Geological Magazine:

Composition and correlation of volcanic ash beds of Wenlock age (Silurian) from the eastern Baltic and geochemical comparison with earlier Silurian volcanism

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Appendix 1: Drill core storage addresses:

Ventspils D3 and Vidale 263 cores (Talsi 263 – project Talsi):

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Ohesaare core:

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tel: 620 30 10
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e-post: inst@gi.ee
Web page: www.gi.ee

Ruhnu 500 core:

Geological Survey of Estonia
Kadaka 82
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- Tallinn, 12618
- Tel: 672 0094
- Fax: 672 0091
- E-mail: egk@egk.ee
- URL: www.egk.ee

Appendix 2. Data of Wenlock bentonite samples from the Ventspils-D3 and Vidale-263 drill cores

Depth, m	Thickness, cm	Major minerals	Minor minerals
Ventspils-D3			
709.50	2.7	kaol, i/s	pyr, gyp, bi
714.05	0.4	kaol, i/s	qu, pyr, gyp
714.10	0.3	kaol, i/s	qu, pyr, gyp, bi, san
715.40	2.0	kaol, i/s, K-fsp	pyr, jar, gyp, san
718.70	0.3		
720.60	2.0	kaol, i/s	pyr, gyp, bi, K-fsp?, ap?
728.05	2.5(0.5)	kaol, i/s, K-fsp	pyr, jar, gyp, qu
736.40	6.0	kaol, i/s, K-fsp	qu, pyr, gyp
737.10	1.5	kaol, i/s, K-fsp	qu, pyr, gyp, ana?
738.60	1.0	kaol, i/s, K-fsp	qu, pyr, gyp, jar, ana?
745.40	1.0	kaol, i/s, K-fsp	qu, pyr, gyp, bi, ana?
746.10	0.5	kaol, i/s, K-fsp	qu, pyr, gyp, bi?, halite?
748.60	2.0	kaol, i/s	qu, pyr, gyp
755.90	4.0	kaol, i/s, K-fsp	qu, pyr, gyp, ana?
764.30	1.0	kaol, i/s, K-fsp	gyp, san?, ana?
767.15	5.0	kaol, i/s, K-fsp	qu, pyr, jar, gyp, bi?, ap?, san?, ana?
789.20	3.5	kaol, i/s	bi, pyr, gyp, qu, ap?
792.70	0.2	kaol, i/s, K-fsp	pyr, gyp, qu
792.75	3.0	kaol, i/s, K-fsp	pyr, qu, gyp, jar
Vidale-263			
634.10	0.9	kaol, i/s, K-fsp	pyr, jar, gyp, Fe-sul, qu
644.60	>0.5	kaol, i/s, K-fsp	pyr, jar, gyp, qu, ana, san
646.80	2.5	kaol, i/s, K-fsp	pyr, jar, gyp, qu, ana, san
656.10	0.1	biotite layer	
670.70	1.5	kaol, i/s, K-fsp	pyr, jar, gyp, qu, bi, san?
677.60	0.5	kaol, i/s	K-fsp?, pyr, gyp, qu, bi?, ana?
677.75	>0.3	kaol, i/s	K-fsp?, pyr, qu, bi?, ana?
677.90	0.5	kaol, i/s	K-fsp?, pyr, qu, bi, san?
681.10	0.2	kaol, i/s	K-fsp?, pyr, gyp, jar, qu, ana, san
682.40	0.3	K-fsp, i/s	kaol?, pyr, gyp, jar,qu, Fe-sul, albite
685.00	1.5	kaol, i/s, K-fsp	pyr, gyp, jar, qu, ana, bi?, san?
686.60	1.0	kaol, i/s, K-fsp	pyr, gyp, jar, qu, ana, bi?, san?
687.80	1.0	kaol, i/s, K-fsp	pyr,qu, gyp, ana?, san, albite
689.40	2.5	kaol, i/s	K-fsp?, pyr, gyp, qu, bi
694.70	>0.6	kaol, i/s	K-fsp?, qu, pyr, bi
703.15	1.0	kaol, i/s	bi, qu, san
705.80	1.0	kaol, i/s, K-fsp	qu, pyr, gyp, ana
709.90	0.3	kaol, i/s, K-fsp	qu, pyr, ana, san?

kaol - kaolinite, i/s - illite-smectite, K-feldspar - authigenic potassium feldspar,
pyr - pyrite, gyp - gypsum, bi - biotite, qu - quartz, san - magmatic sanidine,
ap - apatite, jar - jarosite, ana - anatase, Fe-sul - Fe-sulphate

Appendix 3. Occurrence of bentonites in the frame of chitinozoan biozonation, properties of sanidine and abundance of biotite.

Chitinozoan biozones	Ohesaare				Ruhnu 500				Ventspils D3				Vidale 263			
	Sanidine				Sanidine				Sanidine				Sanidine			
	Depth, m	Peak width, 2 theta	Na+Ca-com-ponent, mol %	Biotite abun- dance	Depth, m	Peak width, 2 theta	Na+Ca-com-ponent, mol %	Biotite abun- dance	Depth, m	Peak width, 2 theta	Na+Ca-com-ponent, mol %	Biotite abun-dance	Depth, m	Peak width, 2 theta	Na+Ca-com-ponent, mol %	Biotite abun-dance
C.subcyatha									709.50	0.09	34.9	++				
	201.20	0.13	32.2	++					714.05	0.14	34.5	++				
									714.10	0.18	49.8	++				
	201.50	0.17	31.2	++												
	203.96	Weak		+++												
									715.40	0.23	50.1	+	634.10	0.25	51.5	+
													644.60	0.22	54.1	+
													646.80	0.31	51.3	++
									718.70	Weak		++				
	215.70	0.07	23.5	++	337.50	0.06	22.9	+++								
									720.60	0.09	29.7	++	656.10			
C.pachycephala	233.44	Very wide														
									728.05	Very wide		+	670.70	Very wide		++
E.spongiosa					374.00	0.06	29.6	++					677.60	0.16	29.3	++
													677.75	0.17	28.5	++
													677.90	0.08	40.9	++
									736.40	0.27	32.4	+				
									737.10	0.21	33.2	+				
C.cingulata													681.10	0.10	57.9	no
													682.40	0.27	44.8	+
					388.40	Weak		Muscovite								
									738.60	0.22	30.6	++	685.00	0.27	30.5	++
													686.60	0.30	30.4	+
	275.32	0.12	32.5	no									687.80	0.18	31.2	+
	283.78	Very wide		+++												
	287.85	Wide		no												
	288.44	0.11	30.4	++												
	291.09	Wide		+					745.40	Wide		+				
	294.23	Weak		Muscovite					746.10	Weak		Muscovite	689.40	Weak		Muscovite
									748.60	Weak		no				
	298.51	Weak		no	411.45	Very wide		no	755.90	Very wide		no				
C.tuba	300.25	0.12	39.5	no												
	301.36	0.06	34.6	++												
	301.95	0.08	34.5	+									694.90	0.10	34.3	++
	307.61	0.08	29.5	+++												
	311.80	Very wide		no												
	312.46				423.50	0.28	36.8	+								
													703.15	0.07	23.8	++
C.mamilla					430.50	Very wide		+	764.30	0.30	52.3	no	705.80	0.22	48.1	no
	323.20	Very wide		+	435.84	Very wide		+	767.15	0.34	46.8	+	709.90	0.26	47.7	+
	323.21	0.19	45.5	+	435.84	0.2	45.9	++								
	323.85	Very wide		+	437.40	Wide		+								
M.margaritana	340.79	Weak		+++					789.20	Weak		+++				
	342.08	0.24	35.5	no												
									792.70	0.13	37.4	+				
	345.83	0.25	40.0	+					792.75	0.27	39.8	+				

Appendix 4. Results of X-ray fluorescence analyses of volcanic ashes (B) and terrigenous host rocks (T) from the Ventspils and Vidale drill cores

Core		Ventspils	Ventspils	Ventspils	Ventspils	Ventspils	Ventspils	Ventspils	Ventspils	Ventspils	Vidale	Vidale	Vidale	Vidale	Vidale
Depth	m	709.50	715.40	720.60	728.05	737.10	748.60	755.90	789.20	792.75	634.10	646.80	670.70	677.90	682.40
Rock type		B	B	B	B	B	B	B	B	B	B	B	B	B	B
SiO2	%	44.6	40.7	46.3	38.4	45.6	46.9	47.3	44.8	43.3	41.4	50.0	39.6	44.4	45.4
TiO2	%	0.67	1.03	0.57	1.30	0.94	0.41	0.84	0.54	0.62	1.19	0.82	1.36	0.96	1.11
Al2O3	%	34.2	27.9	33.4	21.2	27.4	29.3	31.0	34.3	31.9	18.8	24.3	24.4	33.0	14.9
Fe2O3T	%	4.10	7.64	3.24	13.15	6.20	5.90	3.80	4.40	7.10	12.10	7.15	11.17	5.18	13.35
MnO	%	0.015	0.047	0.026	0.064	0.039	0.018	0.015	0.023	0.008	0.074	0.032	0.050	0.033	0.054
MgO	%	1.45	1.19	1.56	1.23	1.41	2.32	1.40	1.35	0.97	1.19	2.29	1.09	1.14	1.60
CaO	%	0.54	0.58	0.50	2.56	1.43	0.73	0.74	0.60	0.22	1.10	0.92	1.54	0.48	2.44
Na2O	%	0.92	0.69	1.09	0.53	1.27	1.16	1.18	1.01	0.86	0.75	0.97	0.58	0.62	0.71
K2O	%	1.38	2.77	1.85	3.37	3.86	2.65	2.96	1.28	1.91	4.56	4.77	3.06	1.84	6.34
P2O5	%	0.06	0.17	0.08	0.20	0.08	0.03	0.09	0.16	0.10	0.25	0.21	0.32	0.12	0.27
S	%	2.05	4.99	1.49	8.93	3.16	3.52	1.94	2.19	3.91	7.94	3.79	4.83	2.83	7.91
LOI	%	12.85	14.59	11.19	17.13	9.96	12.18	10.24	13.09	14.11	16.88	10.38	15.50	13.36	12.18
As	ppm	13	16	30	46	26	15	13	17	23	28	14	26	41	70
Ba	ppm	244	168	275	148	181	41	174	144	128	207	191	514	160	521
Cr	ppm	6	6	5	18	13	13	13	10	11	17	13	13	6	26
Cu	ppm	<100	<100	<100	120	<100	<100	<100	<100	<100	225	<100	<100	<100	152
Ga	ppm	7	12	5	11	19	12	12	9	14	8	12	11	19	9
Mo	ppm	<3	23	13	35	<3	<3	8	6	11	31	10	76	24	76
Nb	ppm	33	19	32	30	34	14	28	21	24	19	18	23	56	22
Ni	ppm	15	41	10	21	8	9	18	15	37	46	18	6	9	38
Pb	ppm	71	57	71	76	62	33	62	54	90	64	40	78	107	127
Rb	ppm	36	34	54	44	76	98	46	41	25	45	73	31	34	64
Sr	ppm	105	145	113	182	389	115	237	68	127	131	175	377	53	253
Th	ppm	35	13	56	25	40	47	25	37	29	19	17	17	67	18
U	ppm	12	12	7	21	15	7	11	5	8	14	8	20	20	14
V	ppm	14	86	35	51	102	1	145	50	85	151	145	182	83	151
Y	ppm	90	26	42	13	91	30	48	19	54	30	43	10	33	15
Zn	ppm	102	57	21	40	48	18	141	40	38	78	30	30	46	365
Zr	ppm	746	303	452	256	776	317	472	309	472	278	376	236	487	184

Appendix 4 continued. Results of X-ray fluorescence analyses of volcanic ashes (B) and terrigenous host rocks (T) from the Ventspils and Vidale drill cores

Core		Vidale	Vidale	Vidale	Vidale	Ventspils	Ventspils	Vidale	Vidale	Vidale	Vidale	Vidale	Vidale	Vidale
Depth	m	686.60	689.40	703.15	705.80	740.00	748.90	649.00	651.80	677.75	678.10	687.80	706.00	709.90
Rock type		B	B	B	B	T	T	T	T	T	T	T	T	T
SiO2	%	47.7	49.0	54.4	48.3	48.5	50.5	39.6	41.7	54.0	44.4	51.5	43.4	43.3
TiO2	%	0.82	0.51	0.47	0.89	0.67	0.65	0.52	0.54	0.73	0.61	0.64	0.57	0.56
Al2O3	%	27.0	31.5	29.0	29.9	14.1	15.0	12.4	12.7	14.9	12.5	14.5	12.2	12.5
Fe2O3T	%	6.16	3.27	2.28	3.92	4.46	4.48	5.00	4.49	4.91	4.29	4.31	4.07	4.12
MnO	%	0.060	0.035	0.011	0.018	0.047	0.045	0.072	0.068	0.043	0.048	0.039	0.041	0.042
MgO	%	1.64	1.78	1.69	1.34	4.14	4.01	7.42	7.11	3.95	3.70	4.09	3.99	3.73
CaO	%	1.10	0.34	0.46	0.52	9.66	8.01	11.89	11.01	7.24	14.96	8.86	12.71	15.50
Na2O	%	0.60	0.67	1.16	1.11	1.23	1.72	0.64	0.61	0.85	0.68	0.75	1.18	0.88
K2O	%	3.24	2.57	5.23	3.16	3.64	3.96	4.04	4.18	4.25	3.57	3.94	3.31	3.35
P2O5	%	0.09	0.15	0.12	0.12	0.10	0.10	0.13	0.11	0.09	0.06	0.14	0.13	0.11
S	%	3.40	2.19	0.16	1.95	0.65	0.61	0.04	0.08	0.68	0.46	0.55	0.81	0.82
LOI	%	11.62	11.66	6.89	12.39	13.30	11.27	19.34	18.60	10.17	15.03	12.97	16.44	17.27
As	ppm	21	20	8	15	6	9	16	8	9	7	6	10	10
Ba	ppm	186	61	203	231	378	322	310	313	321	354	284	301	251
Cr	ppm	16	15	14	6	70	72	74	73	82	65	74	64	76
Cu	ppm	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Ga	ppm	9	10	18	14	16	21	18	16	19	20	18	16	11
Mo	ppm	19	14	<3	11	<3	<3	<3	<3	5	<3	3	5	3
Nb	ppm	24	27	14	25	14	18	10	9	16	13	15	12	12
Ni	ppm	11	14	6	17	37	40	32	31	38	30	36	35	33
Pb	ppm	51	92	19	62	11	9	19	13	12	9	8	22	25
Rb	ppm	59	63	230	50	116	124	109	113	126	105	111	99	97
Sr	ppm	188	63	52	204	185	188	82	84	146	221	156	324	323
Th	ppm	22	36	19	30	11	10	7	12	11	6	7	5	6
U	ppm	9	10	8	14	6	<4	4	4	<4	4	<4	6	<4
V	ppm	143	36	44	148	176	116	170	103	145	116	178	92	101
Y	ppm	49	34	13	35	26	25	12	15	25	26	29	21	20
Zn	ppm	45	35	95	147	72	79	61	64	96	82	91	78	51
Zr	ppm	444	365	164	423	169	155	91	95	162	129	183	135	127