



*Geophysical Research Letters*

Supporting Information for

**Constraining Jumps in Density and Elastic Properties at the 660~km discontinuity  
Using Normal Mode Data via the Backus-Gilbert Method**

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Table S1

**Introduction**

The table of mode center frequencies is provided in this document.

**Table S1.**

Catalogue of normal mode center frequency data compiled from the Reference Earth Model (REM, <https://igppweb.ucsd.edu/~gabi/rem.dir/surface/smodes.list>) and Deuss et al. (2013) and Roullet et al. (2010) listed in the "D/R" column. In that column, all frequencies are from Deuss et al. (2013), other than the four radial modes which are from Roullet et al. (2010).

$n$	type	$l$	REM frequency (mHz)	REM error (mHz)	D/R frequency* (mHz)	D/R error* (mHz)
0	S	2	0.30945	0.00025	0.309480	2E-05
0	S	3	0.4685	0.00015	0.468460	4E-05
0	S	4	0.64682	0.0001	0.64678	3E-05
0	S	5	0.84002	0.0001	0.83999	4E-05
0	S	6	1.03755	0.0001	1.03754	4E-05
0	S	7	1.23105	0.0001	1.23098	3E-05
0	S	8	1.41285	0.0001	1.41281	2E-05
0	S	9	1.57755	0.00015	1.57756	2E-05
0	S	10	1.7256	0.0002		
0	S	11	1.8613	0.0004	1.8619	8E-05
0	S	12	1.989	0.0003	1.98973	3E-05
0	S	13	2.11158	0.0001	2.11202	4E-05
0	S	14	2.2298	0.00025	2.23047	4E-05
0	S	15	2.34495	0.00015	2.34545	6E-05
0	S	16	2.4569	0.00015	2.4575	3E-05
0	S	17	2.5658	0.0003	2.56653	5E-05
0	S	18	2.6725	0.0003		
0	S	19	2.7761	0.0004	2.77686	0.0001
0	S	20	2.87795	0.0004	2.87836	0.00016
0	S	21	2.9773	0.0002	2.97748	0.00061
0	S	22	3.0747	0.0002		
0	S	23	3.1707	0.00015		
0	S	24	3.2655	0.0002		
0	S	25	3.35885	0.00015		
0	S	26	3.45135	0.00015		
0	S	27	3.5431	0.00015		
0	S	28	3.6342	0.00015		
0	S	29	3.7247	0.0002		
0	S	30	3.8148	0.0002		
0	S	31	3.9047	0.00025		
0	S	32	3.99400	0.00025		
0	S	33	4.0835	0.0003		
0	S	34	4.1725	0.0003		
0	S	35	4.2617	0.0003		
0	S	36	4.3511	0.0003		

0	S	37	4.4402	0.00035		
0	S	38	4.5295	0.00035		
0	S	39	4.6189	0.00035		
0	S	40	4.7084	0.0004		
0	S	41	4.7981	0.0004		
0	S	42	4.8879	0.0005		
0	S	43	4.9777	0.0005		
0	S	44	5.0676	0.0006		
0	S	45	5.1579	0.0006		
0	S	46	5.2482	0.0006		
0	S	47	5.3385	0.0006		
0	S	48	5.4290	0.0006		
0	S	49	5.5195	0.0007		
0	S	50	5.6103	0.0007		
0	S	51	5.7016	0.0008		
0	S	52	5.7925	0.0012		
0	S	53	5.8838	0.0015		
0	S	54	5.9751	0.0014		
0	S	55	6.0665	0.0015		
0	S	56	6.1583	0.0015		
0	S	57	6.25	0.0013		
0	S	58	6.3418	0.0015		
0	S	59	6.4338	0.0025		
0	S	60	6.526	0.003		
0	S	65	6.989	0.005		
0	S	70	7.455	0.007		
0	S	75	7.925	0.007		
0	S	80	8.3930	0.008		
0	S	85	8.867	0.008		
0	S	90	9.339	0.009		
0	S	95	9.8130	0.009		
0	S	100	10.2890	0.01		
0	S	110	11.247	0.011		
0	S	120	12.205	0.012		
0	S	130	13.165	0.013		
0	S	140	14.135	0.014		
0	S	150	15.11	0.015		
0	S	160	16.078	0.016		
0	S	170	17.048	0.017		
0	S	180	18.0190	0.018		
0	S	190	18.989	0.019		

0	S	200	19.958	0.019		
1	S	0			1.63155	0.0001217
1	S	2	0.6802	0.0002	0.67991	5E-05
1	S	3	0.93997	0.0002	0.93998	6E-05
1	S	4	1.17278	0.0002	1.17289	5E-05
1	S	5	1.37	0.0002	1.37009	3E-05
1	S	6	1.5215	0.0002	1.52148	4E-05
1	S	7	1.65455	0.00015	1.65456	6E-05
1	S	8	1.798	0.0002	1.79786	3E-05
1	S	9	1.962	0.0004	1.96194	3E-05
1	S	10	2.1465	0.0005	2.1463	0.000140000
1	S	11	2.3465	0.002		
1	S	14			2.97336	0.00075
1	S	15	3.17	0.002		
1	S	16	3.34084	0.002		
1	S	17	3.49339	0.00084000		
1	S	18	3.64375	0.00061		
1	S	19	3.79223	0.00091		
1	S	20	3.93997	0.00076		
1	S	21	4.08564	0.00061		
1	S	22	4.23147	0.0008		
1	S	23	4.37625	0.00116		
1	S	24	4.52103	0.00116		
1	S	25	4.66265	0.00210000		
1	S	26	4.80911	0.00138		
1	S	27	4.95277	0.00159		
1	S	28	5.08865	0.00256		
1	S	29	5.23302	0.00153000		
1	S	30	5.37306	0.00178000		
1	S	31	5.51354	0.00208000		
1	S	32	5.65236	0.00233		
1	S	33	5.78881	0.00206		
1	S	34	5.9292	0.0029		
1	S	35	6.06183	0.00237		
1	S	36	6.195	0.003		
1	S	37	6.331980	0.0033		
1	S	38	6.46534	0.00265		
1	S	39	6.59433	0.0034		
1	S	40	6.728290	0.00385		
2	S	0			2.50892	0.00141200
2	S	1			0.40417	4E-05

2	S	3	1.24300	0.00015	1.24282	4E-05
2	S	4	1.3797	0.0002	1.37951	3E-05
2	S	5	1.5158	0.0003	1.51523	3E-05
2	S	6	1.6814	0.0003	1.6811	6E-05
2	S	7	1.8657	0.0004	1.86511	5E-05
2	S	8	2.0503	0.00025	2.04939	3E-05
2	S	9	2.2297	0.00045	2.22857	0.00015
2	S	10	2.4036	0.0005	2.40309	1E-05
2	S	11	2.57204	0.00025	2.57224	0.000180000
2	S	12	2.73745	0.0006	2.73715	2E-05
2	S	13	2.9	0.0005	2.89978	4E-05
2	S	14	3.062	0.003		
2	S	26	5.579	0.003		
2	S	27	5.74613	0.00085		
2	S	28	5.90381	0.0011		
2	S	29	6.06814	0.00128		
2	S	30	6.22856	0.00117		
2	S	31	6.38516	0.00113		
2	S	32	6.54109	0.00149		
2	S	33	6.697190	0.00134		
2	S	34	6.85208	0.00125		
2	S	35	7.01191	0.00231		
2	S	36	7.16441	0.00245000		
2	S	37	7.31855	0.00207		
2	S	38	7.473	0.00181		
2	S	39	7.62339	0.00266		
2	S	40	7.774940	0.0025		
2	S	41	7.921240	0.00389000		
2	S	42	8.06988	0.00458		
2	S	43	8.21954	0.0040600		
2	S	44	8.36054	0.00424		
2	S	45	8.50896	0.00444		
2	S	46	8.65702	0.0047300		
2	S	47	8.807270	0.00510000		
3	S	0			3.2718	0.0010534
3	S	1	0.94435	0.00015	0.94429	4E-05
3	S	2	1.1062	0.0003	1.10628	0.0001
3	S	6	2.5489	0.00035	2.5488	8E-05
3	S	7	2.6872	0.0012	2.68578	0.000210000
3	S	8	2.8205	0.0006	2.81925	3E-05
3	S	9	2.951	0.0006	2.95139	3E-05

3	S	10	3.08212	0.0005		
3	S	11	3.21952	0.00053		
3	S	12	3.36136	0.00041		
3	S	13	3.50755	0.00055		
3	S	14	3.6562	0.00053		
3	S	15	3.81098	0.00059000		
3	S	16	3.96685	0.00065		
3	S	17	4.12401	0.0006		
3	S	18	4.2838	0.00067		
3	S	19	4.44613	0.00067		
3	S	20	4.60898	0.00088		
3	S	21	4.77158	0.00075		
3	S	22	4.932870	0.00085		
3	S	23	5.09842	0.00076		
3	S	24	5.26294	0.00081000		
3	S	25	5.4245	0.0025		
3	S	41	8.82312	0.00257		
3	S	42	8.97689	0.00241000		
3	S	43	9.13826	0.0023		
3	S	44	9.29013	0.00243000		
3	S	45	9.44223	0.00331		
3	S	46	9.60345	0.00247000		
3	S	47	9.750640	0.00246		
3	S	48	9.90812	0.00393		
3	S	49	10.0529	0.00348		
3	S	50	10.20665	0.00349		
4	S	0			4.10618	0.0003589
4	S	1	1.4116	0.0002	1.4118	5E-05
4	S	2	1.72165	0.0002	1.72141	5E-05
4	S	3	2.04835	0.00015	2.04827	1E-05
4	S	4	2.2786	0.0003	2.2783	3E-05
4	S	5	2.4115	0.0005	2.41112	3E-05
4	S	9	3.7075	0.0015		
4	S	10	3.86407	0.00063		
4	S	11	4.0075	0.001		
4	S	12	4.152	0.0015		
4	S	13	4.29205	0.00104000		
4	S	14	4.4353	0.00081000		
4	S	15	4.584	0.0015		
4	S	16	4.72985	0.0015		
4	S	17	4.88532	0.00114		

4	S	18	5.04366	0.00105000		
4	S	19	5.20063	0.00153000		
4	S	20	5.36219	0.00126		
4	S	21	5.52607	0.00129000		
4	S	22	5.695	0.0015		
4	S	23	5.86148	0.00134		
4	S	24	6.02867	0.00149		
4	S	25	6.19723	0.00158		
4	S	26	6.36549	0.00124		
4	S	27	6.53554	0.00173		
4	S	28	6.70265	0.00186		
4	S	29	6.87295	0.0013		
4	S	30	7.03811	0.0013		
4	S	31	7.20441	0.00212		
4	S	32	7.369390	0.00158		
4	S	33	7.536510	0.00187000		
4	S	34	7.700080	0.00183		
4	S	35	7.85958	0.00178000		
4	S	36	8.01995	0.00148		
4	S	37	8.18438	0.00148		
4	S	38	8.34215	0.00215		
4	S	39	8.49951	0.00234		
4	S	40	8.66348	0.00281		
5	S	2	2.0907	0.0003	2.09047	6E-05
5	S	3	2.1688	0.0002	2.16868	6E-05
5	S	4	2.37925	0.00015	2.37918	4E-05
5	S	5	2.7036	0.0002	2.70339	1E-05
5	S	6	3.01155	0.00015	3.01103	5E-05
5	S	7	3.2922	0.0003	3.29163	4E-05
5	S	8	3.52600	0.0006	3.52591	2E-05
5	S	10	4.211	0.0005		
5	S	11	4.46205	0.002	4.456840	0.00011
5	S	12	4.697	0.001	4.69573	3E-05
5	S	13	4.92546	0.00102		
5	S	14	5.1364	0.00077000	5.134930	6E-05
5	S	15	5.32726	0.00112000	5.32685	2E-05
5	S	16	5.50595	0.00109	5.50243	0.0001
5	S	17	5.66985	0.00128	5.66875	6E-05
5	S	18	5.8292	0.00196		
5	S	19	5.98849	0.00217		
5	S	20	6.15222	0.00188		

5	S	21	6.31038	0.00218		
5	S	22	6.47356	0.00185		
5	S	23	6.63543	0.00179000		
5	S	24	6.80078	0.00232		
5	S	25	6.96594	0.00192000		
5	S	26	7.13266	0.00179000		
5	S	27	7.291930	0.00222		
5	S	28	7.455360	0.00208000		
5	S	29	7.61688	0.00241000		
5	S	30	7.778520	0.0026		
5	S	31	7.94178	0.00235		
5	S	32	8.09906	0.00206		
5	S	33	8.253590	0.00254		
5	S	34	8.4090	0.004		
5	S	35	8.57059	0.00282		
5	S	36	8.72695	0.00344		
5	S	37	8.8845	0.00289		
5	S	38	9.04367	0.0027		
5	S	39	9.20063	0.00312		
5	S	40	9.360490	0.00377		
5	S	41	9.51	0.005		
5	S	42	9.67932	0.0031		
5	S	43	9.83577	0.00464		
5	S	44	9.989460	0.00355000		
5	S	45	10.150360	0.00337		
5	S	46	10.307	0.005		
5	S	47	10.47661	0.00361		
5	S	48	10.6383	0.00384000		
5	S	49	10.79693	0.00345000		
5	S	50	10.9624	0.00325		
5	S	51	11.11599	0.00332		
5	S	52	11.28207	0.004		
6	S	1	1.9832	0.001		
6	S	3	2.82185	0.00015	2.8217	3E-05
6	S	8	3.7375	0.002		
6	S	9	3.9645	0.003	3.96499	4E-05
6	S	10	4.2112	0.0003	4.21102	3E-05
6	S	13	5.2335	0.0025		
6	S	14	5.41100	0.002		
6	S	15	5.6002	0.0012	5.60123	0.000130000
6	S	16	5.80674	0.00133		



6	S	17	6.02071	0.00113		
6	S	18	6.2381	0.00138	6.23566	8E-05
6	S	19	6.44615	0.00176		
6	S	20	6.65389	0.00131		
6	S	21	6.8552	0.0018		
6	S	22	7.05031	0.00164		
6	S	23	7.23475	0.00148		
6	S	24	7.412490	0.00208000		
6	S	25	7.58813	0.00201000		
6	S	26	7.756130	0.00210000		
6	S	27	7.921940	0.00163		
6	S	28	8.08818	0.00204		
6	S	29	8.25578	0.00203000		
6	S	30	8.41721	0.00307		
6	S	31	8.5883	0.00265		
6	S	32	8.759310	0.00313		
6	S	33	8.926920	0.00262		
6	S	34	9.092080	0.00292		
6	S	35	9.25799	0.00361		
6	S	36	9.42384	0.0031		
6	S	37	9.5980	0.0035		
6	S	38	9.76062	0.00289		
6	S	39	9.92885	0.00227		
6	S	40	10.08884	0.00357		
7	S	2	2.52145	0.0006		
7	S	4	3.4112	0.0006		
7	S	5	3.65778	0.00035	3.65754	2E-05
7	S	6	3.95600	0.0005	3.95563	2E-05
7	S	7	4.2341	0.0003	4.234380	3E-05
7	S	8	4.448	0.001	4.44942	0.000130000
7	S	9	4.612	0.0025	4.61445	0.000140000
7	S	10	4.7635	0.0045		
7	S	11	4.9155	0.003		
7	S	12	5.06925	0.00153000		
7	S	17	6.61015	0.00377		
7	S	18	6.7627	0.006		
7	S	19	6.919810	0.00448000		
7	S	20	7.07702	0.00361		
7	S	21	7.24837	0.00282		
7	S	22	7.41873	0.00196		
7	S	23	7.59392	0.00168000		

7	S	24	7.77887	0.00224000		
7	S	25	7.96277	0.00187000		
7	S	26	8.15433	0.00226		
7	S	27	8.3423	0.0017		
7	S	28	8.52131	0.004		
7	S	29	8.70928	0.004		
7	S	30	8.902520	0.00235		
7	S	31	9.08929	0.00274000		
7	S	32	9.27915	0.0023		
7	S	33	9.457460	0.00207		
7	S	34	9.63683	0.00267		
7	S	35	9.82029	0.0027		
7	S	36	9.9985	0.00337		
7	S	37	10.17404	0.00368		
7	S	38	10.34765	0.00328		
7	S	39	10.52843	0.00493000		
7	S	40	10.70962	0.00418		
8	S	1	2.8726	0.0002	2.87263	1E-05
8	S	5	4.1653	0.00025	4.16522	8E-05
8	S	6			4.43029	3E-05
8	S	7	4.64515	0.0006	4.64644	0.00016
8	S	8	4.902340	0.002		
8	S	9	5.2070	0.002		
8	S	10	5.50678	0.001	5.50301	4E-05
8	S	11	5.70954	0.00144000		
8	S	12	5.86904	0.0025		
8	S	13	6.01893	0.0035		
8	S	14	6.16507	0.0046		
8	S	15	6.31411	0.0065		
8	S	16	6.468	0.0065		
8	S	20	7.84685	0.0065		
8	S	21	7.97633	0.00425		
8	S	22	8.12786	0.00439		
8	S	23	8.282210	0.0085		
8	S	24	8.43449	0.007		
8	S	25	8.59061	0.0075		
8	S	26	8.75356	0.007		
8	S	27	8.912	0.0075		
8	S	28	9.074	0.007		
8	S	29	9.24265	0.008		
8	S	30	9.42174	0.008		

8	S	31	9.593740	0.008		
8	S	32	9.76723	0.007		
9	S	2	3.2307	0.0005	3.23092	8E-05
9	S	3	3.5565	0.0004	3.5557	4E-05
9	S	4	3.8784	0.0015	3.8783	0.0001
9	S	6			4.61888	0.00017
9	S	8	5.1385	0.0035	5.13847	6E-05
9	S	9	5.38155	0.003		
9	S	10	5.60554	0.00151	5.60609	0.00023
9	S	11	5.88083	0.00083	5.88236	5E-05
9	S	12	6.18507	0.00085	6.18366	4E-05
9	S	13	6.47969	0.00082	6.48068	5E-05
9	S	14	6.767	0.0015	6.764710	3E-05
9	S	15	7.026490	0.00109	7.025290	0.0001
9	S	16	7.23273	0.00251000		
9	S	17	7.39833	0.003		
9	S	18	7.54147	0.00386000		
9	S	19	7.68969	0.0045		
9	S	24	9.19	0.005		
9	S	25	9.343010	0.006		
9	S	26	9.503	0.005		
9	S	27	9.657	0.007		
9	S	28	9.81428	0.0085		
10	S	2	4.0405	0.001		
10	S	8	5.735	0.007		
10	S	9	5.939	0.0045		
10	S	10	6.18507	0.00085	6.18647	0.000210000
10	S	11	6.44666	0.00206		
10	S	12	6.685	0.004		
10	S	13	6.86379	0.00285		
10	S	14	7.0310	0.0045		
10	S	15	7.19800	0.005		
10	S	16	7.42012	0.00152		
10	S	17	7.673490	0.00137000	7.67266	7E-05
10	S	18	7.93646	0.00109	7.936380	0.00011
10	S	19	8.19552	0.00108	8.19675	9E-05
10	S	20	8.44479	0.00133	8.44605	0.00016
10	S	21	8.6759	0.00233	8.671330	0.000180000
10	S	22	8.86467	0.00244		
10	S	26	10.036770	0.00213		
10	S	27	10.25388	0.00251000		

10	S	28	10.45985	0.00305000		
10	S	29	10.649340	0.0032		
11	S	1			3.68769	0.00059000
11	S	4	4.76605	0.00025	4.76598	9E-05
11	S	5	5.0726	0.00025	5.07276	4E-05
11	S	6	5.34828	0.0005	5.34893	4E-05
11	S	9	6.4355	0.0025	6.43187	5E-05
11	S	10	6.70602	0.00122	6.70557	0.00011
11	S	11	6.915	0.009		
11	S	12	7.144	0.005	7.14297	0.00041
11	S	13	7.4115	0.004		
11	S	14	7.6790	0.0035	7.67955	0.00052000
11	S	16	8.101	0.005		
11	S	17	8.265	0.008		
11	S	18	8.42049	0.009		
11	S	20	8.72419	0.00478		
11	S	21	8.89696	0.00335		
11	S	22	9.103060	0.00235		
11	S	23	9.328	0.002	9.33285	0.00025
11	S	24	9.57288	0.00212	9.57047	0.000240000
11	S	25	9.811	0.005	9.80851	0.000130000
11	S	28	10.79557	0.00436		
11	S	29	10.99878	0.0034		
11	S	30	11.22057	0.003		
11	S	31	11.42186	0.00376		
11	S	32	11.64302	0.004		
11	S	33	11.86182	0.004		
11	S	34	12.05286	0.004		
12	S	6			5.64385	0.00015
12	S	7			5.85244	0.0001
12	S	8	6.1333	0.0004	6.13206	6E-05
12	S	10	6.86	0.005		
12	S	11	7.135660	0.00089000	7.133440	4E-05
12	S	12	7.4494	0.001	7.448910	4E-05
12	S	13	7.767920	0.00064	7.769840	0.00011
12	S	14	8.0883	0.00083	8.09028	9E-05
12	S	15	8.402990	0.00097000	8.40452	9E-05
12	S	16	8.68938	0.00177	8.686690	0.00011
12	S	17	8.9306	0.005	8.92822	0.000140000
12	S	18	9.138540	0.005		
12	S	19	9.32002	0.0068		

12	S	20	9.48718	0.007		
12	S	21	9.64281	0.008		
13	S	1	4.4946	0.00035	4.49438	8E-05
13	S	2	4.8447	0.00035	4.84455	2E-05
13	S	3	5.1939	0.00025	5.19381	0.0001
13	S	6			6.15811	0.00011
13	S	7	6.393	0.0035		
13	S	8	6.55200	0.0035		
13	S	12	7.95	0.0055		
13	S	13	8.08446	0.009		
13	S	14	8.25484	0.0065		
13	S	15	8.46942	0.009	8.472670	0.00063
13	S	16	8.74138	0.00153000	8.74485	0.000280000
13	S	17	9.05382	0.00156		
13	S	18	9.36505	0.0014	9.363720	0.00011
13	S	19	9.66355	0.00106	9.664480	0.000140000
13	S	20	9.95363	0.0014	9.95447	0.0001
13	S	21	10.226240	0.0017		
13	S	22	10.47661	0.00203000		
13	S	23	10.68295	0.0045		
13	S	24	10.86048	0.0065		
14	S	4	5.5433	0.0006	5.54204	0.000280000
14	S	7	6.773	0.0025	6.769370	0.000240000
14	S	8	7.039	0.0015	7.04254	0.000280000
14	S	9	7.345	0.0008	7.344530	0.000120000
14	S	10	7.624	0.004		
14	S	11	7.813160	0.0066		
14	S	13	8.731	0.0035	8.72983	7E-05
14	S	14	8.9820	0.004	8.9815	8E-05
14	S	15	9.163	0.004		
14	S	16	9.334	0.004		
14	S	17	9.514	0.0045		
14	S	18	9.7417	0.0055		
14	S	19	9.97963	0.005		
14	S	20	10.2330	0.004		
14	S	21	10.463390	0.007		
14	S	22	10.69341	0.0065		
14	S	23	10.93331	0.0058		
15	S	3	6.0309	0.00035	6.0309	7E-05
15	S	4	6.3233	0.001	6.32345	0.0002
15	S	9	7.768	0.0035		

15	S	10	7.896	0.006		
15	S	11	8.12242	0.0015		
15	S	12	8.426740	0.002	8.42774	0.000130000
15	S	15	9.59553	0.002	9.59215	0.00011
15	S	16	9.92125	0.0025	9.92112	0.00016
15	S	17	10.213	0.008		
16	S	5	6.8302	0.0004	6.83081	7E-05
16	S	6	7.1493	0.0004	7.1491	9E-05
16	S	7	7.4715	0.0008	7.47018	0.000120000
16	S	9	8.116	0.002		
16	S	10	8.433	0.003	8.43336	8E-05
16	S	11	8.729	0.005	8.73013	0.00027
16	S	13	9.08837	0.0055		
16	S	14			9.29932	0.00095
16	S	17	10.31637	0.007		
16	S	18	10.62613	0.00138		
16	S	19	10.95829	0.00168000		
16	S	20	11.27891	0.00156		
16	S	21	11.578490	0.00301000		
17	S	1	6.1226	0.0015	6.128910	0.000240000
17	S	8			7.80259	0.00039
17	S	12	9.1455	0.003	9.148440	6E-05
17	S	13	9.429	0.003	9.428470	8E-05
17	S	14	9.705	0.005	9.69854	0.0003
17	S	15	9.93193	0.0055	9.93267	0.00052000
17	S	18	11.24474	0.0075		
17	S	19	11.4370	0.005		
17	S	22	11.97057	0.00351000		
17	S	23	12.25732	0.0035		
17	S	24	12.54761	0.004		
17	S	25	12.83344	0.004		
18	S	2	6.5370	0.002		
18	S	3	6.8863	0.0008	6.88897	9E-05
18	S	4	7.2383	0.0003	7.23854	5E-05
18	S	6			7.956810	0.000260000
18	S	9	8.735	0.007		
19	S	8	8.79295	0.008		
19	S	9	9.044	0.008		
19	S	10	9.353	0.002	9.35114	5E-05
19	S	11	9.644	0.004	9.644790	0.00023
19	S	13	10.41969	0.0025		

19	S	14	10.71043	0.0025		
19	S	15	10.99157	0.003		
20	S	1	6.9555	0.0015	6.953990	0.00029
20	S	2	7.36	0.0035		
20	S	4	8.118	0.002		
20	S	5	8.4655	0.002	8.46552	0.00015
20	S	16	11.42174	0.008		
20	S	17	11.715	0.005		
20	S	18	12.0171	0.005		
20	S	19	12.32364	0.0025		
20	S	20	12.59004	0.00516000		
21	S	6	8.8495	0.0008	8.84907	0.000130000
21	S	7	9.1705	0.0015	9.17118	0.000210000
21	S	8	9.492	0.003		
21	S	10	10.1195	0.005		
21	S	11	10.433	0.005		
22	S	1	7.8225	0.001	7.82262	3E-05
22	S	2	8.2	0.002		
22	S	14	11.615	0.005		
22	S	15	11.9240	0.005		
23	S	4	8.9370	0.002	8.93644	0.00011
23	S	5	9.29	0.001	9.28993	4E-05
23	S	13	12.06	0.007		
24	S	11	11.419	0.005		
24	S	14	12.397	0.005		
25	S	1	8.6590	0.004	8.65667	0.00039
25	S	2	9.026	0.003	9.02515	4E-05
26	S	8	11.212	0.005		
26	S	11	12.24	0.007		
27	S	1	9.494	0.003		
27	S	2	9.872	0.003	9.87192	0.00019
28	S	5	10.955	0.005		
28	S	6	11.3010	0.005		
28	S	9	12.3990	0.005		
29	S	2	10.669	0.005		
29	S	5	11.717	0.008		