

## Development of geochemical sensors for continuous, on-line monitoring and modelling of coastal groundwater aquifers

Thorn, Paul

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# Electronic Supplementary Material

for

## Groundwater Salinity in Greve, Denmark: Determining the Source from Bulk Water Samples

*Hydrogeology Journal*

**Author:**

**Paul Thorn**

Department of Environmental, Social and Spatial Change

Roskilde University

Hus 02, Universitetsvej 1

4000 Roskilde, Denmark

Tel: +45 4674 3068; Fax: +45 4674 3031

e-mail: [pthorn@ruc.dk](mailto:pthorn@ruc.dk)

Authors note:

The following 40 tables show the raw data collected for the 40 groundwater abstraction wells examined in this study. ESM Tables 1-40 represent the well number referenced in the article. Blank cells indicate no data was available for the specific parameter during that specific year. The following information is given for each well:

**DGU nr:** represents the Danish Geological Survey reference number for the well.

**Year:** the year in which the sample was taken.

**WL:** water level measured in the well, referenced to mean sea level.

**Abstraction:** is the average abstraction rate for the entire year, given in m<sup>3</sup>/hour.

**Cl:** chloride, given in mg/l.

**Na:** sodium, given in mg/l.

**Mg:** magnesium, given in mg/l.

**Ca:** calcium, given in mg/l.

**K:** potassium, given in mg/l.

**SO<sub>4</sub>:** sulphate, given in mg/l.

**HCO<sub>3</sub>:** bicarbonate, given in mg/l.

**Na/Cl:** the sodium to chloride molecular ratio.

**Average:** gives the average of all of the chloride for the well.

Additional notes are provided for the wells when appropriate.

ESM Table 1:

Well 1 - DGU Id. Nr. - 207.2734										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1985	-2	2.3	87	46	39	103	4.4	16	426	0.82
1986	-7.8	17	93							
1987	-10.7	14.7	98							
1988	-12.1	13.5	84							
1989	-11.8	11	100							
1990	-13.2	9.7	110							
1991	-11.8	7.7	109							
1992	-9.1	9.8	101							
1993	-9.8	7.5	96	81	45	55	4.4	21	431	1.30
1994	-11.7	7.4	108							
1995	-6.9	3.7	92							
1996	-7.8	3.8	118	70	50	59	4.5	23	441	0.92
1997	-7.6	6.6	116							
1998	-7.2	3.3	102							
1999	-5.8	3.5	81	63	48	61	4	21	439	1.20
2000	-5.9	3.1	111							
2001	-5.1	4.1	112							
2002	-4.9	4.3	103	78	46	59	5.1	25	433	1.17
2003	-3.4	3.6	106							
2004	-3.1	2.4	100			56				
2005	-3.1	3.8	114	78	47	60	4.9	22	426	1.06
2006	-3.9	2.9	116							
2007	-4.1	5.1	104					22		
2008	-3.4	4.2	104	78	40	68	4.6	22	431	1.16
<b>Average</b>			<b>103</b>							

ESM Table 2:

Well 2 - DGU Id. Nr. - 207.2733										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1985	-1.7	1.6	136	110	43	85	5		437	1.25
1986	-8.5	17.3	100							
1987	-10.7	9.1	214							
1988	-11.8	12.8	196							
1989	-12.8	10	230							
1990	-14.3	8.6	240							
1991	-12.8	7.5	240							
1992	-11	10.3	215							
1993	-11.9	8	240	180	46	56	5		433	1.16
1994	-12.7	8.5	250							
1995	-7.5	4.9	242							
1996	-8.8	5.1	246	160	51	59	5		444	1.00
1997	-9.2	7.9	244							
1998	-10.3	3	248							
1999	-6.5	4.5	230	160	49	61	5		438	1.07
2000	-6.8	4.4	246							
2001	-6.7	4.3	189							
2002	-5.7	4.9	252		51	56	5		330	
2003	-3.8	3.2	242							
2004	-3.6	2.7	238							
2005	-3.7	5.2	254	201	49	60	7		429	1.22
2006	-4.4	4.1	244							
2007	-5.2	7.8	246							
2008	-4.1	5.5	240	201	43	70	6		431	1.29
<b>Average</b>			<b>226</b>							

ESM Table 3:

Well 3 - DGU Id. Nr. - 207.2732										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1985	-1.8	2	170	135	38	81	5	28	417	1.23
1986	-10.7	16.2	224							
1987	-13.2	16.5	202							
1988	-13.4	11.5	202							
1989	-14.8	12	240							
1990	-15.5	15.4	230							
1991	-11.8	12.4	237							
1992	-13.1	13.6	234							
1993	-12.8	6.2	230	150	44	57	5	24	408	1.01
1994	-8.1	8.9	240							
1995	-7.4	5.8	214							
1996	-8.9	6	230	150	46	64	5	25	419	1.01
1997	-5.5	9.7	242					22		
1998	-5.1	3.5	246							
1999	-7.6	5.7	238	150	44	64	5	24	413	0.97
2000	-6.1	5.9	232					24		
2001	-5.4	4.6	223					24		
2002	-5.6	5.2	206	143	43	61	6	26	399	1.07
2003	-3.5	4.1	208							
2004	-2.2	4	226			59		24		
2005	-2.1	2.1	222	137	45	65	6	27	399	0.95
2006	-4.1	5.3	228							
2007	-4.6	3.8	201					25		
2008	-5	4.9	202	158	43	68	6	25	431	1.21
<b>Average</b>			<b>222</b>							

ESM Table 4:

Well 4 - DGU Id. Nr. - 207.881										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1973		10.2	400	No Data	No Data	No Data	No Data	No Data	No Data	No Data
1974		13.1	410							
1975		13.4	475							
1976		11	520							
1977		11.6	535							
1978		3.8	470							
1979		4.9	475							
1980	-7.8	8	456							
1981	-8.2	9	519							
1982	-6	6.9	477							
1983	-4	8.2	424							
1984	-5.8	17.6	338							
1985	-5.3	16.2	368							
1986	-7	17.1	372							
1987	-7.8	16.5	396							
1988	-7.5	16	420							
1989	-8.1	16.2	360							
1990	-7.3	13.7	372							
1991	-8.1	2.6								
<b>Average</b>			<b>433</b>							

ESM Table 5:

Well 5 - DGU Id. Nr. - 207.880										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1973		10.2		No Data	No Data	No Data	No Data	No Data	No Data	No Data
1974		13.1								
1975		13.4	500							
1976		11	495							
1977	-2.8	11.6	519							
1978		3.8	450							
1979		4.9	410							
1980		8	480							
1981		9	426							
1982		6.9	467							
1983		8.2	436							
1984		8	183							
1985		8.1	172							
1986		0	180							
<b>Average</b>			<b>393</b>							

ESM Table 6:

Well 6 - DGU Id. Nr. - 207.2586										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1973				No Data	No Data	No Data	No Data	No Data	No Data	No Data
1974										
1975		13.4	225							
1976		11	235							
1977	-2.8	11.6	270							
1978		3.8	245							
1979		4.9	240							
1980		8	292							
1981		9	233							
1982		6.9	250							
1983		8.2	248							
1984		8	254							
1985		8.1	293							
1986		0	226							
<b>Average</b>			<b>251</b>							



ESM Table 7:

Well 7 - DGU Id. Nr. - 207.2386										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1971	-3.2	7.3	158							
1972		7.3								
1973		7.3	159	105	45	63	5	13	414	1.02
1974		7.3								
1975		7.3								
1976	-0.9	7.3	181							
1977		7.3								
1978		7.3								
1979		7.3	220							
1980		7.3	205							
1981	-13	7.3	227							
1982	-8.2	7.3	172							
1983	-11.4	13.7	206							
1984	-11.3	10	224							
1985	-11.2	12.6	218							
1986	-12.4	9.1	203							
1987	-14.1	12.9	173							
1988	-9.4	8	199							
1989	-12.6	8.1	280							
1990	-14.5	10.3	220							
1991	-14.7	8.4	224							
1992	-11.8	0	230	140	43	65	5	22	405	0.94
<b>Average</b>			<b>206</b>							
Note: only an average abstraction rate for the time period between 1971 and 1982 was available.										

ESM Table 8:

Well 8 - DGU Id. Nr. - 207.2385										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1971	-2.94	7.3	292							
1972		7.3								
1973		7.3	239	186	49	56	5	42	445	1.20
1974		7.3								
1975		7.3								
1976		7.3	216							
1977		7.3								
1978		7.3								
1979		7.3								
1980		7.3								
1981		7.3	250							
1982		7.3	246							
1983		3.7	248							
1984		3.7	232							
1985		3.7	248							
1986		3.7	228							
1987		3.7	236							
<b>Average</b>			<b>244</b>							

Note: only an average abstraction rate was available for between 1971-1982, and 1983-1987.

ESM Table 9:

Well 9 - DGU Id. Nr. - 207.852										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1965		5.7								
1966		5.7								
1967		5.7								
1968		5.7								
1969		5.7								
1970		5.7								
1971		5.7								
1972		5.7								
1973		5.7								
1974		5.7								
1975		5.7								
1976		7.3								
1977		7.3								
1978		7.3								
1979		7.3								
1980		7.3								
1981		7.3	398							
1982		7.3	333							
1983	-16.6	13.3	311							
1984	-15.4	7	352							
1985	-17.2	12	349							
1986	-18.2	13.8	338							
1987	-14.8	7.5	350							
1988	-13.6	6.6	327							
1989	-18.5	11.6	490							
1990	-19.5	12.5	410							
1991	-13.4	11.2	356							
1992	-16.3	5.9	430	250	52	69	5	50	434	0.90
1993	-16.5	6.3	360							
1994	-15.5	6.6	328							
1995	-9.8	5.9	410	260	60	68	6	53	424	0.98
1996	-9.8	5.5	376							
1997	-7.4	4.7	317					54		
1998	-6.2	3.9	320	210	61	64	6	51	449	1.01
1999	-9	7.6	316					47		
2000	-8.8	4.9	267					58		
2001	-9.7	4.1	112	74	45	77	4	65	428	1.02
2002	-6.1	5	256					54		
2003	-5.8	3.9	216					29		
2004	-2.6	2.8	234	200	51	64	7	46	430	1.32
2005	-2.7	5.1	262					59		
2006	-5.9	4.3	253							
2007	-4.8	3.9	240	164	50	64	7	44	431	1.05
2008	-5.2	3.8	268					23		
<b>Average</b>			<b>321</b>							

Note: Sample from 2001 with the entire ion suite is suspect, and not considered correct. The is chloride less than half the value reported by the water works both three months before and three months after the sampling, as well as the long term trend both before and after the 2001 sample occurred. Only an average abstraction rate was available between 1965-1982.

ESM Table 10:

Well 10 - DGU Id. Nr. - 207.										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1971	-6.6	5.7	305							
1972		5.7								
1973		5.7	316	261	52	51	5	79	464	1.27
1974		5.7								
1975		5.7								
1976		5.7	337							
1977		5.7								
1978		5.7	332							
1979		5.7								
1980		5.7								
1981		5.7	313							
1982		7.3	308							
1983		7.3								
1984		7.3	198							
1985		7.3	364							
1986		7.3	324							
1987		7.3								
1988		4.1								
1989		4.1								
<b>Average</b>			<b>311</b>							
Note: only an average abstraction rate for the time period between 1971 and 1989 was available.										

ESM Table 11:

Well 11 - DGU Id. Nr. - 207.2582										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1973		5.7	239	161	58	69	5	33	456	1.04
1974		5.7	260	170	58	71	5	39	454	1.01
1975		7.3								
1976		7.3	277							
1977	-14.5	7.3								
1978		7.3	276							
1979		7.3								
1980		7.3								
1981	-24.2	7.3	261							
1982	-23.3	7.9	348							
1983	-24.5	7.4	93							
1984	-18.2	4.0	186							
1985	-24.5	6.4	134							
1986	-24.5	6.1	97							
1987	-23.7	6.6	103							
1988	-24.4	6.2	94							
1989	-26.5	5.8	110							
1990	-27.1	5.6	100							
1991	-23.8	4.9	108							
1992	-24.0	7.5	88	66	44	68	4	37	423	1.16
1993	-24.1	4.4	120							
1994	-17.7	3.7	124							
1995	-16.1	3.7	120	84	52	68	4	50	416	1.08
1996	-11.7	3.7	123							
1997	-11.2	3.0	96					54		
1998	-9.0	3.1	110	80	53	69	4	53	428	1.12
1999	-10.3	4.5	102					65		
2000	-9.6	3.9	106					66		
2001	-10.0	4.3	98	78	51	71	5	69	430	1.23
2002	-10.7	4.7	88					63		
2003	-10.1	3.5	100					74		
2004	-6.8	3.7	90	89	51	69	5	74	428	1.53
2005	-7.1	4.0	106			71		56		
2006	-7.9	4.6	108					80		
2007	-8.3	4.7	93	67	54	72	5	80	435	1.11
2008	-7.6	5.4	116							
<b>Average</b>			<b>140</b>							

Note: only an average abstraction rate for the time period between 1973 and 1982 was available.

ESM Table 12:

Well 12 - DGU Id. Nr. - 207.2583										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1973		5.7	220	166	58	49	5	44	442	1.16
1974		5.7	206	156	55	58	5	44	444	1.17
1975		7.3								
1976		7.3								
1977		7.3								
1978		7.3								
1979		7.3								
1980		7.3								
1981	-23.7	7.3	252							
1982	-24.1	7.9	265							
1983	-23.8	8.0	212							
1984	-22.5	6.1	223							
1985	-21.8	4.1	220							
1986	-24.7	8.3	196							
1987	-22.5	6.5	177							
1988	-23.3	7.2	197							
1989	-24.9	7.0	370							
1990	-25.2	7.0	230							
1991	-22.0	6.2	211							
1992	-22.3	6.9	200	130	50	68	5	67	420	1.00
1993	-24.5	6.0	230							
1994	-17.6	2.7	273							
1995	-12.9	10.4	210	150	53	65	5	61	397	1.10
1996	-11.4	2.4	284							
1997	-9.9	1.7	223					47		
1998	-8.8	2.5	296	210	52	61	6	50	427	1.10
1999	-10.1	3.4	231					65		
2000	-9.2	2.8	235					66		
2001	-9.6	3.1	214	178	49	62	5	61	426	1.28
2002	-10.2	2.9	237					81		
2003	-7.5	1.8	224					88		
2004	-5.4	4.2	226	161	48	62	7	53	422	1.10
2005	-8.1	2.7	262					100		
2006	-7.7	2.5	240							
2007	-8.5	3.4	218	141	53	70	7	82	429	1.00
2008	-7.3	3.7	196					96		
<b>Average</b>			<b>233</b>							

Note: only an average abstraction rate for the time period between 1973 and 1982 was available.

ESM Table 13:

Well 13 - DGU Id. Nr. - 207.2387										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1971	-8.2	5.7	266	226	46	61	5	73	469	1.31
1972		5.7								
1973		5.7								
1974		5.7	280							
1975		7.3								
1976	-11.9	7.3								
1977		7.3								
1978		7.3								
1979		7.3								
1980		7.3								
1981		7.3	128							
1982	-18.5	7.3	238							
1983	-17.5	7.4	244							
1984	-16.7	7.0	296							
1985	-16.8	2.2	588							
1986	-14.5	0.7	360							
1987	-10.6	0.5	614							
1988	-16.4	3.1	278							
1989	-18.7	7.0	350							
1990	-19	6.9	268							
1991	-17.5	5.8	304							
1992	-16	4.3	350	260	46	54	6	76	445	1.15
1993	-16.3	4.0	300							
1994	-14.2	4.2	212							
1995	-10.5	3.8	190	145	50	56	4	27	421	1.18
1996	-9.3	3.3	344							
1997	-8.7	3.1	420					36		
1998	-5.5	3.0	298							
1999	-7.1	1.8	328							
2000	-8.1	5.8	296					64		
2001	-7.5	4.3	276	254	51	52	6	60	447	1.42
2002	-6	4.3	304					34		
2003	-6.2	4.8	286					38		
2004	-5.3	5.8	286	222	49	50	8	71	444	1.20
2005	-6.2	5.1	314					69		
2006	-6.7	6.0	307							
2007	-7.1	3.5	330			53				
2008	-5.6	4.2	300					125		
<b>Average</b>			<b>312</b>							

Note: only an average abstraction rate for the time period between 1971 and 1982 was available.

ESM Table 14:

Well 14 - DGU Id. Nr. - 207.2389										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1971		5.7	313	230	52	61	5	58	451	1.13
1972		5.7								
1973		5.7								
1974		5.7								
1975		7.3								
1976		7.3	323							
1977		7.3								
1978		7.3								
1979		7.3								
1980		7.3								
1981		7.3	423							
1982		7.3	334							
1983		4.1	340							
1984		11.0	340							
1985		5.6	416							
1986		2.2	368							
1987		0.0	454							
1988		13.2	360							
1989		9.0	360							
1990		8.8	340							
1991		4.2	360							
1992	-17.5		390	250	57	70	6	77	452	0.99
1993	-15.6									
1994	-17.1									
<b>Average</b>			<b>366</b>							

Note: only an average abstraction rate for the time period between 1971 and 1982 was available.



ESM Table 15:

Well 15 - DGU Id. Nr. - 207.234										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1965	No Data	5.7	325							
1966		5.7	380							
1967		5.7	390							
1968		5.7	300							
1969		5.7	350							
1970		5.7	340							
1971		5.7	355							
1972		5.7	360							
1973		6.3	424	297	59	62	5	49	465	1.08
1974		2.1	424							
1975		6.3	375							
1976		7.3	320							
1977		5.8	325							
1978		1.3								
<b>Average</b>			<b>359</b>							
Note: Abstraction rates are only reported as an average for the entire period from 1965-1972.										

ESM Table 16:

Well 16 - DGU Id. Nr. - 207.2390										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1971		5.7								
1972		5.7								
1973		5.7	89	66	38	73	3	20	409	1.14
1974		5.7								
1975		7.3								
1976	-7.5	7.3	78							
1977		7.3								
1978		7.3								
1979		7.3								
1980		7.3								
1981		7.3	148							
1982		7.3	136							
1983	-5.4	17.9	116							
1984	-4.0	11.3	152							
1985	-5.4	12.0	117							
1986	-4.0	11.7	176							
1987	-9.8	12.5	193							
1988	-8.0	15.0	200							
1989	-8.7	12.1	221							
1990	-10.0	9.6	228							
1991	-7.1	5.6	146	43	40	84	4	51	428	0.45
1992	-6.0	6.7	139							
1993	-5.6	10.3	123							
1994	-5.0	10.3	95							
1995	-2.9	9.4	121	35	41	153	3	200	402	0.45
1996	-2.1	1.5	62							
1997	-2.2	2.0	65					180		
1998	-0.1	1.2	58	33	34	132	3	120	390	0.88
1999	-0.8	1.0	62							
2000	0.8	1.5	58					125		
2001	0.2	1.6	56					114		
2002	1.2	1.6	47	30	30	101	3	91	395	0.99
2003	1.1	1.0	52					92		
2004	1.5	1.7	52					84		
2005	1.9	2.4	52	32	32	105	3	68	378	0.95
2006	1.8	1.6	58							
2007	2.4	1.6	53					68		
2008	2.3	1.5	60					46		
<b>Average</b>			<b>107</b>							

Note: only an average abstraction rate for the time period between 1971 and 1982 was available.

ESM Table 17:

Well 17 - DGU Id. Nr. - 207.2388										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1973	0.0	5.7	118	76	50	69	4	22	431	0.99
1974		5.7								
1975		7.3								
1976		7.3	131							
1977		7.3								
1978		7.3								
1979		7.3								
1980		7.3								
1981	-4.5	7.3	85							
1982	-7.5	7.3	120							
1983	-7.5	10.1	103							
1984	-5.8	10.4	123							
1985	-8.1	7.9	120							
1986	-6.0	8.1	117							
1987	-10.5	16.8	129							
1988	-10.7	14.0	135							
1989	-11.8	14.0	148							
1990	-10.8	13.9	145							
1991	-8.8	12.5	148							
1992	-7.7	12.6	137	75	46	73	4		428	0.85
1993	-9.3	16.5	142							
1994	-8.3	13.2	132							
1995	-4.9	10.5	96	67	47	85	4		414	1.08
1996	-4.0	10.3	87							
1997	-3.7	14.6	98							
1998	-2.1	9.8	108	37	39	121	3		410	0.53
1999	-3.5	13.9	85							
2000	-2.9	15.5	124							
2001	-3.1	11.4	321	207	49	63	5		430	1.00
2002	-3.0	15.5	114							
2003	-2.4	16.8	118							
2004	-1.1	7.5	94	57	43	87	4		416	0.94
2005	0.2	9.4	120			78				
2006	-0.4	8.1	122							
2007	-0.6	12.3	121							
2008	-0.3	10.7	116							
<b>Average</b>			<b>125</b>							
Note: Bad sample is expected for 2001. A following sample taken by the water works 3-months after the 2001 sample showed a chloride value of 110mg/l, which is on line with the other values prior to and after 2001.										

ESM Table 18:

Well 18 - DGU Id. Nr. - 207.2719										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1985	-12.3	7.7	71							
1986	-14.6	14.7	83							
1987	-16.7	13.5	72							
1988	-18.0	14.9	73							
1989	-19.5	7.4	76							
1990	-16.8	6.0	75							
1991	-15.6	1.6	76							
1992	-15.1	5.7	78	42	39	75	3	18	403	0.84
1993	-14.2	2.3	88							
1994	-12.0	4.8	83							
1995	-10.5	4.5	77	44	44	73	4	17	398	0.88
1996	-9.0	4.8	77							
1997	-6.0	6.4	81					14		
1998	-7.4	2.1	88	41	44	75	4	16	417	0.72
1999	-8.7	5.6	73					16		
2000	-8.2	4.4	87					15		
2001	-8.4	4.2	79	47	40	67	4	16	407	0.92
2002	-7.3	4.2	78					16		
2003	-6.8	3.5	78					16		
2004	-4.7	3.3	71	44	39	69	4	15	405	0.96
2005	-2.3	3.5	78					18		
2006	-4.9	3.6	79							
2007	-1.1	2.1	79	44	41	66	4	18	415	0.86
2008	-5.8	3.6	86					15		
<b>Average</b>			<b>79</b>							

ESM Table 19:

Well 19 - DGU Id. Nr. - 207.2720										
<b>Year</b>	<b>WL</b>	<b>Abstraction</b>	<b>Cl</b>	<b>Na</b>	<b>Mg</b>	<b>Ca</b>	<b>K</b>	<b>SO4</b>	<b>HCO3</b>	<b>Na/Cl Ratio</b>
1985	-11.5	7.9	103							
1986	-12.2	18.7	196							
1987	-12.8	14.4	101							
1988	-11.5	9.1	115							
1989	-16.3	14.3	110							
1990	-18.6	14.7	100							
1991	-14.8	12.2	103							
1992	-13.8	8.9	103	59	41	69	4	17	419	0.89
1993	-13.4	9.9	101							
1994	-10.6	9.1	99							
1995	-8.4	5.3	106	65	48	70	4	16	416	0.95
1996	-8.0	5.8	98							
1997	-5.5	7.6	104					14		
1998	-6.9	2.9	105	57	47	70	4	17	433	0.84
1999	-8.0	7.6	89							
2000	-7.2	6.1	107					17		
2001	-7.7	6.3	104					17		
2002	-6.7	6.6	93	50	43	69	4	17	419	0.83
2003	-5.1	5.3	90					20		
2004	-2.8	4.5	94							
2005	-1.9	4.4	86	60	43	70	5	19	412	1.08
2006	-4.7	6.6	98							
2007	-6.1	4.5	93					17		
2008	-6.0	7.0	102	70	41	69	5	17	419	1.06
<b>Average</b>			<b>104</b>							

ESM Table 20:

Well 20 - DGU Id. Nr. - 207.2502										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1971	4.0	5.7	192	133	45	78	6	37	443	1.07
1972		5.7								
1973		5.7								
1974		5.7								
1975		5.7								
1976	4.25	7.3	273							
1977		7.3								
1978		7.3								
1979		7.3								
1980		7.3								
1981		7.3	299							
1982		7.3	258							
1983		4.1	283							
1984		4.1	296							
1985		4.1	296							
1986		4.1	233							
1987		4.1	187							
1989		3.8	180							
1990		3.8	290							
1991		3.8	290	180	57	59	7	42	480	0.96
<b>Average</b>			<b>256</b>							
Note: Only average abstraction rates were available for this well.										

ESM Table 21:

Well 21 - DGU Id. Nr. - 207.2501										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1971		5.7	31	28	34	85	5	19	424	1.37
1972	1.9	5.7								
1973		5.7								
1974		5.7								
1975		5.7								
1976		7.3	98							
1977		7.3								
1978		7.3	105							
1979		7.3								
1980		7.3								
1981		7.3	95							
1982		7.3	92							
1983		4.1	118							
1984		4.1	118							
1985		4.1	103							
1986		4.1	122							
1987		4.1	121							
1988		3.8	111							
1989		3.8	130							
1990		3.8	120							
1991		3.8	120	77	51	64	5	23	467	0.98
1992	-7.6	3.8	122							
1993	-6.9	3.8	120							
1994	-6.3	3.8	120							
<b>Average</b>			<b>109</b>							

Note: Only average abstraction rates were available for this well.

ESM Table 22:

Well 22 - DGU Id. Nr. - 207.2499										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1973		7.3	45	35	36	80	4	19	416	1.18
1974		7.3								
1975		7.3								
1976		7.3								
1977		7.3								
1978		7.3								
1979		7.3								
1980		7.3								
1981		7.3								
1982		7.3								
1983	-7.1	19.5	59							
1984	-5.0	19.4	51							
1985	-10.9	15.9	47							
1986	-5.6	18.5	51							
1987	-9.3	17.2	56							
1988	-8.9	14.3	48							
1989	-8.2	18.1	56							
1990	-8.1	20.5	42							
1991	-6.6	16.3	53	28	36	87	4	42	422	0.80
1992	-4.3	13.8	50							
1993	-5.0	15.4	52							
1994	-5.7	16.4	57							
1995	-2.8	20.4	53	28	40	101	4	61	410	0.81
1996	-3.1	18.4	44							
1997	-3.7	23.6	60					51		
1998	1.2	2.0	66	26	39	128	4	97	430	0.60
1999	-1.8	14.0	58					66		
2000	-0.1	15.4	57					61		
2001	-1.2	17.0	60	26	34	98	4	58	407	0.66
2002	0.0	15.3	60							
2003	-0.4	16.4	56					59		
2004	1.0	12.6	58	28	35	98	4	48	410	0.73
2005	0.3	10.7	58							
2006	0.8	9.6	60					58		
2007	1.1	16.0	52	27	34	94	3	47	406	0.79
2008	1.3	13.2	64					46		
<b>Average</b>			<b>55</b>							

Note: only an average abstraction rate for the time period between 1973 and 1982 was available.



M Table 23:

Well 23 - DGU Id. Nr. - 207.2313										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1973	4.2	7.3								
1974		7.3								
1975		7.3								
1976		7.3								
1977		7.3								
1978		7.3								
1979		7.3								
1980		7.3								
1981		7.3								
1982	-4.9	7.3								
1983	-6.1	10.3	71							
1984	-4.1	8.1	66							
1985	-5.6	8.0	63							
1986	-5.4	10.0	65							
1987	-5.4	3.5	59							
1988	-6.2	8.6	67							
1989	-6.1	8.2	70							
1990	-3.7	8.3	55							
1991	-3.3	6.2	54	28	45	73	4	29	425	0.79
1992	-2.2	4.1	62							
1993	-3.4	8.4	57							
1994	-2.6	8.1	58							
1995	-2.0	7.5	47	31	42	76	4	21	397	1.00
1996	-1.6	7.6	45							
1997	-2.3	6.0	59					20		
1998	-2.7	2.1	68	29	62	74	4	31	473	0.65
1999	-4.4	4.5	51					24		
2000	-5.1	6.0	51					16		
2001	-4.2	5.7	50	48	41	76	4	23	403	1.46
2002	-4.3	7.6	59					17		
2003	-4.1	6.9	48					26		
2004	-3.8	6.8	54	29	42	76	4	25	404	0.82
2005	-3.4	7.6	52					24		
2006	-3.7	4.3	62							
2007	-3.2	6.0	53	31	39	72	3	24	407	0.89
2008	-3.1	5.9	56					18		
<b>Average</b>			<b>58</b>							

Note: only an average abstraction rate for the time period between 1973 and 1982 was available.

ESM Table 24:

Well 24 - DGU Id. Nr. - 207.2500										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1971	-3.8			No Data	No Data	No Data	No Data	No Data	No Data	No Data
1972										
1973										
1974										
1975		10.8								
1976	-3.9	10.8								
1977		10.8								
1978		10.8								
1979		10.8								
1980	-3.5	10.8								
1981		10.8	310							
1982		10.8	305							
1983		11.3	289							
1984		11.3	382							
1985	-3.4	11.3	397							
1986		11.3	358							
1987		11.3	421							
<b>Average</b>			<b>352</b>							
Note: only an average abstraction rate for the time period between 1973 and 1987 was available.										

ESM Table 25:

Well 25 - DGU Id. Nr. - 207.2581										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1974	No Data	10.8	180	121	58	71	5	39	454	1.04
1975		10.8	170							
1976		10.8	150							
1977		10.8	155							
1978		10.8	160							
1979		10.8	155							
1980		10.8	170							
1981		10.8	150							
1982		11.3	150							
1983		11.3	133							
1984		11.3	134							
1985		11.3	173							
1986		11.3	128							
1987		11.3	143							
<b>Average</b>			<b>154</b>							

Note: only an average abstraction rate for the time period between 1973 and 1987 was available.

ESM Table 26:

Well 26 - DGU Id. Nr. - 207.2234										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1971				No Data	No Data	No Data	No Data	No Data	No Data	No Data
1972										
1973										
1974		10.8								
1975	-5.8	10.8	530							
1976		10.8								
1977		10.8								
1978		10.8	500							
1979		10.8	550							
1980		10.8	500							
1981		10.8	547							
1982		11.3	495							
1983		11.3	622							
1984		11.3	525							
1985		11.3	501							
1986		11.3	386							
1987		11.3	364							
<b>Average</b>			<b>502</b>							
Note: only an average abstraction rate for the time period between 1973 and 1987 was available.										

ESM Table 27:

Well 27 - DGU Id. Nr. - 207.2580										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1971	No Data			No Data	No Data	No Data	No Data	No Data	No Data	No Data
1972										
1973										
1974		10.8								
1975		10.8	210							
1976		10.8	200							
1977		10.8	200							
1978		10.8	199							
1979		10.8	195							
1980		10.8	170							
1981		10.8	190							
1982		11.3	180							
1983		11.3	180							
1984		11.3	192							
1985		11.3	192							
1986		11.3	190							
1987		11.3	192							
<b>Average</b>			<b>192</b>							
Note: only an average abstraction rate for the time period between 1973 and 1987 was available.										

ESM Table 28:

Well 28 - DGU Id. Nr. - 207.708										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1965	ND	8.1								
1966		8.1								
1967		8.1								
1968		8.1								
1969		8.1								
1970		8.1								
1971		8.1								
1972		8.1								
1973		8.1								
1974		8.1								
1975		10.4								
1976		10.4								
1977		10.4								
1978		10.4								
1979		10.4								
1980		10.4	28	16	29	88	3	22	376	0.87
1981		10.4	28	16	26	85	3	34	263	0.87
1982		10.4								
1983		9.8								
1984		9.8	26							
1985		9.8	26							
1986		9.8								
1987		9.8	27							
1988		10	27							
1989		10	29							
1990		7.9	31							
1991		7.9	30	18	28	88	3	33	368	0.91
1992		7.9								
1993		7.9								
1994		7.9								
1995		7.9	26	17	27	93	2	36	354	0.99
1996		7.9								
1997		7.9								
1998		7.9								
1999		7.9								
2000		7.9								
2001		7.9								
2002		7.9								
2003		7.1	27	15	25	97	3	50	347	0.85
2004		7.1								
2005		7.1								
2006		7.1								
2007		7.1	25	14	19	91	2	35	339	0.85
2008		7.1	27	16				50	375	0.90
<b>Average</b>			<b>27</b>							

Note: only average abstraction rates were available for the different time-periods.

ESM Table 29:

Well 29 - DGU Id. Nr. - 207.2543										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1980	-5.1	6.8	50							
1981		7.0	75							
1982		6.2	111							
1983		5.9	111							
1984		4.9	114							
1985		4.7	148							
1986		4.9	141							
1987		5.2	81							
1988		5.5	106							
1989		4.2	212							
1990		3.8	380							
1991		3.0								
1992		3.4								
1993		2.7								
1994		2.1	230	103	53	107	6	40	425	0.68
1995		1.4								
1996		1.4								
1997		1.6								
1998		1.4	285	102	65	108	4	40	390	0.54
1999		1.2								
2000		1.4								
2001		1.2								
2002		1.4	325	110	68	104	6	47	406	0.52
2003		1.0	306	124	68	104	5	45	415	0.62
2004		1.0	309			107				
2005		1.0								
2006		1.0								
2007		1.0								
2008		1.0								
<b>Average</b>			<b>187</b>							

ESM Table 30:

Well 30 - DGU Id. Nr. - 207.2662										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1980	-8.2	6.8								
1981		7.0								
1982		6.2	61							
1983		5.9	87							
1984		4.9	118							
1985		4.7	148							
1986		4.9	286							
1987		5.2	222							
1988		5.5	555							
1989		4.2	577							
1990		3.8	610							
1991		3.0	725	325	87	157	11	100	424	0.682159
1992		3.4								
1993		2.7								
1994		2.1								
1995		1.4								
1996		1.4	625	325	71	138	7	98	436	0.791304
1997		1.6								
1998		1.4								
1999		1.2	730	320	96	138	7	108	363	0.667064
2000		1.4								
2001		1.2								
2002		1.4	299	150	61	109	6	83	401	0.763414
2003		1.2								
2004		1.2	524	271	77	100	6	74	426	0.787006
2005		1.1								
2006		1.1								
2007		1.0								
2008		1.1								
<b>Average</b>			<b>398</b>							



ESM Table 31:

Well 31 - DGU Id. Nr. - 207.2730										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1985	-10	4.7	29							
1986		4.9	53							
1987		5.2	37							
1988		5.5	46							
1989	-5.5	4.2	104							
1990		3.8	66							
1991		3.0								
1992		3.4								
1993		2.7	74	42	44	84	4	18	442	0.88
1994		2.1								
1995		1.4								
1996		1.4								
1997		1.6								
1998		1.4	294	130	58	112	6	36	427	0.68
1999		1.2								
2000		1.4								
2001		1.2								
2002		1.4	570	245	78	119	9	82	413	0.66
2003		1.2								
2004		1.2								
2005		1.1								
2006		1.1								
2007		1.0								
2008		1.1								
<b>Average</b>			<b>141</b>							

ESM Table 32:

Well 32 - DGU Id. Nr. - 207.2639										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1978	-4.5	8.2	116							
1979		6.8	100							
1980		6.8	92							
1981		7.0	101							
1982		6.2	116							
1983		5.9	195							
1984		4.9	293							
1985		4.7	375							
1986		4.9	758							
1987		5.2	724							
1988		5.5	737							
1989		4.2	755							
1990		3.8	900							
1991		3.0								
1992		3.4	610	272	68	155	9	95	386	0.69
1993		2.7								
1994		2.1								
1995		1.4								
1996		1.4	1100	440	90	247	9	105	355	0.62
1997		1.6								
1998		1.4								
1999		1.2								
2000		1.4								
2001		1.2								
2002		1.4	1183	448	85	192	9	171	341	0.58
2003		1.2								
2004		1.1								
2005		1.0								
2006		1.1								
2007		1.1								
2008		1.0								
<b>Average</b>			<b>510</b>							

ESM Table 33:

Well 33 - DGU Id. Nr. - 207.261D										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1972	No Data	4.7		No Data	No Data	No Data	No Data	No Data	No Data	No Data
1973		4.1								
1974		5.5								
1975		6.6								
1976		5.5	225							
1977		6.6	250							
1978		8.2	275							
1979		6.8	300							
1980		6.8	500							
1981		7.0	580							
1982		6.2	500							
1983		5.9	600							
1984		4.9	700							
1985		4.7	780							
1986		4.9	1100							
<b>Average</b>			<b>528</b>							

ESM Table 34:

Well 34 - DGU Id. Nr. - 207.2735										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1983		5.1	38							
1984		4.8	37							
1985		11.2	40							
1986	-3.8	16.2	34							
1987		12.4	37							
1988		12.0	38							
1989	-5.5	7.4	39							
1990		6.3	43							
1991	-1.6	9.5	46	19	27	122	3	9	380	0.64
1992		8.5	56							
1993		7.6								
1994	4.4	3.3								
1995	2.1	8.0								
1996	1.4	9.5	73	22	28	155	3	120	370	0.47
1997		3.6								
1998	1.7	7.6	82							
1999		6.7								
2000		6.4	71	28	28	138	4	130	382	0.61
2001	-0.1	5.7								
2002	-1.1	5.8	92					123		
2003	1	6.2	96	34	30	153	4	113	383	0.55
2004	1.2	6.4	106			164		132		
2005	3.4	7.3	96					130		
2006	3	9.0	100							
2007	3.5	8.3	93					117		
2008	4.3	8.2	96					121		
<b>Average</b>			<b>66</b>							

ESM Table 35:

Well 35 - DGU Id. Nr. - 207.1848										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1969	12	6.6								
1970		6.1								
1971		6.6								
1972		6.0								
1973		5.9								
1974		6.3								
1975		6.3								
1976		4.8								
1977		5.3								
1978		4.8								
1979		4.6								
1980		3.6								
1981		3.2								
1982		5.7								
1983		5.1								
1984		4.8	24							
1985		11.2	25							
1986		16.2	22							
1987		12.4	25							
1988		12.0	23							
1989	-3.5	7.4	24							
1990		6.3	24							
1991	-5.2	9.5	23	16	45	71	3	22	419	1.07
1992		0.7	23							
1993		0.7								
1994	0.3	3.3								
1995	1.1	8.0								
1996		9.5	21	15	45	74	3	16	414	1.10
1997	-4.2	3.6								
1998	-5.6	7.6	22							
1999		6.7								
2000		6.4	21	15	44	72	3	19	422	1.10
2001	-6.8	5.7	32							
2002	-4.7	5.8	42							
2003	-3.1	4.0	30	15	44	74	3	20	407	0.77
2004	-2	3.8	40					23		
2005	0.5	3.6	30							
2006	-1.5	3.0	49							
2007	-1.1	2.9	28					26		
2008	-0.9	3.9	36							
<b>Average</b>			<b>28</b>							

ESM Table 36:

Well 36 - DGU Id. Nr. - 207.1142										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1969	2.6	6.6								
1970		6.1								
1971		6.6								
1972		6.0								
1973		5.9								
1974		6.3								
1975	-0.4	6.3								
1976		4.8								
1977		5.3								
1978		4.8								
1979		4.6								
1980		3.6								
1981		3.2								
1982		5.7	22							
1983		5.1	23							
1984		4.8	23							
1985		11.2	24							
1986		16.2	21							
1987		12.4	25							
1988		12.0	25							
1989	-5.5	7.4	24							
1990		6.3	28							
1991	-3.6	9.5								
1992		0.7	28							
1993		0.7								
1994	0	3.3	52	24	40	93	4	42	407	0.71
1995	-4.3	8.0								
1996	-4.4	9.5								
1997		3.6								
1998	-8.1	7.6	46	22	44	84	4	32	417	0.74
1999		6.7								
2000		6.4								
2001	-6.2	5.7	56							
2002	-6.1	8.7	44	20	42	80	3	30	406	0.70
2003	-3.8	7.2	46	20	41	85	3	33	403	0.67
2004	-3.4	6.8	48					29		
2005	-1.1	3.5	52					33		
2006	-2.6	2.8	50							
2007	-0.7	3.0	50					29		
2008	-2.1	3.2	48					29		
<b>Average</b>			<b>37</b>							

ESM Table 37:

Well 37 - DGU Id. Nr. - 207.1141										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1969	1.5	6.6								
1970		6.1								
1971		6.6								
1972		6.0								
1973		5.9								
1974		6.3								
1975		6.3								
1976	-1.4	4.8								
1977		5.3								
1978		4.8								
1979		4.6								
1980		3.6								
1981		3.2								
1982		5.7	38							
1983		5.1	59							
1984		4.8	71							
1985		11.2	45							
1986		16.2	47							
1987		12.4	47							
1988	-6.9	12.0	57							
1989	-4.8	7.4	52							
1990		6.3	75							
1991	-2.9	9.5	82	32	38	120	4	91	406	0.60
1992		0.7	87							
1993	-1	0.7								
1994	1.5	3.3	52							
1995	1.2	8.0								
1996	-0.3	9.5	110	39	36	148	4	110	403	0.55
1997		3.6								
1998	0.6	7.6								
1999		6.7								
2000	1.6	6.4	140	54	32	160	4	140	406	0.60
2001	-2.2	5.7	148							
2002	-1.5	5.8	162					142		
2003	-0.8	5.6	146					133		
2004	-0.7	6.3	152					128		
2005	2.3	5.8	150	53	33	169	4	120	400	0.55
2006	0.7	5.1	145							
2007	2	5.6	152					120		
2008	1.6	3.6	148	49	31	158	4	114	442	0.51
<b>Average</b>			<b>98</b>							

ESM Table 38:

Well 38 - DGU Id. Nr. - 207.1140										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1969	2.6	6.6								
1970		6.1								
1971		6.6								
1972		6.0								
1973		5.9								
1974		6.3								
1975		6.3								
1976	1.8	4.8								
1977		5.3								
1978		4.8								
1979		4.6								
1980		3.6								
1981		3.2								
1982		5.7	44							
1983		5.1	72							
1984		4.8	58							
1985		11.2	59							
1986		16.2	69							
1987		12.4	64							
1988		12.0	67							
1989	-5.7	7.4	81							
1990		6.3	100							
1991	-3.2	9.5								
1992		0.7	91							
1993		0.7								
1994	1.4	3.3	180	78	39	182	4	190	407	0.67
1995	-0.5	8.0								
1996	-1.1	9.5								
1997		3.6								
1998	-0.7	7.6	140	47	32	189	4	160	412	0.52
1999		6.7								
2000		6.4								
2001	-2.9	5.7	180							
2002	-1.1	5.8	162	56	27	140	3	113	382	0.53
2003	-1	4.1	164					185		
2004	-1.2	3.7	160	50	28	195	5	173	410	0.48
2005	0.9	3.9	126	50	25	197	4	140	420	0.61
2006	0.4	3.2	165							
2007	2.2	6.3	154					126		
2008	1	4.1	180	57	23	197	5	142	471	0.49
<b>Average</b>			<b>116</b>							



ESM Table 39:

Well 39 - DGU Id. Nr. - 207.1169										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1969	2.5	6.6		No Data	No Data	No Data	No Data	No Data	No Data	No Data
1970		6.1								
1971		6.6								
1972		6.0								
1973		5.9								
1974		6.3								
1975		6.3								
1976	0.4	4.8								
1977		5.3								
1978		4.8								
1979		4.6								
1980		3.6								
1981		3.2								
1982		5.7								
1983		5.1	43							
1984		4.8	45							
1985		11.2	44							
1986		16.2	76							
1987		12.4	239							
1988		12.0	610							
1989		7.4	826							
1990		6.3	1800							
1991		9.5								
1992		8.6	2200							
<b>Average</b>			<b>654</b>							

ESM Table 40:

Well 40 - DGU Id. Nr. - 207.2964										
Year	WL	Abstraction	Cl	Na	Mg	Ca	K	SO4	HCO3	Na/Cl Ratio
1965	No Data	8.1								
1966		8.1								
1967		8.1								
1968		8.1								
1969		8.1								
1970		8.1								
1971		8.1								
1972		8.1								
1973		8.1								
1974		8.1								
1975		10.4								
1976		10.4								
1977		10.4								
1978		10.4								
1979		10.4								
1980		10.4	52	21	27	122	6	95	349	0.62
1981		10.4	52	22	24	122	7	104	344	0.65
1982		10.4	51							
1983		9.8	61							
1984		9.8	60							
1985		9.8	62							
1986		9.8	60							
1987		9.8	63							
1988		10	65							
1989		10								
1990		7.9								
1991		7.9	69	28	23	124	8	88	345	0.63
1992		7.9								
1993		7.9								
1994		7.9								
1995		7.9	75	36	24	128	5	83	337	0.74
1996		7.9								
1997		7.9								
1998		7.9								
1999		7.9	120	45	25	134	9	80	343	0.58
2000		7.9								
2001		7.9								
2002		7.9	124	47	24	129	9	80	345	0.59
2003		7.1	118	48	25	130	9	81	344	0.63
2004		7.1								
2005		7.1								
2006		7.1								
2007		7.1	123	48	23	117	8	80	354	0.60
2008		7.1	120	50	23	125	9	79	356	0.64
<b>Average</b>			<b>80</b>							

Note: only average abstraction rates were available for the different time-periods.