

**Supplement 2: 234U, 238U, 230Th and <sup>230</sup>Th<sub>ex</sub> concentrations in (dpm/g) from GIK23065-3 core and reference material.**

Sample	234U	SD	238U	SD	230Th	SD	230Th <sub>ex</sub>
Th-GIK23065-3_63.5cm	1.6318131	0.0104332	1.6446437	0.0040281	2.7069453	0.0413163	1.0751322
Th-GIK23065-3_73.5cm	1.7491401	0.0131992	1.7093064	0.003128	4.3807623	0.1603486	2.6316222
Th-GIK23065-3_80.5cm	1.8701571	0.0184153	1.8931331	0.0033196	3.931999	0.0237652	2.061842
Th-GIK23065-3_94.5cm	1.7514499	0.0164291	1.7421411	0.0035853	3.0585521	0.0215131	1.3071022
Th-GIK23065-3_97.5cm	1.9193669	0.0164943	1.8956926	0.0085249	3.3692048	0.1035993	1.4498379
Th-GIK23065-3_116.5cm	1.8268182	0.0211513	1.7725443	0.0057078	3.3240957	0.0152102	1.4972775
Th-GIK23065-3_134.5cm	1.3044185	0.0071309	1.2518013	0.0028826	2.9014734	0.0897613	1.5970549
Th-GIK23065-3_142.5cm	1.1918641	0.0128627	1.1504313	0.0017486	1.9920742	0.0289351	0.8002101
Th-GIK23065-3_146.5cm	1.2984318	0.0170468	1.2602354	0.0049906	2.7755157	0.0739599	1.4770839
Th-GIK23065-3_158.5cm	1.4774454	0.0078915	1.4348544	0.0033179	2.1323397	0.0367108	0.6548942
Th-GIK23065-3_163cm	1.5656261	0.0265847	1.5368678	0.0059938	1.3597615	0.0789024	-0.205865
Th-GIK23065-3_173.5cm	1.7582493	0.0098721	1.7132605	0.0032688	5.0358833	0.1327541	3.277634
Th-GIK23065-3_204.5cm	1.204055	0.0103408	1.2292596	0.0047074	3.2893172	0.0867724	2.0852622
Th-GIK23065-3_209.5cm	1.2473082	0.0075429	1.2151773	0.004218	2.8433911	0.0440825	1.5960828
Th-GIK23065-3_219.5cm	1.3114284	0.0112225	1.2853069	0.001601	2.8286371	0.0596992	1.5172087
Th-GIK23065-3_222.5cm	1.1953518	0.020085	1.1529485	0.0036134	3.2211831	0.043436	2.0258313
Th-GIK23065-3_254.5cm	1.4406106	0.0168678	1.4635231	0.0031348	1.5807415	0.0149582	0.1401309
Th-GIK23065-3_283.5cm	1.5299354	0.016897	1.5139501	0.0047331	1.5995364	0.0665168	0.069601
Th-GIK23065-3_295.5cm	1.6058058	0.0076655	1.6501229	0.0068739	1.3417108	0.0522297	-0.264095
Th-GIK23065-3_304.5cm	1.4002585	0.02069	1.3787343	0.0033603	1.2246485	0.0089436	-0.17561
Th-GIK23065-3_335.5cm	1.7618356	0.0191552	1.7565873	0.0032245	2.4587415	0.0106189	0.6969059
Th-GIK23065-3_352.5cm	1.580507	0.0202679	1.6048614	0.0022655	1.862412	0.0372843	0.281905
Th-GIK23065-3_354.5cm	1.303506	0.0127052	1.3570698	0.004165	1.1145393	0.0334928	-0.188967
Th-GIK23065-3_365.5cm	1.4054022	0.0176332	1.420832	0.0047672	1.7817192	0.0493378	0.376317
Th-GIK23065-3_379.5cm	1.2703724	0.0091732	1.3994569	0.0020621	1.1004922	0.0206919	-0.16988
Th-GIK23065-3_399.5cm	1.5859073	0.0104624	1.7264682	0.0034884	2.0250618	0.0143548	0.4391545
Th-GIK23065-3_420cm	1.0430224	0.0057309	1.1091115	0.0006846	1.793072	0.0609121	0.7500496
Th-GIK23065-3_446cm	1.4203313	0.0107988	1.5400168	0.0038932	1.2646135	0.0514278	-0.155718
Th-GIK23065-3_474cm	1.3364801	0.011108	1.534126	0.0031284	1.7551682	0.0226415	0.4186881
Th-GIK23065-3_494.5cm	3.1867726	0.0172055	2.9185419	0.0035165	3.4898087	0.0706832	0.3030362
Th-GIK23065-3_499.5cm	3.9781777	0.0414414	2.6678101	0.0075481	2.5390177	0.0714082	-1.43916
Th-GIK23065-3_504.5cm	3.2877404	0.0108878	2.2252819	0.0055432	1.5960118	0.0559814	-1.691729
Th-GIK23065-3_516.5cm	1.9914014	0.0074598	1.5221821	0.0038462	1.4312543	0.0571478	-0.560147
Th-GIK23065-3_524.5cm	1.0720315	0.0131128	1.1600989	0.0017244	1.5377816	0.0278004	0.4657501
Th-GIK23065-3_564cm	1.167965	0.0149643	1.2850573	0.0028229	1.4663431	0.0653885	0.2983781
<b>Reference materials</b>							
Th-GIK23065-3_IS-A	1.9842863	0.0093197	1.9340216	0.0069628	1.7103061	0.0183375	-0.27398
Th-GIK23065-3_IS-B	2.043208	0.0256194	1.9414956	0.0057794	1.7204344	0.0347162	-0.322774
Th-GIK23065-3_IS-C	1.9786505	0.0169501	1.9038793	0.0069018	1.6968497	0.0326259	-0.281801
Th-GIK23065-3_IS-D	1.9292044	0.0168133	1.9220463	0.0036592	1.699432	0.0951799	-0.229772
Th-GIK23065-3_Mess4-A	2.6187712	0.0207687	2.677171	0.0075134	2.5953711	0.0560976	-0.0234
Th-GIK23065-3_Mess4-B	2.5833695	0.0264409	2.6446183	0.0080834	2.5374937	0.034476	-0.045876
Th-GIK23065-3_Mess4-C	2.5900542	0.0186917	2.6512333	0.0101627	2.6875388	0.0809128	0.0974846
Th-GIK23065-3_Mess4-D	2.5083494	0.009771	2.6666204	0.0051845	2.5976243	0.0738189	0.0892749

IS stands for IAEA-385 from the Irish Sea reference material (Pham et al., 2008)

Sample	238U dpm/g	SD	Expected	Recovery (%)	230Th dpm/g	SD	Expected	Recovery (%)
Th-GIK23065-3_IS-A	1.93	0.007			1.710	0.018		90
Th-GIK23065-3_IS-B	1.94	0.006			1.720	0.035	1.89 ±	91
Th-GIK23065-3_IS-C	1.90	0.007			1.697	0.033	0.108	90
Th-GIK23065-3_IS-D	1.92	0.004			1.699	0.095		90
Th-GIK23065-3_Mess4-A	2.68	0.008		106	2.595	0.056		
Th-GIK23065-3_Mess4-B	2.64	0.008	2.52 ± 0.30	105	2.537	0.034		
Th-GIK23065-3_Mess4-C	2.65	0.010		105	2.688	0.081		
Th-GIK23065-3_Mess4-D	2.67	0.005		106	2.598	0.074		

Reference materials were analysed alongside each batch of full digestions. It should be noted that these reference materials are certified for larger sample masses than those used in this study; therefore, some degree of variability may arise from sample heterogeneity at smaller subsample sizes.