COSMOGENIC RADIONUCLIDES IN PAIRED DIOGENITES FROM LAPAZ ICEFIELD, ANTARCTICA. K. C. Welten[1], M. W. Caffee[2], J. Masarik[3]. [1]Space Sciences Laboratory, University of California, Berkeley, CA 94720-7450, USA. [2]PRIME Laboratory, Purdue University, West Lafayette, IN 47907, USA. [3]Nuclear Physics Department, Comenius University, Bratislava, Slovakia.

Introduction: Diogenites are the least abundant members of the HED achondrite clan. To date, only 11 diogenite falls have been reported, while more than 160 finds are known, including 122 from Antarctica and 44 from hot deserts; many of the Antarctic specimens belong to a few large showers, such as the Yamato (A) and (B) diogenites, which include ~70 specimens. Between 1991 and 2004, the ANSMET program recovered fourteen diogenites from a single location, LaPaz (LAP) icefield, of which at least 10 are believed to be paired. Noble gases and radionuclides have previously been reported for LAP 91900, indicating a CRE age of ~18 Myr [1], a pre-atmospheric radius of ~30 cm and a terrestrial age <30 kyr [2]. We now report cosmogenic ^{10}Be, ^{26}Al and ^{36}Cl in seven LAP diogenites to verify pairing and to study variations in radionuclide concentrations as a funtion of depth in a medium-sized object. Measured concentrations are compared with calculated depth profiles of ^{10}Be, ^{26}Al and ^{36}Cl obtained using the LCS model [2.3].

Results and discussion. The LAP diogenites show moderate to large variations in ^{36}Cl (25%), ^{10}Be (40%) and ^{26}Al (80%). These variations are not due to compositional effects, because the 7 LAP diogenites are remarkably homogeneous (Table 1). The large variations in ^{26}Al are consistent with calculated depth profiles for objects of 30-45 cm in radius [2], assuming that LAP 02216, 03781 and 04844 were near the surface of the meteoroid (D<5 cm), while LAP 91900, 03630 and 04839 came from the interior portion (D>20 cm). Based on a constant ^{36}Cl production rate of 23 dpm/kg[Fe] (and small contributions from Ti, Cr and Mn), we derived elemental ^{36}Cl production rates of ~160 to ~300 dpm/kg[Ca] for the LAP samples, which are also in excellent agreement with model calculations [3]. The excellent correlation between $P(^{36}Cl)_{Ca}$ and $P(^{26}Al)$ can be used to calculate ^{36}Cl production rates for howardites and eucrites, where ^{36}Cl production is dominated by spallation from Ca. These production rates will improve terrestrial age determinations for Antarctic and non-Antarctic achondrite finds.

References: [1] Welten K. C. et al. 1997. *Meteoritics & Planetary Science* 32, 891-902. [2] Welten K. C. et al. 2007. *Nuclear Instruments and Methods in Physics Research* B259, 653-662. [3] Masarik J. and Reedy R. C. 1994. *Geochimica et Cosmochimica Acta* 58, 5307-5317.

Table 1. Concentrations of major elements (in wt%) and cosmogenic radionuclides (in dpm/kg) in LaPaz Icefield diogenites.

LAP	Mg	Al	Ca	Fe	^{10}Be	^{26}Al	^{36}Cl
9190	15.	0.3	0.8	11.	24.1±0.	78.5±1.	5.1±0.
0	8	5	3	6	5	2	2
0221	17.	0.4	0.7	11.	19.6±0.	53.6±1.	4.2±0.
6	5	1	8	6	4	2	1
0356	16.	0.5	0.8	13.	22.3±0.	63.8±1.	4.8±0.
9	8	4	3	1	9	6	1
0363	14.	0.3	0.8	11.	25.5±0.	77.7±2.	5.3±0.
0	4	6	6	6	8	0	1
0378	15.	0.3	0.8	12.	20.0±0.	52.1±1.	-
1	7	8	3	6	4	5	
0483	15.	0.3	0.8	11.	26.6±0.	82.4±2.	-
9	6	4	8	9	5	3	
0484	15.	0.3	0.8	12.	19.2±0.	46.3±1.	4.3±0.
4	5	5	6	4	4	2	1