Data report: Quaternary dinoflagellate cyst and pollen census counts from IODP Hole U1352B, Canterbury Basin, New Zealand[1]

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Abstract

Pollen, spore, and dinoflagellate cyst census counts are reported from Hole U1352B, part of Integrated Ocean Drilling Program Expedition 317 to the Canterbury Basin, New Zealand. Fifty one samples were processed for palynology between 91.1 and 181.5 m composite depth. Based on the shipboard biostratigraphy, the samples described here include sediment deposited during marine isotope Stages 12–10. Preservation of dinoflagellate cysts and pollen was generally good, although palynomorphs were frequently obscured by the presence of abundant terrestrial organic matter (cuticle and wood fragments) that was observed in all slides. Dinoflagellate cyst assemblages were dominated by the heterotrophic genus *Brigantedinium,* which made up, on average, 78% of the assemblage (range = 36%–98%). Alternation of two broad pollen associations was observed. Pollen assemblages dominated by Poaceae, *Halocarpus, Phyllocladus,* and Caryophyllaceae/Chenopodiaceae, interpreted to represent an alpine or cooler climate vegetation, alternated with a pollen assemblage dominated by *Fuscospora fusca* and *Prumnopitys/Podocarpus,* reflecting warmer interglacial conditions.

Introduction

The purpose of this pilot study was to assess the suitability of marine and terrestrial palynomorph assemblages from Hole U1352B for combined paleoenvironmental reconstructions of both the eastern South Island terrestrial vegetation and the nearby surface ocean. Previous studies of marine and terrestrial palynomorphs from Deep Sea Drilling Project Site 594, farther east and offshore of the present site, revealed glacial–interglacial changes in pollen assemblages over the last 350 k.y. (Heusser and Van der Geer, 1994) and dinoflagellates cyst assemblages back to 125 ka (Marret et al., 2001). Records from Site U1352 were investigated to add to this information for two reasons. The site is closer to land, with a more constrained pollen source area and is under a different surface-water mass than Site 594, which is overlain by a narrow tongue of partly subtropical water (the Southland Front) that flows around the eastern margin of South Island (Sutton, 2003)

Coring in Hole U1352B recovered 613 m of sediment from the offshore Canterbury Basin, eastern South Island, New Zealand, in November 2009 (see the **"Site U1352"** chapter [Expedition 317

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Scientists, 2011]). This data report documents the presence of dinoflagellate cysts and pollen and spores from 51 samples, which were collected between 91.1 and 181.5 m composite depth (mcd). Based on the shipboard biostratigraphy (see the "Site U1352" chapter [Expedition 317 Scientists, 2011]), the samples described here include sediment deposited during marine isotope Stages 12–10. The Stage 11 interval was targeted because it had a prolonged period of stable interglacial climate and a similar orbital solution to the present and thus has some similarity to the Holocene (e.g., Siegenthaler et al., 2005; Tzedakis et al., 2009). Additional high-resolution age control required for detailed study is not yet available for this core. Should this become available through future postcruise research, more detailed interpretation and expansion of the present palynomorph data set may be warranted.

Methods and materials

Fifty one samples were analyzed for palynology between 91.1 and 181.5 mcd. Samples were processed as described in Crouch et al. (2010) and Prebble et al. (2013) at the GNS Science Palynology Laboratory, Lower Hutt, New Zealand. This laboratory has positive filtered air pressure to minimize contamination during processing. Samples of 5 cm^3 were oven dried at 50°C for 24 h and then weighed. A *Lycopodium* tablet (batch Number 938934) was added to obtain absolute abundance counts (e.g., Mertens et al., 2009). Cold 10% HCl was added to the dried sample to remove carbonates, followed by 24 h in cold 52% HF and a second 10% HCl wash. Samples were placed in an ultrasonic bath for up to 1 min, sieved through 6 µm mesh to remove small particulate material, and then mounted on glass slides in glycerine jelly. All slides and residues are held in the paleontology collections at GNS Science.

All counts were completed on a light microscope at 500× magnification. For most samples two entire slides were examined. For dinoflagellate cysts, taxonomy and nomenclature followed Zonneveld (1997), Rochon et al. (1999), Marret and Zonneveld (2003), Radi et al. (2013), and references therein, with identification to species level where possible. Broken cysts were counted per 0.25 of a specimen. For pollen and spores, identification was mostly to a generic level and followed Pocknall (1981a, 1981b, 1981c), Large and Braggins (1991), and Moar (1993). Some taxa, including the frost-intolerant *Ascarina lucida,* were grouped into an "undifferentiated angiosperms" category. Division within the podocarps followed Heusser and Van der Geer (1994), with *Dacrydium cupressinum, Dacrycarpus dacrydioides, Halocarpus* sp., and *Phyllocladus* spp. differentiated, whereas *Prumnopitys* spp. and *Podocarpus* spp. were grouped. *Fuscospora fusca* pollen, *Lophozonia menzeisii,* and *Trisyngyne brassii* were separated. *Cyathea* spp. and other trilete and monolete spores were counted outside of the dry land sum. Notwithstanding the exceptions outlined above, nomenclature followed Moar et al. (2011).

Results

Preservation of dinoflagellate cysts and pollen was generally good, although palynomorphs were frequently obscured by the abundant terrestrial organic matter (cuticle and wood fragments) observed in all slides. No oxidation was undertaken during processing in order to reduce loss of sensitive dinoflagellate cysts, but oxidation and other steps to concentrate the pollen fraction are advised for future pollen and spore studies from this interval.

Dinoflagellate cysts

On average, 203 specimens were counted per sample (range = 7–374 specimens). Twenty five taxa or groups of dinoflagellate cysts were identified. Count data are included in Table T1, and relative abundance of selected taxa shown in Figure F1.

Assemblages were dominated by *Brigantedinium* spp., which made up 78% of the assemblage on average (range = 36%–98%). Other common taxa occurring throughout the sequence were *Selenopemphix quanta* and *Selenopemphix nephroides* (*Selenopemphix undulata* Verleye and Louwye was not differentiated from *S. nephroides*). *Bitectatodinium tepikiense,* ?*Islandium minutum,* and *Quinquecuspis concreta* were common in a few samples.

Gonyaulacoid cysts were considerably rarer than peridinoid cysts. The most frequently occurring form was *Operculodinium centrocarpum sensu* Wall and Dale, which never exceeded 10% of the assemblage. These proportions are similar to those recorded in surface sediment from the area (Crouch et al., 2010; Prebble et al., 2013).

The dinoflagellate cyst assemblages are likely too uniform to allow detailed paleoenvironmental reconstruction, although this uniformity may itself demonstrate a degree of consistency of the surface-water masses in the area on glacial–interglacial timescales.

Pollen and spores

On average, 124 pollen and spore grains were counted per sample (range = 2–450 specimens). Sixty seven taxa or groups of pollen and spores were identified. Count data are included in Table T2, and relative abundance of selected taxa is shown in Figure F1.

Spores, dominated by *Cyathea,* composed on average 15% (range = 3%–35%) of the pollen and spore assemblages. Gymnosperm pollen was dominated by *Prumnopitys/Podocarpus* species and *Halocarpus*. The most common angiosperm pollen was from Poaceae, Asteraceae, and *F. fusca*.

An alternation of two broad pollen associations was observed. Pollen of Poaceae, *Halocarpus, Phyllocladus,* and Caryophyllaceae/Chenopodiaceae, interpreted to represent an alpine or cooler climate vegetation, alternates with a pollen assemblage dominated by *F. fusca* and *Prumnopitys/Podocarpus,* reflecting warmer/interglacial conditions.

Acknowledgments

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Figure F1. **A.** Smoothed natural gamma radiation (NGR) using a Gaussian low-pass filter (30 passes) (see Fig. **F34** in the "Site U1352" chapter [Expedition 317 Scientists, 2011]). **B.** Relative abundance (%) of selected pollen and spores shown as a proportion of spore and pollen sum. Samples with <100 spore and pollen specimens are denoted by a circle. **C.** Relative abundance (%) of selected dinoflagellate cysts shown as a proportion of dinoflagellate cyst sum. Samples with <100 dinoflagellate cyst specimens are denoted by a circle. **D.** Microfossil bioevents (see Table **T5** in the "Site U1352" chapter [Expedition 317 Scientists, 2011]). **1.** Calcareous nannofossil (CN) last occurrence (LO) *Emiliania huxleyi* (Zone NN21 base); 0.29 Ma (±0.03); 112.82–121.10 mcd. **2.** Benthic foraminifer highest occurrence (HO) *Proxifrons advena;* ~0.40 Ma (±0.2); 130.26–141.14 mcd. **3.** CN HO *Pseudoemiliania lacunosa* (Zone NN20 base); 0.44 Ma (±0.01); 155.99–164.18 mcd. **4.** Planktonic foraminifer (PF) LO *Hirsutella hirsuta;* 0.34 Ma (±0.1); 180.38–189.06 mcd. **5.** PF HO *Globoconella puncticuloides;* 0.5 Ma (±0.2); 189.06–198.87 mcd (recalibrated at Site U1352).

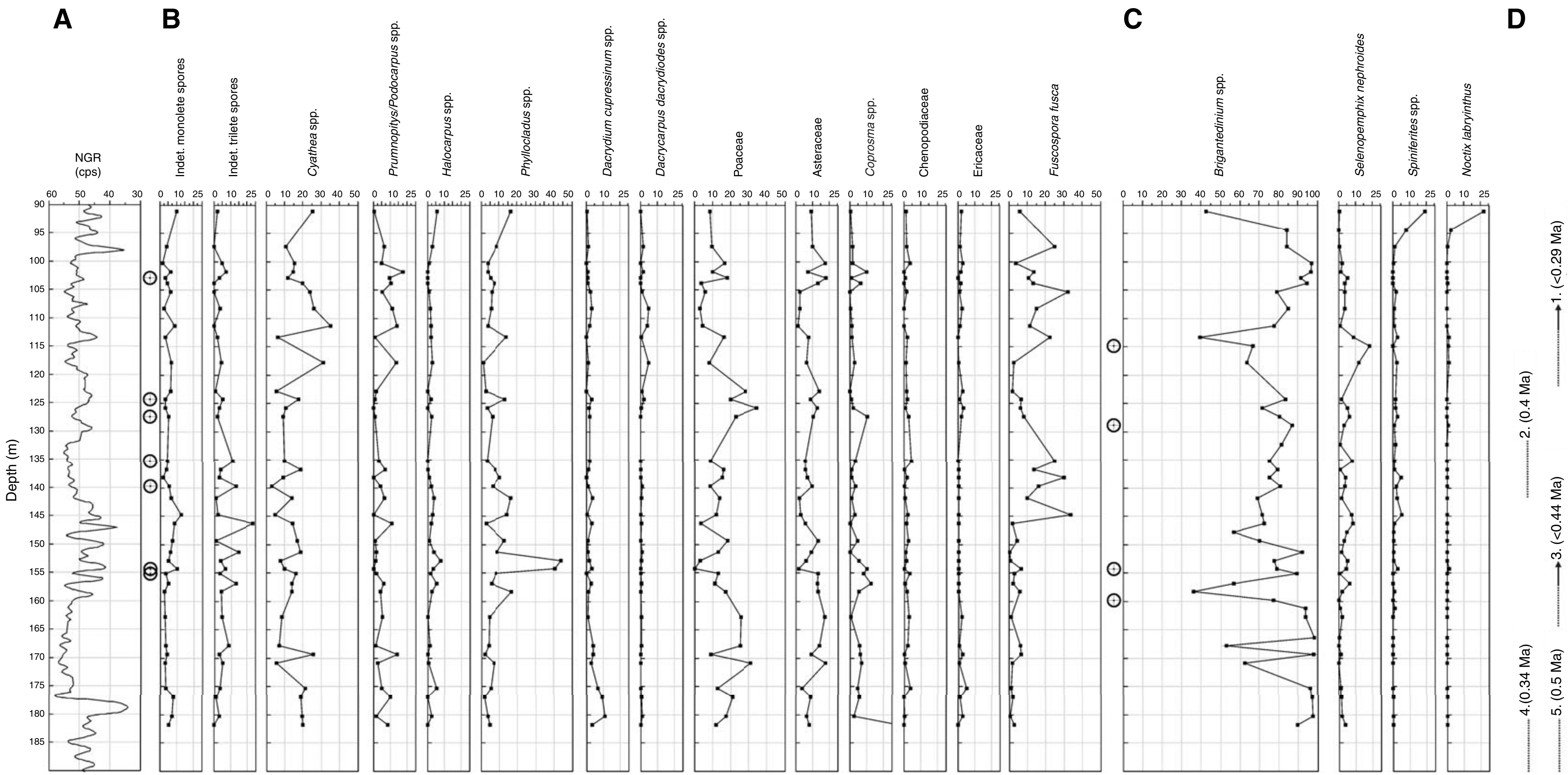

Table T1. Dinoflagellate cyst census counts, Hole U1325B.

Core, section, interval (cm)	Depth (mcd)	GNS Science Laboratory number	Slides counted (*N*)	Dinoflagellate sum	Spike *Lycopodium* count	Dry weight (g)	*Bitectatodinium tepikiense*	*Brigantedinium* spp.	*Protoperidinium nudum* cyst	*Echnidium* sp.	*Impagidinium paradoxum*	*Impagidinium patulum*	*Islandinium? minutum*	*Islandinium? cezare*	*Lejeunecysta* sp.	*Nematosphaeropsis labyrinthus*	*Operculodinium centrocarpum* (long)	*Pyxidinopsis reticulata*	*Quinquecuspis concreta*	"Round brown - more crumpled"	*Selenopemphix antarctica*	*Selenopemphix nephroides*	*Selenopemphix quanta*	*Selenopemphix* spp.	*Spiniferites delicatus*	*Spiniferites hypercanthus*	*Spiniferites membranaceous*	*Spiniferites mirabilis* group	*Spiniferites pachydermus*	*Spiniferites ramosus*	*Spiniferites* spp.	*Votadinium clavum*	Unknown dinocysts	Reworked - pre-Quaternary
317-U1325B-																																		
10H-6, 0.65	91.11	L25044	2	130.5	530	2.99	6	55.5								29		1	2		2	1	9							25				
11H-1, 0.68	94.38	L25046	2	108	315	5.26		91								3			1				3		2					7			1	
11H-3, 0.65	97.35	L25048	1	246	578	5.63	2	207.5								1						1.5	31					1		2				
11H-5, 0.65	100.33	L25050	2	358	1415	4.07		347												1		8						2						1
11H-6, 0.64	101.82	L25051	1.2	291	645	6.4		282											4			4	1											
11H-7, 0.65	102.83	L25052	2	198.5	875	3.24		182		1							1			2		10.5	2											
12H-1, 0.65	103.85	L25053	2	203	795	5.72		192								1	1					8	1											
12H-2, 0.65	105.35	L25054	2	131	1023	3.54		104												17	1	5	1							2	1			
12H-4, 0.65	108.31	L25056	2	360	930	6.27		306		4										31		13	3							3				
12H-6, 0.65	111.31	L25058	2	323.25	324	5.48		252							1				1	33	1	3	29					2		1	0.25			1
13H-1, 0.65	113.35	L25060	2	207.5	916	3.03		82		4						3			2	80		18.5	12				2		3		1			
13H-2, 0.65	114.83	L25061	2	91.25	1694	2.45		61		1						1		1	3			17	7								0.25			
13H-3, 0.65	116.33	L25062	2	7	270	3.61		6.5														0.5												
13H-4, 0.65	117.83	L25063	2	159.5	1851	4.65	3	102		1		5.5		3		2			1			19	19					1		3				
13H-5, 0.65	119.33	L25064	2	10.5	202	7.18		8.5									1														1			
13H-6, 0.65	120.83	L25065	1	16	513	3.52		14														1	1											
14H-1, 0.65	122.85	L25066	2	42.5	1153	5.57		31														5.5	4					1					1	
14H-2, 0.65	124.35	L25067	2	105	2844	3.6	1	88							5		1	1			1	2	4							2				1
14H-3, 0.65	125.85	L25068	2	188	1492	5.6		135		2												10	33	3		1				1	1		2	
14H-4, 0.65	127.35	L25069	2	100	2945	3.84		80.5				1							1		7	6.5	1							3				
14H-5, 65–67	128.85	L24628	2	94	152	5.73		82								1						3	4	2				1				1		
15H-1, 65–67	132.35	L24629	2	109.5	324	5.52		89.5											5	8		1	2			2							2	
15H-2, 65–67	133.85	L24630	1	29.75	77	5.93		25.5									1					0.5	1								0.75	1		
15H-3, 65–67	135.28	L24631	2	138	356	6.95		104	1								9		1	3		11	5.5					1.5					2	
15H-4, 65–67	136.78	L24632	2	116	636	6.46		92.5										1	10	6		1	2.5							1		2		
15H-5, 65–67	138.15	L24633	3	186	790	5.81		140.5									1.5		11	10		8	3	3	1			5			3			
15H-6, 65–67	139.65	L24634	2	326	366	6.55		264.5	1.5		2		5.5		1		3.5		2	10		12.25	8.5			2		4.5			0.75		8	
16H-1, 65–67	141.85	L24635	2	230.5	1498	6.78		160			1.5						3		31.5	7		4	4					4		1	0.5	14		1
16H-2, 64–66	143.34	L24636	1	9	126	4.6		8												1														
16H-3, 64–66	144.81	L24637	2	177.75	413	6.17		127.5							1		9		11.5	1		13.5	2.5					5		1	3.75	2		
16H-4, 64–66	146.31	L24638	2	276	992	5.23		201	1								30		3.5	7		23.5	0.5					1			1.5	2	5	
16H-5, 65–67	147.82	L24639	2	165	214	6.43	1	93.5									4.5			48.5		8	6.5								1		2	
16H-6, 65–67	149.32	L24640	2	322	290	6.4		226.5					1	4			7			35	4	11	26	5				2.5				p		1
17H-1, 64–66	151.34	L24641	2	239.75	686	5.91		221.5				0.25	1				1			8	2	4					1						1	
17H-2, 65–67	152.85	L24642	2	296.25	468	8.37	14	231				2.5					8		1	3		15.5	16	2				1			1.25	1		1
17H-3, 65–67	154.35	L24643	1	68	173	5.84		54			0.5					1				5		3	1.5							2			1	
17H-4, 59–61	155.08	L24644	1	309	83	5.78		277											p	15		2	14										1	1
18H-1, 65–67	156.85	L24645	2	312.5	1640	6.15	2	177.5	1				78			1	9.5		7		1	21	12.5		1								1	
18H-2, 65–67	158.35	L24646	1	374	459	4.6		135.5					172	p		p	8		1	1		8	44.5					3					1	
18H-3, 64–66	159.84	L24647	2	96.5	42	9.19		75									1.5			16			4											
18H-5, 0.65	161.25	L25070	2	324.25	1310	7.8		305				0.25					1				3	3	8							4				
18H-6, 0.66	162.76	L25071	1.5	343	1360	5.8		323									2			2		7	8			1								
19H-1, 0.66	166.36	L25072	0.75	302	1000	5.02		297														2	3											
19H-2, 0.65	167.85	L25073	0.5	338.25	926	5.09	143	179									2					1	13								0.25			
19H-3, 0.64	169.34	L25074	1	303	380	8.58	2	297														4												
19H-4, 0.64	170.84	L25075	0.5	349.5	480	6.61	110.5	220									2			3			14											
19H-5, 0.65	172.35	L25076	0.5	14	250	3.23	9	5																										
20H-1, 0.65	175.35	L25077	0.5	313	1088	3.94		302									3					4	4											
20H-2, 0.65	176.85	L25078	1.5	330	1548	4.09		320														4	6											
21H-1, 0.64	180.34	L25079	1.25	305	1642	4.86		297														6	1							1				1
21H-2, 0.65	181.85	L25080	0.75	324	572	6.81		290									1				1	12	20											

p =present.

Table T2. Pollen and spore census counts, Hole U1325B.

Core, section, interval (cm)	Depth (mcd)	GNS Science Laboratory number	Slides counted (*N*)	Pollen and spore sum	Spike *Lycopodium* count	Dry weight (g)	*Acacia*	Asteraceae	Bisaccate indeterminate/weathered	*Botryococcus*	Caryophyllaceae	Caryophyllaceae cf. *Stellaria* sp.	*Casuarina*	cf. *Dactylanthis*	Chenopodiaceae	*Coprosma*	*Coriaria* sp.	*Cyathea dealbata* type	*Cyathea smithii* type	*Dacrycarpus dacrydioides*	*Dacrydium cupressinum*	*Dodonea viscosa*	*Epilobum*	Ericaceae	*Fuscospora fusca*	*Fuscospora* spp.	*Gonocarpus* type	*Griselinia*	*Halocarpus*	*Haloragis* type	*Hoheria*	*Leptospermum* type	*Libocedrus*	*Lophozonia menzeisii*	*Lycopodium* spp.	*Phormium*	*Phyllocladus*	*Pinus*	*Plagianthus*	Poaceae	*Prumnopitys/Podocarpus*	*Pseudowintera*	*Trisyngyne brassii* type	Weathered angiosperm	*Weinmannia racemosa*	Undifferentiated angiosperm miospore	Undifferentiated monolete spores	Undifferentiated trilete spores
317-U1325B-																																																
10H-6, 0.65	91.11	L25044	2	149.5	530	2.99		14							2	1			38		1			3	9			1	8.5				4	1			25	2		13	1		1	3		4	15	3
11H-1, 0.68	94.38	L25046	2	24	315	5.26		4		1					3										5					1										4	4			1		2		
11H-3, 0.65	97.35	L25048	1	165	578	5.63		17	2						3	3		5	13	3	2			2	41				5					1	5		14	1		16	11		5	7		3	7	
11H-5, 0.65	100.33	L25050	2	103	1415	4.07		18		3					4	2		2	14					3	4				1	4				1	3		4	1.5		17	5		4	6		4	2	5
11H-6, 0.64	101.82	L25051	2	109.5	1399	6.4		8			2					11			16	2	1			2	15			1			1						4			11	19.5						7	8
11H-7, 0.65	102.83	L25052	2	94	875	3.24		17	1	1					1	1			11		1				10					1					2		5	1		17	9		4	3		4	3	3
12H-1, 0.65	103.85	L25053	2	106	1023	5.72		14			3					7		1	20		1			2	14		1			3					3		8			4	11		3			3	5	
12H-2, 0.65	105.35	L25054	2	183	1023	3.54		5	1.5	2					3			4	40	2	5			2	59				1.5	1				5	3		11			11	10		7				12	
12H-4, 0.65	108.31	L25056	2	403	1537	6.27		10	7		2					2		15	90	20	13		1	10	61			1	7	2		5	1	4	10		23			13	45		4			30	11	15
12H-6, 0.65	111.31	L25058	2	450	1427	5.48		7	3.5	8						6		19	139	18	9			6	51			3	10.5				1	6	12		17			20	64		1	1		15	40	
13H-1, 0.65	113.35	L25060	2	142.5	916	3.03		11							3	2			9	1		1			32		1		3				2	1	2		20			23	1.5		1	2		18	5	3
13H-2, 0.65	114.83	L25061	2	29	1694	2.45		6	3	1						4		1	6		2				1															1						1		4
13H-3, 0.65	116.33	L25062	0.5	9	270	3.61		3											3																											3		
13H-4, 0.65	117.83	L25063	2	318	1851	4.65		21	4	32			5		4	9		36	63	16	5			2	9			1	9					4	4		4	1		26	44		2			13	22	14
13H-5, 0.65	119.33	L25064	0.5	12.5	201	7.18		1	0.5		1							3	5																					1						1		
13H-6, 0.65	120.83	L25065	1.1	16	513	3.52			4									1	5					1	1												1			2								
14H-1, 0.65	122.85	L25066	2	106	1153	5.57		15	5	2			2		2			3	3	1				3	2								1				3	1		30	2		4	12		9	7	1
14H-2, 0.65	124.35	L25067	1	91	2844	3.6		8		1					2	1			16	2	3			1	6			1	2	1					1		12	4	3	18	1		1	2		1	3	5
14H-3, 0.65	125.85	L25068	2	168	1492	5.6		22		2					2	4		1	17	1	3			6	11			1				1	1		2		6	1.5		58			3			17	6	6
14H-4, 0.65	127.35	L25069	2	96.5	2945	3.84		10							3	10			9		2			2	8			2	2.5				1		2		6	1		22	1	1	1	3		4	5	2
14H-5, 65–67	128.85	L24628	2	37.5	152	5.73		5	0.5						4	1			2		1				4				2			1			1			1		9			1	1		2		3
15H-1, 65–67	132.35	L24629	2	21.5	324	5.52		5	0.5						1			1	2						2							1						1		4						3	1	1
15H-2, 65–67	133.85	L24630	1	15	77	5.93		4											1						5																1	1	2	1				
15H-3, 65–67	135.28	L24631	2	88.5		6.95		5	0.5					1	4	3			9		2				22									1	1		3			8	3			4		8	4	10
15H-4, 65–67	136.78	L24632	2	101.5	636	6.46		6	2							1		2	17		1.5				14					1				4	1		8			16	7		4			9	4	4
15H-5, 65–67	138.15	L24633	3	106.5	790	5.81		7.5							2	1			10						32	3			1	1	1			1			11	2		16			4			8	2	3
15H-6, 65–67	139.65	L24634	2	92.5	366	6.55		9	0.5		1					3			3	1	1				15				2	1		1	1		3		6			8	4					13	5	12
16H-1, 65–67	141.85	L24635	2	169	1498	6.78		4	3						1	2		1	23	1	6.5				17				6.5	2				4	7		28	2		23	11		1			15	11	2
16H-2, 64–66	143.34	L24636	1	22	126	4.6		1										1							12												6						1	1				
16H-3, 64–66	144.81	L24637	2	142.5	413	6.17		4	2						3	4			7		1				48				4				1		4		20.5			17						5	18	3
16H-4, 64–66	146.31	L24638	2	140	992	5.23		8	3						2			2	18	1	5				3	2			3	2			1		4.5		4			5	15	1	0.5			14	12	33
16H-5, 65–67	147.82	L24639	2	42	214	6.43		6	1.5									4	6		1				1	2			4						1		1.5			3						10		1
16H-6, 65–67	149.32	L24640	2	111.5	856	6.4		15				1			3	5		3	16		1				5			1	1	3							14.5			20	1					12	8	1
17H-1, 64–66	151.34	L24641	2	179.5	686	5.91		17	0.5			1			2			3	31	2	2				1	3		3	7						10		16			23	3		1		1	16	11	26
17H-2, 65–67	152.85	L24642	2	217.5	468	8.37		13	6						3	12		4	13	1	4				2				16.5	1	2		1		8		96			7	3					6	11	8
17H-3, 65–67	154.35	L24643	2	60	173	5.84		1	0.5							6		1	5		2				4	1			2			1			2		24.5										6	4
17H-4, 59–61	155.08	L24644	2	61	319	5.78		8	1.5						2	5		1	9						2	0.5		1	1	2							5			8	1		3			7	2	2
18H-1, 65–67	156.85	L24645	2	200.5	1640	6.15		26	1						1	25		11	17	1	6				5			4	10.5	2		1	2	1	4	1	11			22	12		1				10	26
18H-2, 65–67	158.35	L24646	2	164.5	1741	4.6		22	4			1			3	9		2	21		2				10				4.5	3		2	1		6		28	2		28	7						4	7
18H-3, 64–66	159.84	L24647	2	18.5	42	9.19		1							2				3		1				5																1.5		2	1		2		
18H-5, 0.65	161.25	L25070	2	48	2718	7.8		8								4			5		2			2	3			2						1	2		1			15				1		1	1	
18H-6, 0.66	162.76	L25071	2	174.5	2718	5.8		30		5			8		5	1		5	10	1	2			4	2			2							8		8			44	9.5		2			20	5	8
19H-1, 0.66	166.36	L25072	1.2	29	1157	5.02		4			1					2			3					1	6										3					2	2					4	1	
19H-2, 0.65	167.85	L25073	2	143	2109	5.09		20	4	3			2		3	8		3	7	1	6	1		1	9				2						2		6			36	2		1			12	5	12
19H-3, 0.64	169.34	L25074	2	194	1389	8.58		18	2	2	5					12		8	42		8			5	13					6					3		4	1		17	27	1				9	8	6
19H-4, 0.64	170.84	L25075	2	140.5	2788	6.61		25							1	10		1	7		4			1	3				1						4		10	4		44	3.5					14	4	7
19H-5, 0.65	172.35	L25076	0.5	2	250	3.23																																		1								1
20H-1, 0.65	175.35	L25077	2	252	3017	3.94		10		17					10	12		3	51		18			13	3			7	14	1					9		13	2.5		32	13		8			17	9	9
20H-2, 0.65	176.85	L25078	2	137	2545	4.09		12	1		1					8			26	1	13			2	3										8		3			29	14					2	11	2
21H-1, 0.64	180.34	L25079	2	230	1864	4.86		15	6	5					1	6		5	40	2	25			7	1			2	6						16		9			40	4					20	17	8
21H-2, 0.65	181.85	L25080	1.5	185	994	6.81		15			4					51		4	33		6	1			5										2		9			22	16					6	10	