23,7 ± 34,0
N1287-13	1,424E-15	1,716E-06	9,438E-09	1,773E-07	1,738E-08	2,462E-05	1,477E-07	1,570E-03	1,727E-06	1,056E-03	1,0111	0,15	69,13	317,9 ± 3,5	20,9 ± 35,7
N1287-14	1,049E-15	8,696E-07	2,800E-08	1,825E-07	1,004E-08	2,335E-05	1,168E-07	1,475E-03	2,065E-06	7,819E-04	1,011	0,15	89,54	322,7 ± 4,9	15,4 ± 18,6
N1287-15	9,311E-15	2,346E-05	5,983E-08	1,573E-07	1,479E-08	1,477E-05	1,034E-07	6,853E-04	1,371E-06	6,807E-03	1,0127	0,15	4,76	328,5 ± 42,3	19,8 ± 54,9

Results	40Ar/39ArK ± 1σ	Age ± 1σ (Ka)	MSWD	39Ar(k) (n)	K/Ca ± 1σ
Weighted mean	0,4706 ± 0,0018 ± 0,39%	323,9 ± 2,0 ± 0,63%	0,69	73,71 11	5,9 ± 1,2
		Full External Error ± 3,4	0,98	Statistical T ratio	
		Analytical Error ± 1,2			
Results	40(a)/36(a) ± 1σ	40(r)/39(k) ± 1σ	Age ± 1σ (Ka)	MSWD	
Inverse Isochron	2,9642 ± 1,7342 ± 0,59%	0,4698 ± 0,0023 ± 0,49%	323,4 ± 2,3 ± 0,70%	0,74	
Full External Error			± 3,5		
Analytical Error			± 1,6		

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Statistics	Statistical F ratio	1,11	Convergence #####
Error Magnification	1,0000	Number of Iterations	3
Number of Data Points	11	Calculated Line	Weighted York-2

Table. S4- 40Ar/39Ar detailed data for level 12-01



## Procedural blanks :

Background corrections POL 13-01

N	<sup>36</sup> Ar		<sup>37</sup> Ar		<sup>38</sup> Ar		<sup>39</sup> Ar		<sup>40</sup> Ar		<sup>40</sup> Ar	
	V	±s36	V	±s37	V	±s38	V	±s39	V	±s40	V	±s40
N1297-01	4,710E-07	2,496E-08	1,588E-07	1,731E-08	1,746E-07	1,711E-08	6,100E-08	1,690E-08	1,422E-05	3,413E-07		
N1297-02	4,710E-07	2,496E-08	1,588E-07	1,731E-08	1,746E-07	1,711E-08	6,100E-08	1,690E-08	1,422E-05	3,413E-07		
N1297-03	5,260E-07	8,416E-09	1,117E-07	3,910E-09	1,567E-07	7,052E-09	5,661E-08	1,681E-08	1,335E-05	2,537E-07		
N1297-04	5,260E-07	8,416E-09	1,117E-07	3,910E-09	1,567E-07	7,052E-09	5,661E-08	1,681E-08	1,335E-05	2,537E-07		
N1297-05	5,260E-07	8,416E-09	1,117E-07	3,910E-09	1,567E-07	7,052E-09	5,661E-08	1,681E-08	1,335E-05	2,537E-07		
N1297-06	5,260E-07	8,416E-09	1,117E-07	3,910E-09	1,567E-07	7,052E-09	5,661E-08	1,681E-08	1,335E-05	2,537E-07		
N1297-07	5,470E-07	1,389E-08	1,505E-07	1,249E-08	1,489E-07	1,727E-08	3,870E-07	1,091E-07	1,118E-05	4,025E-07		
N1297-08	4,498E-07	1,035E-08	1,297E-07	1,595E-08	1,531E-07	1,608E-08	1,090E-07	1,061E-07	8,636E-06	3,368E-07		
N1297-09	4,498E-07	1,035E-08	1,297E-07	1,595E-08	1,531E-07	1,608E-08	1,090E-07	1,061E-07	8,636E-06	3,368E-07		
N1297-10	4,723E-07	1,748E-08	1,321E-07	1,361E-08	1,364E-07	1,241E-08	4,406E-07	8,416E-08	9,731E-06	4,671E-07		
N1297-11	4,723E-07	1,748E-08	1,321E-07	1,361E-08	1,364E-07	1,241E-08	4,406E-07	8,416E-08	9,731E-06	4,671E-07		
N1297-12	4,723E-07	1,748E-08	1,321E-07	1,361E-08	1,364E-07	1,241E-08	4,406E-07	8,416E-08	9,731E-06	4,671E-07		
N1297-13	4,723E-07	1,748E-08	1,321E-07	1,361E-08	1,364E-07	1,241E-08	4,406E-07	8,416E-08	9,731E-06	4,671E-07		
N1297-14	4,324E-07	2,249E-08	1,313E-07	1,510E-08	1,250E-07	1,000E-08	3,430E-07	8,575E-08	8,123E-06	4,224E-07		
N1297-15	4,324E-07	2,249E-08	1,313E-07	1,510E-08	1,250E-07	1,000E-08	3,430E-07	8,575E-08	8,123E-06	4,224E-07		
N1297-16	3,981E-07	2,906E-08	1,769E-07	3,131E-08	1,272E-07	1,552E-08	1,115E-06	6,579E-08	1,462E-05	2,338E-07		
N1297-17	3,564E-07	3,343E-08	1,466E-07	2,023E-08	6,570E-08	1,774E-08	7,880E-07	7,880E-08	1,227E-05	3,658E-07		
N1297-18	3,564E-07	3,343E-08	1,466E-07	2,023E-08	6,570E-08	1,774E-08	7,880E-07	7,880E-08	1,227E-05	3,658E-07		

Background corrections POL 12-02

N	<sup>36</sup> Ar		<sup>37</sup> Ar		<sup>38</sup> Ar		<sup>39</sup> Ar		<sup>40</sup> Ar	
	V	±s36	V	±s37	V	±s38	V	±s39	V	±s40
N1276-01	4,175E-07	1,628E-08	1,665E-07	2,031E-08	1,808E-07	1,880E-08	2,841E-07	9,773E-08	7,346E-06	3,085E-07
N1276-02	4,175E-07	1,628E-08	1,665E-07	2,031E-08	1,808E-07	1,880E-08	2,841E-07	9,773E-08	7,346E-06	3,085E-07
N1276-03	4,175E-07	1,628E-08	1,665E-07	2,031E-08	1,808E-07	1,880E-08	2,841E-07	9,773E-08	7,346E-06	3,085E-07
N1276-04	4,175E-07	1,628E-08	1,665E-07	2,031E-08	1,808E-07	1,880E-08	2,841E-07	9,773E-08	7,346E-06	3,085E-07
N1276-05	4,502E-07	2,521E-08	1,127E-07	2,930E-08	1,395E-07	2,358E-08	5,216E-08	5,164E-08	6,518E-06	2,216E-07
N1276-06	4,502E-07	2,521E-08	1,127E-07	2,930E-08	1,395E-07	2,358E-08	5,216E-08	5,164E-08	6,518E-06	2,216E-07
N1276-07	4,342E-07	2,562E-08	1,302E-07	1,862E-08	1,398E-07	2,097E-08	5,025E-08	4,975E-08	6,879E-06	3,646E-07
N1276-08	4,342E-07	2,562E-08	1,302E-07	1,862E-08	1,398E-07	2,097E-08	5,025E-08	4,975E-08	6,879E-06	3,646E-07
N1276-09	4,342E-07	2,562E-08	1,302E-07	1,862E-08	1,398E-07	2,097E-08	5,025E-08	4,975E-08	6,879E-06	3,646E-07
N1276-10	4,175E-07	1,628E-08	1,665E-07	2,031E-08	1,808E-07	1,880E-08	2,841E-07	9,773E-08	7,346E-06	3,085E-07
N1276-11	5,603E-07	2,577E-08	1,490E-07	1,773E-08	2,174E-07	2,631E-08	1,657E-07	8,119E-08	5,472E-06	3,174E-07
N1276-12	5,603E-07	2,577E-08	1,490E-07	1,773E-08	2,174E-07	2,631E-08	1,657E-07	8,119E-08	5,472E-06	3,174E-07
N1276-13	5,603E-07	2,577E-08	1,490E-07	1,773E-08	2,174E-07	2,631E-08	1,657E-07	8,119E-08	5,472E-06	3,174E-07
N1276-14	4,616E-07	1,062E-08	1,641E-07	2,396E-08	1,783E-07	1,337E-08	9,276E-07	3,191E-07	1,395E-05	2,232E-07
N1276-15	4,616E-07	1,062E-08	1,641E-07	2,396E-08	1,783E-07	1,337E-08	9,276E-07	3,191E-07	1,395E-05	2,232E-07

Background corrections POL 12-03

N	<sup>36</sup> Ar		<sup>37</sup> Ar		<sup>38</sup> Ar		<sup>39</sup> Ar		<sup>40</sup> Ar		<sup>40</sup> Ar	
	V	±s36	V	±s37	V	±s38	V	±s39	V	±s40	V	±s40
N1288-02	4,777E-07	1,433E-08	1,487E-07	1,874E-08	1,263E-07	2,210E-08	9,758E-08	8,694E-08	1,091E-05	2,946E-07	V	V
N1288-03	4,770E-07	1,932E-08	1,537E-07	1,629E-08	1,764E-07	2,205E-08	1,986E-07	1,261E-07	1,229E-05	4,793E-07	V	V
N1288-04	4,770E-07	1,932E-08	1,537E-07	1,629E-08	1,764E-07	2,205E-08	1,986E-07	1,261E-07	1,229E-05	4,793E-07	V	V
N1288-05	4,770E-07	1,932E-08	1,537E-07	1,629E-08	1,764E-07	2,205E-08	1,986E-07	1,261E-07	1,229E-05	4,793E-07	V	V
N1288-06	4,770E-07	1,431E-08	1,537E-07	1,629E-08	1,764E-07	2,205E-08	1,986E-07	1,261E-07	1,229E-05	4,793E-07	V	V
N1288-07	4,786E-07	2,058E-08	1,371E-07	2,002E-08	1,717E-07	1,957E-08	4,110E-07	8,056E-08	1,295E-05	4,015E-07	V	V
N1288-08	4,786E-07	2,058E-08	1,371E-07	2,002E-08	1,717E-07	1,957E-08	4,110E-07	8,056E-08	1,295E-05	4,015E-07	V	V
N1288-09	4,786E-07	2,058E-08	1,371E-07	2,002E-08	1,717E-07	1,957E-08	4,110E-07	8,056E-08	1,295E-05	4,015E-07	V	V
N1288-10	4,786E-07	2,058E-08	1,371E-07	2,002E-08	1,717E-07	1,957E-08	4,110E-07	8,056E-08	1,295E-05	4,015E-07	V	V
N1288-11	4,715E-07	1,650E-08	1,490E-07	1,728E-08	1,759E-07	1,653E-08	6,262E-08	6,256E-08	1,115E-05	3,791E-07	V	V
N1288-12	4,395E-07	1,538E-08	1,294E-07	1,579E-08	1,513E-07	1,770E-08	9,427E-09	9,418E-09	9,427E-06	3,865E-07	V	V
N1288-13	4,395E-07	1,538E-08	1,294E-07	1,579E-08	1,513E-07	1,770E-08	9,427E-09	9,418E-09	9,427E-06	3,865E-07	V	V
N1288-14	4,616E-07	1,062E-08	1,641E-07	2,396E-08	1,783E-07	1,337E-08	9,427E-07	1,301E-07	1,395E-05	2,232E-07	V	V
N1288-15	4,616E-07	1,062E-08	1,641E-07	2,396E-08	1,783E-07	1,337E-08	9,427E-07	1,301E-07	1,395E-05	2,232E-07	V	V

## Background corrections POL 12-01

N	$^{36}\text{Ar}$		$^{37}\text{Ar}$		$\pm\sigma36$		$^{38}\text{Ar}$		$\pm\sigma37$		$^{38}\text{Ar}$		$\pm\sigma38$		$^{39}\text{Ar}$		$\pm\sigma39$		$^{40}\text{Ar}$		$\pm\sigma40$	
	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
N1287-01	6,019E-07	1,866E-08	1,787E-07	1,751E-08	2,030E-07	1,751E-08	2,030E-07	2,030E-08	1,417E-07	1,751E-08	2,030E-07	1,417E-07	2,030E-08	1,417E-07	7,595E-08	1,440E-05	1,440E-08	1,440E-05	1,440E-05	1,440E-05	3,744E-07	3,744E-07
N1287-02	6,019E-07	1,866E-08	1,787E-07	1,751E-08	2,030E-07	1,751E-08	2,030E-07	2,030E-08	1,417E-07	1,751E-08	2,030E-07	1,417E-07	2,030E-08	1,417E-07	7,595E-08	1,440E-05	1,440E-08	1,440E-05	1,440E-05	1,440E-05	3,744E-07	3,744E-07
N1287-03	4,819E-07	1,783E-08	1,052E-07	1,494E-08	1,629E-07	1,494E-08	1,629E-07	1,303E-08	1,126E-07	1,494E-08	1,629E-07	1,126E-07	1,303E-08	1,126E-07	9,346E-08	1,272E-05	9,346E-08	1,272E-05	1,272E-05	1,272E-05	3,053E-07	3,053E-07
N1287-04	4,819E-07	1,783E-08	1,052E-07	1,494E-08	1,629E-07	1,494E-08	1,629E-07	1,303E-08	1,126E-07	1,494E-08	1,629E-07	1,126E-07	1,303E-08	1,126E-07	9,346E-08	1,272E-05	9,346E-08	1,272E-05	1,272E-05	1,272E-05	3,053E-07	3,053E-07
N1287-05	4,645E-07	1,765E-08	1,501E-07	1,651E-08	1,618E-07	1,651E-08	1,618E-07	2,508E-08	1,736E-07	1,651E-08	1,618E-07	1,736E-07	2,508E-08	1,736E-07	7,968E-08	1,331E-05	7,968E-08	1,331E-05	1,331E-05	1,331E-05	2,662E-07	2,662E-07
N1287-06	4,645E-07	1,765E-08	1,501E-07	1,651E-08	1,618E-07	1,651E-08	1,618E-07	2,508E-08	1,736E-07	1,651E-08	1,618E-07	1,736E-07	2,508E-08	1,736E-07	7,968E-08	1,331E-05	7,968E-08	1,331E-05	1,331E-05	1,331E-05	2,662E-07	2,662E-07
N1287-07	4,645E-07	1,765E-08	1,501E-07	1,651E-08	1,618E-07	1,651E-08	1,618E-07	2,508E-08	1,736E-07	1,651E-08	1,618E-07	1,736E-07	2,508E-08	1,736E-07	7,968E-08	1,331E-05	7,968E-08	1,331E-05	1,331E-05	1,331E-05	2,662E-07	2,662E-07
N1287-08	5,917E-07	2,428E-08	1,795E-07	1,580E-08	2,144E-07	1,580E-08	2,144E-07	1,651E-08	2,148E-07	1,580E-08	2,144E-07	1,651E-08	2,148E-07	1,651E-08	1,323E-07	1,397E-05	1,323E-07	1,397E-05	1,397E-05	1,397E-05	4,190E-07	4,190E-07
N1287-09	5,917E-07	2,428E-08	1,795E-07	1,580E-08	2,144E-07	1,580E-08	2,144E-07	1,651E-08	2,148E-07	1,580E-08	2,144E-07	1,651E-08	2,148E-07	1,651E-08	1,323E-07	1,397E-05	1,323E-07	1,397E-05	1,397E-05	1,397E-05	4,190E-07	4,190E-07
N1287-10	5,917E-07	2,428E-08	1,795E-07	1,580E-08	2,144E-07	1,580E-08	2,144E-07	1,651E-08	2,148E-07	1,580E-08	2,144E-07	1,651E-08	2,148E-07	1,651E-08	1,323E-07	1,397E-05	1,323E-07	1,397E-05	1,397E-05	1,397E-05	4,190E-07	4,190E-07
N1287-11	5,917E-07	2,428E-08	1,795E-07	1,580E-08	2,144E-07	1,580E-08	2,144E-07	1,651E-08	2,148E-07	1,580E-08	2,144E-07	1,651E-08	2,148E-07	1,651E-08	1,323E-07	1,397E-05	1,323E-07	1,397E-05	1,397E-05	1,397E-05	4,190E-07	4,190E-07
N1287-12	5,752E-07	1,007E-08	1,583E-07	2,754E-08	1,903E-07	2,754E-08	1,903E-07	1,218E-08	4,242E-07	2,754E-08	1,903E-07	1,218E-08	4,242E-07	1,218E-08	1,807E-07	1,629E-05	1,807E-07	1,629E-05	1,629E-05	1,629E-05	4,073E-07	4,073E-07
N1287-13	5,752E-07	1,007E-08	1,583E-07	2,754E-08	1,903E-07	2,754E-08	1,903E-07	1,218E-08	4,242E-07	2,754E-08	1,903E-07	1,218E-08	4,242E-07	1,218E-08	1,807E-07	1,629E-05	1,807E-07	1,629E-05	1,629E-05	1,629E-05	4,073E-07	4,073E-07
N1287-14	5,752E-07	1,007E-08	1,583E-07	2,754E-08	1,903E-07	2,754E-08	1,903E-07	1,218E-08	4,242E-07	2,754E-08	1,903E-07	1,218E-08	4,242E-07	1,218E-08	1,807E-07	1,629E-05	1,807E-07	1,629E-05	1,629E-05	1,629E-05	4,073E-07	4,073E-07
N1287-15	4,777E-07	1,433E-08	1,487E-07	1,874E-08	1,263E-07	1,874E-08	1,263E-07	2,210E-08	9,752E-08	1,874E-08	1,263E-07	2,210E-08	9,752E-08	2,210E-08	8,718E-08	1,090E-05	8,718E-08	1,090E-05	1,090E-05	1,090E-05	2,943E-07	2,943E-07

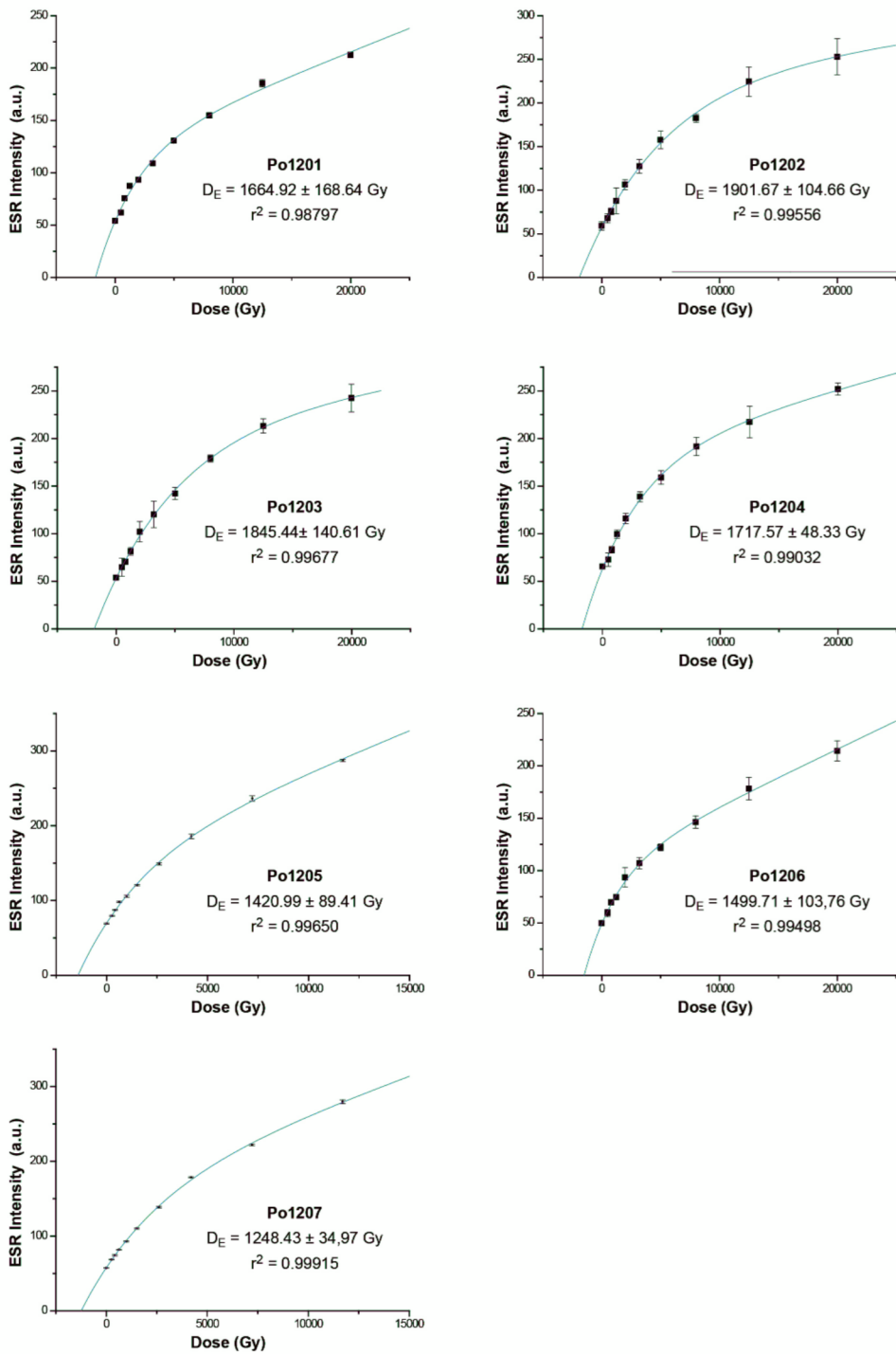


Fig S1 - ESR growth curves of the Polledrara tooth enamel samples and corresponding (Exp+Lin)  $D_E$  extrapolation for the 7 teeth.

Sample	$D_E$ E+L (Gy) ( $\pm 1\sigma$ )	$D_E$ DSE (Gy) ( $\pm 1\sigma$ )	$D_E$ SSE *(Gy) ( $\pm 1\sigma$ )
PO2012-01	1664.92 $\pm$ 168.64	1580.54 $\pm$ 284.86	1369.40 $\pm$ 234.65 (5pts)
PO2012-02	1901.67 $\pm$ 104.66	1901.56 $\pm$ 198.30	2441.58 $\pm$ 544.20 (5pts)
PO2012-03	1845.44 $\pm$ 140.61	1827.39 $\pm$ 192.85	2254.18 $\pm$ 383.93 (5pts)
PO2012-04	1717.57 $\pm$ 48.33	1715.35 $\pm$ 222.82	2402.02 $\pm$ 894.48 (5pts)
PO2012-05	1420.92 $\pm$ 89.41	1391.50 $\pm$ 186.23	1254.94 $\pm$ 93.47 (7pts)
PO2012-06	1499.71 $\pm$ 103.76	1438.60 $\pm$ 167.42	2271.79 $\pm$ 569.03 (5pts)
PO2012-07	1248.43 $\pm$ 34.97	1246.11 $\pm$ 68.05	1232.03 $\pm$ 32.53 (7pts)

\* according to Duval and Grün (2016) recommendations ( $0.8 \cdot D_E < D_{max} < 1.8 \cdot D_E$  and  $D_E + D_{max} \geq 3,400$  Gy)

Table S5. - Equivalent doses obtained for the Polledrara tooth samples using Exponential + Linear (E+L), Double Saturating Exponential (DSE) and Single Saturating Exponential (SSE) functions respectively.

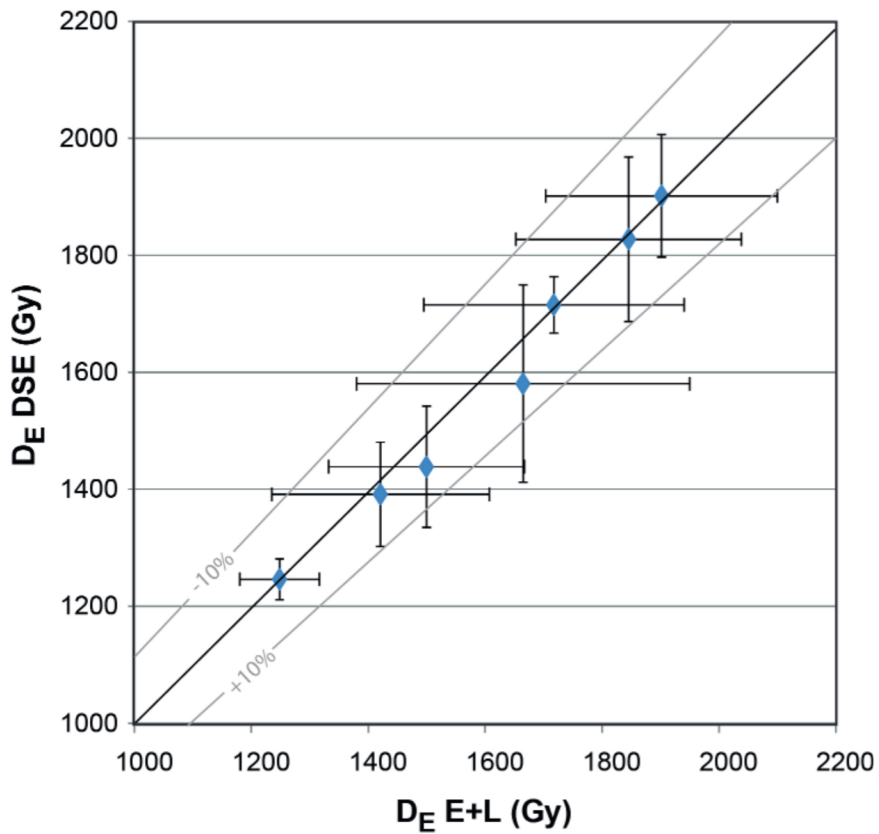


Fig. S2 - Comparison of the equivalent doses obtained for the Polledrara tooth samples using Exponential + Linear (E+L) and Double Saturating Exponential (DSE) functions respectively.

Sample	Square	U (ppm)	Th (ppm)	K (%)
L1 inf	N13 SE	10,790 ± 0,401	64,575 ± 0,766	1,271 ± 0,035
L1 sup	N13 SE	7,536 ± 0,326	45,385 ± 0,606	1,543 ± 0,036
L2 inf	N15 NE	11,100 ± 0,320	43,742 ± 0,568	0,839 ± 0,027
L2sup	N15 NE	9,866 ± 0,238	37,652 ± 0,415	1,420 ± 0,026
L4 inf	M15 NW	8,949 ± 0,317	40,931 ± 0,561	1,080 ± 0,030
L4 sup	M15 NW	8,020 ± 0,349	39,535 ± 0,653	1,483 ± 0,046
P5 inf	M13 NE	19,640 ± 0,376	58,285 ± 0,642	0,779 ± 0,027
dos1	N11 SW	20,700 ± 0,413	60,856 ± 0,703	1,427 ± 0,035
dos5	P13 SE	13,890 ± 0,342	37,653 ± 0,572	1,446 ± 0,035
sed2013-3 tooth 7	N11 SW	15,820 ± 0,383	42,343 ± 0,655	1,438 ± 0,039
<b>Mean value</b>		<b>12,630</b>	<b>47,096</b>	<b>1,273</b>

Table. S6 - Radioelement contents of the Polledrara sediments samples determined by low background high purity  $\gamma$ -spectrometry.

Dosimeter	Square	Gamma dose-rate ( $\mu$ Gy/a)
Dos1	N11-SW	3138 ± 55
Dos2	N11-SW	2416 ± 28
Dos3	N13SE	2713 ± 35
Dos4	I13 NE	4401 ± 224
Dos5	P13 SE	2597 ± 40
<b>Mean value</b>	<b>(except dos4)</b>	<b>2716</b>

Table. S7 - Gamma dose rate measured by TL ( $\alpha$ -Al<sub>2</sub>O<sub>3</sub>:C) dosimeters at La Polledrara (by courtesy of H el ene Valladas, LSCE, France). Suspected to be badly zeroed and far from the analyzed samples, Dos4 was not used for the weight mean calculation.

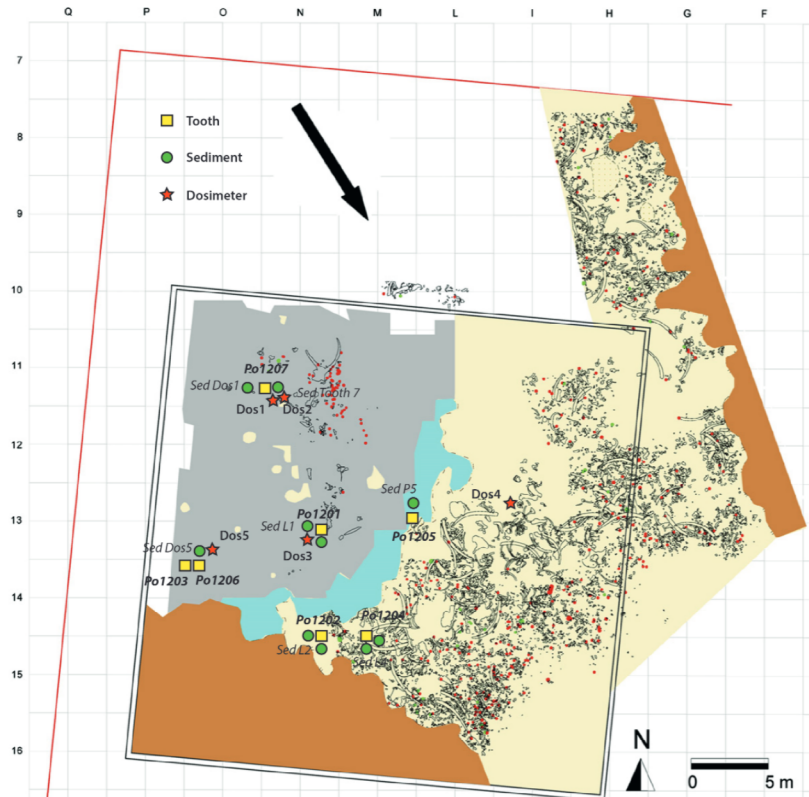


Figure. S3 - Map of La Polledrara site with locations of the sampled teeth, sediments and dosimeters.