

TABLE S11: Oracle LA-ICPMS U-Pb ZIRCON GEOCHRONOLOGY

Zircon #	Composition										Ages						
	U (ppm)	206Pb/204Pb	U/Th	206Pb/207Pb	2σ (%)	207Pb/235U	2σ (%)	206Pb/238U	2σ (%)	Corr.	206Pb/238U	2σ (Ma)	207Pb/235U	2σ (Ma)	206Pb/207Pb	2σ (Ma)	% Disc.
Oracle no CA Run 1																	
Oracle-1	256	31165	2.3	11.110	1.7	2.9605	3.9	0.23865	3.5	0.9	1379.7	43.8	1397.5	29.6	1424.8	32.1	3.2
Oracle-2	566	51042	10.9	10.999	1.4	3.0273	3.8	0.24159	3.5	0.9	1395.0	44.1	1414.5	28.8	1444.1	26.5	3.4
Oracle-3	172	48861	1.9	10.910	2.2	3.0111	4.2	0.23835	3.6	0.9	1378.1	44.8	1410.4	32.1	1459.6	41.0	5.6
Oracle-4	482	85747	2.6	10.968	1.9	2.8222	3.2	0.22461	2.6	0.8	1306.2	30.4	1361.5	24.1	1449.3	36.9	9.9
Oracle-5	106	14803	1.8	11.109	2.3	2.9636	3.8	0.23888	3.1	0.8	1380.9	38.6	1398.3	29.1	1425.1	43.1	3.1
Oracle-6	101	19323	1.2	11.057	2.0	3.0292	3.5	0.24303	2.9	0.8	1402.4	36.8	1415.0	26.9	1434.0	37.5	2.2
Oracle-7	245	556715	2.7	11.020	2.1	3.0413	3.7	0.24318	3.0	0.8	1403.2	38.1	1418.1	27.9	1440.5	39.2	2.6
Oracle-8	559	92618	7.6	11.404	2.1	2.9130	4.1	0.24104	3.5	0.9	1392.1	44.4	1385.3	31.1	1374.7	40.2	-1.3
Oracle-9	232	26758	6.1	10.899	2.9	3.2432	4.4	0.25649	3.3	0.7	1471.9	43.3	1467.6	34.2	1461.3	55.7	-0.7
Oracle-10	247	43724	2.2	10.693	4.1	3.2392	4.8	0.25132	2.5	0.5	1445.3	32.8	1466.6	37.5	1497.6	77.7	3.5
Oracle-11	604	72330	5.2	11.021	1.8	2.9662	3.6	0.23719	3.1	0.9	1372.1	38.4	1399.0	27.1	1440.3	33.6	4.7
Oracle-12	223	451965	3.0	11.086	2.0	3.1000	3.2	0.24935	2.5	0.8	1435.1	31.8	1432.7	24.3	1429.1	37.9	-0.4
Oracle-13	294	39324	6.9	11.013	1.8	3.0245	3.4	0.24169	2.9	0.8	1395.5	35.8	1413.8	25.9	1441.6	35.2	3.2
Oracle-14	177	44719	1.3	10.929	2.0	3.0827	3.3	0.24445	2.6	0.8	1409.8	32.9	1428.4	25.1	1456.2	37.8	3.2
Oracle-15	79	12103	1.8	11.157	2.1	3.0353	4.1	0.24572	3.6	0.9	1416.4	45.4	1416.5	31.7	1416.8	40.5	0.0
Oracle no CA Run 2																	
ORACLE 1	114	414564	1.2	11.082	2.3	3.1473	4.3	0.25307	3.7	0.847	1454.3	47.8	1444.3	33.4	1429.7	44.1	-1.7
ORACLE 10	704	273742	6.98	11.054	1.6	3.0541	3.1	0.24496	2.6	0.846	1412.4	32.9	1421.3	23.4	1434.5	31.1	1.5
ORACLE 11	346	211041	3.32	11.038	1.6	3.0282	2.6	0.24254	2.1	0.797	1399.9	26.3	1414.8	20	1437.2	30.2	2.6
ORACLE 12	160	248470	2.83	11.008	1.5	3.0453	2.8	0.24323	2.4	0.845	1403.5	30.2	1419.1	21.6	1442.5	28.9	2.7
ORACLE 13	41	894564	1.74	11.097	2.8	3.0794	4.4	0.24795	3.5	0.781	1427.9	44.4	1427.6	34	1427.1	53	-0.1
ORACLE 14	344	392460	4.93	11.088	2.1	3.0452	3.3	0.24499	2.6	0.786	1412.6	33.1	1419	25.4	1428.7	39.2	1.1
ORACLE 15	1142	428035	21.56	10.888	2	3.0597	3.2	0.24173	2.5	0.787	1395.7	31.7	1422.7	24.6	1463.3	37.6	4.6
ORACLE 16	121	1E+06	2.44	11.009	2.2	3.0501	3.5	0.24364	2.8	0.793	1405.6	35.4	1420.3	27	1442.3	41.1	2.5
ORACLE 17	52	68909	1.49	11.155	2	3.1299	3.7	0.25333	3.1	0.835	1455.6	40.1	1440.1	28.4	1417.2	38.8	-2.7
ORACLE 18	92	7E+06	1.58	11.203	2.2	3.0494	3.4	0.24788	2.6	0.76	1427.5	33.1	1420.1	26	1409	42.2	-1.3
ORACLE 19	80	71272	1.42	11.125	1.9	3.0982	4.1	0.2501	3.6	0.88	1439	46.3	1432.2	31.3	1422.2	37	-1.2
ORACLE 2	127	102433	1.74	11.09	1.8	3.0408	3.4	0.24469	2.9	0.848	1411	36.3	1417.9	25.8	1428.3	34.2	1.2
ORACLE 20	42	22639	0.81	11.109	2.5	3.1009	5	0.24994	4.3	0.862	1438.2	55.9	1432.9	38.6	1425.1	48.6	-0.9
ORACLE 21	111	163020	1.94	11.029	2.1	3.1083	3.6	0.24875	2.9	0.816	1432	37.8	1434.7	27.7	1438.8	39.8	0.5
ORACLE 22	99	109347	1.26	11.071	2.2	3.2241	4.2	0.259	3.6	0.854	1484.7	47.7	1463	32.7	1431.5	41.9	-3.7
ORACLE 23	108	3E+06	1.5	11.029	2	3.1754	3.7	0.25411	3	0.829	1459.6	39.6	1451.2	28.2	1438.9	38.9	-1.4
ORACLE 25	179	63855	4.11	11.124	1.8	3.2188	3.6	0.2598	3.2	0.873	1488.8	41.9	1461.7	28	1422.5	33.6	-4.7
ORACLE 27	106	72994	1.76	11.015	2.4	3.0471	3.4	0.24354	2.5	0.731	1405.1	31.8	1419.5	26.4	1441.2	44.8	2.5
ORACLE 28	92	72433	2.17	11.055	2	3.0801	3.2	0.24707	2.5	0.784	1423.4	32.5	1427.8	24.9	1434.3	38.4	0.8
ORACLE 3	226	329363	3.74	11.153	1.6	3.0144	3.3	0.24394	2.9	0.867	1407.2	36.1	1411.3	25.1	1417.5	31.3	0.7
ORACLE 30	102	212896	1.72	11.112	2.4	3.1019	4.1	0.25011	3.4	0.82	1439	43.9	1433.2	31.8	1424.5	45.3	-1.0
ORACLE 4	165	382871	2.64	11.136	1.6	3.1231	3.4	0.25234	3	0.88	1450.6	39	1438.4	26.3	1420.5	31	-2.1

ORACLE 5	285	338334	2.61	11.066	1.8	3.1025	2.9	0.24911	2.3	0.787	1433.9	29.8	1433.3	22.6	1432.4	34.7	-0.1
ORACLE 6	81	163860	1.54	11.082	1.9	3.1143	3.6	0.25041	3	0.84	1440.6	39	1436.2	27.6	1429.7	37.2	-0.8
ORACLE 7	182	369622	1.68	11.102	1.8	3.0393	3.5	0.24483	3	0.862	1411.7	37.9	1417.5	26.5	1426.2	33.6	1.0
ORACLE 8	99	104027	1.34	11.393	2.5	3.0245	3.3	0.25002	2.2	0.668	1438.6	28.5	1413.8	25.2	1376.7	47.3	-4.5
ORACLE 9	201	296114	2.51	10.981	1.6	3.1881	2.7	0.25403	2.1	0.794	1459.2	27.9	1454.3	20.8	1447.1	31.1	-0.8
Oracle no CA Run 2 (discordant)																	
ORACLE 24	88	142415	3.07	11.157	1.5	3.2376	4.6	0.26211	4.4	0.946	1500.6	58.3	1466.2	35.7	1416.7	28.4	-5.9
ORACLE 26	279	627209	4.76	11.172	1.5	2.9483	2.9	0.239	2.5	0.858	1381.5	31.2	1394.4	22.1	1414.3	28.7	2.3
ORACLE 29	327	10000	4.91	10	1	0.1	1	0.1	1	0.8	500	1	500	1	500	1	0.0
Composition									Ages								
Zircon	U	206Pb/	U/Th	206Pb/	2σ	207Pb/	2σ	206Pb/	2σ	Corr.	206Pb/	2σ	207Pb/	2σ	206Pb/	2σ	%
#	(ppm)	204Pb		207Pb	(%)	235U	(%)	238U	(%)		238U	(Ma)	235U	(Ma)	207Pb	(Ma)	Disc.
Oracle CA Run 1																	
Oracle-1	256	42437	0.94	11.037	2.0	3.006	4.3	0.24076	3.8	0.889	1390.7	47.4	1409.3	32.5	1437.5	37.3	3.3
Oracle-2	194	83148	1.53	11.371	1.8	2.989	3.2	0.24659	2.6	0.825	1420.9	33.5	1404.8	24.2	1380.4	34.5	-2.9
Oracle-3	222	24360	2.25	10.954	1.7	3.095	3.1	0.24601	2.5	0.826	1417.9	32.4	1431.5	23.7	1451.9	33.1	2.3
Oracle-4	321	81698	2.25	11.156	2.3	3.081	3.5	0.24942	2.7	0.766	1435.5	34.9	1428.1	27.2	1417.0	43.6	-1.3
Oracle-5	207	26367	2.49	11.011	2.0	3.069	3.4	0.24516	2.7	0.803	1413.5	34.9	1424.9	26.2	1441.9	38.9	2.0
Oracle-6	228	86016	2.18	11.131	2.1	3.173	2.8	0.25631	1.8	0.658	1471.0	24.1	1450.7	21.5	1421.2	40.1	-3.5
Oracle-7	239	31511	2.01	11.019	2.5	3.046	3.7	0.24352	2.8	0.740	1405.0	34.9	1419.2	28.6	1440.5	47.9	2.5
Oracle-8	137	18724	2.54	11.068	2.5	3.006	3.3	0.24142	2.1	0.645	1394.1	26.5	1409.2	25.0	1432.0	47.8	2.7
Oracle-10	197	47671	2.37	11.188	2.1	2.915	4.2	0.23661	3.6	0.870	1369.0	44.8	1385.7	31.6	1411.5	39.4	3.0
Oracle-11	159	24921	1.22	11.230	2.4	3.065	4.2	0.24977	3.4	0.820	1437.3	44.4	1424.1	32.2	1404.4	46.0	-2.3
Oracle-12	301	14008	1.33	11.053	2.4	3.141	3.2	0.25191	2.2	0.680	1448.3	28.5	1442.8	24.9	1434.7	45.2	-0.9
Oracle-13	995	34667	3.97	11.044	1.5	3.103	2.9	0.24866	2.5	0.851	1431.6	31.9	1433.4	22.4	1436.2	29.2	0.3
Oracle-14	172	6748	1.97	11.273	1.8	2.967	3.7	0.24266	3.2	0.873	1400.5	40.6	1399.2	28.1	1397.1	34.6	-0.2
Oracle CA Run 1 (discordant)																	
Oracle-9	278	24283	2.49	10.270	2.1	3.524	4.5	0.26262	4.0	0.887	1503.3	53.8	1532.7	35.8	1573.5	39.1	4.5
Oracle-15	102	12576	1.21	12.001	9.6	4.068	60.8	0.35420	60.0	0.987	1954.6	1013.8	1647.9	505.5	1276.1	187.8	-53.2
Oracle CA Run 2																	
Oracle 10	345	88057	1.35	11.077	1.6	3.0884	2.7	0.24822	2.2	0.799	1429.3	27.8	1429.8	20.8	1430.6	31.1	0.1
Oracle 11	433	339436	0.66	10.941	1.9	3.0977	4.5	0.24592	4.1	0.911	1417.4	52.6	1432.1	34.8	1454	35.7	2.5
Oracle 12	273	98315	2.48	11.068	2.1	3.1691	3.1	0.2545	2.3	0.74	1461.7	30	1449.7	23.9	1432.1	39.8	-2.1
Oracle 13	260	203323	2.94	10.999	2.9	3.2058	4.1	0.25585	2.9	0.706	1468.6	38.2	1458.6	31.9	1444	55.6	-1.7
Oracle 14	272	163346	2.72	11.217	2	3.1353	2.7	0.25518	1.7	0.649	1465.1	22.7	1441.4	20.6	1406.5	38.9	-4.2
Oracle 15	264	384353	1.54	10.975	2.1	3.1191	2.9	0.24839	2.1	0.701	1430.1	26.3	1437.4	22.5	1448.2	39.7	1.2
Oracle 16	314	797585	2.45	11.121	2.1	3.1142	3	0.2513	2.1	0.709	1445.2	27.7	1436.2	23.1	1423	40.5	-1.6
Oracle 17	255	87609	2.6	11.016	2	3.2054	3.4	0.2562	2.7	0.813	1470.4	35.9	1458.5	26	1441.1	37.2	-2.0
Oracle 18	241	349913	1.05	10.975	1.6	3.2378	3.6	0.25783	3.2	0.893	1478.7	42.9	1466.2	28.2	1448.2	31.1	-2.1
Oracle 19	291	504060	0.86	11.006	1.7	3.2135	3.2	0.25663	2.7	0.851	1472.6	36.1	1460.4	25	1442.8	32.3	-2.1
Oracle 2	166	140566	1.79	11.05	1.7	3.0607	3.3	0.24541	2.8	0.853	1414.8	36.1	1422.9	25.5	1435.1	33.2	1.4
Oracle 20	227	126079	1.33	11.017	1.8	3.1972	3.4	0.25559	2.9	0.853	1467.2	37.6	1456.5	26	1440.8	33.5	-1.8
Oracle 21	153	115425	1.5	11.141	2.5	3.1098	3.9	0.2514	3	0.773	1445.7	39.2	1435.1	30.1	1419.5	47.5	-1.8

Oracle 22	114	35759	0.9	11.119	2.8	3.2267	4.6	0.26032	3.6	0.797	1491.5	48.4	1463.6	35.4	1423.4	52.8	-4.8
Oracle 23	155	121660	2.08	10.851	2	3.2727	3.2	0.25767	2.5	0.784	1477.9	32.7	1474.6	24.6	1469.8	37.3	-0.6
Oracle 24	163	167415	1.18	11.15	2	3.0081	4.1	0.24337	3.6	0.88	1404.2	46	1409.7	31.6	1418	37.6	1.0
Oracle 25	103	3E+06	0.51	11.098	3	3.0377	4.8	0.24461	3.8	0.779	1410.6	47.5	1417.1	36.8	1426.9	57.6	1.1
Oracle 26	677	169703	2.08	10.955	1.8	3.0651	2.7	0.24363	2	0.741	1405.5	25.4	1424	20.8	1451.7	34.8	3.2
Oracle 27	216	214142	0.91	10.956	1.7	3.077	2.7	0.24461	2.1	0.769	1410.6	26.6	1427	20.9	1451.5	33.2	2.8
Oracle 28	781	582142	4.81	10.898	1.6	3.1552	2.7	0.2495	2.1	0.798	1435.9	27.3	1446.3	20.5	1461.6	30.4	1.8
Oracle 29	586	696608	0.45	10.947	1.8	3.164	2.7	0.25131	2.1	0.757	1445.2	26.8	1448.4	21.1	1453.1	34	0.5
Oracle 3	349	358709	1.32	10.898	2.2	3.1691	3.6	0.25059	2.9	0.792	1441.5	37.1	1449.7	28	1461.6	42.1	1.4
Oracle 30	227	122325	0.85	11.066	2.1	3.2653	3.5	0.26218	2.9	0.814	1501	38.6	1472.8	27.5	1432.4	39.3	-4.8
Oracle 4	279	58934	1.74	11.039	1.7	3.1136	2.7	0.2494	2.1	0.773	1435.4	26.9	1436	20.8	1437	32.7	0.1
Oracle 5	269	1E+06	1.88	10.924	2	3.1345	3.3	0.24846	2.6	0.798	1430.5	33.5	1441.2	25.2	1457	37.5	1.8
Oracle 6	178	441963	2.2	10.994	2.1	3.1279	4.1	0.24951	3.6	0.864	1435.9	45.8	1439.6	31.7	1444.9	39.5	0.6
Oracle 7	313	300360	5.01	11.067	1.9	3.1418	2.9	0.25229	2.2	0.747	1450.3	28.1	1443	22.3	1432.3	36.7	-1.3
Oracle 8	337	2E+06	2.32	10.957	1.5	3.1219	2.6	0.2482	2.1	0.82	1429.2	27.1	1438.1	19.9	1451.3	28.2	1.5
Oracle 9	127	168937	1.42	11.135	1.9	3.1707	3.8	0.25618	3.2	0.863	1470.2	42.6	1450.1	29	1420.6	36.2	-3.5
Oracle CA Run 2 (discordant)																	
Oracle 1	17	5000	1.15	14.5	8.7	1.4205	11.1	0.14945	7	0.628	897.9	58.6	897.6	66.3	896.8	178.6	-0.1