

Table S1. Results of statistical analyses at each monitoring station.

Watershed	Well Station	Depth (m)	Cross-Correlation*		Regression*		Harmonic Analysis**	
			CCF.	Time Lag	Slope	R ²	Tidal Effect	Aquifer Type
Han River Basin	Gapyeong Gapyeong	7.5	0.991	0	0.94	0.98	-	ND
		130.0					-	ND
	Gangneung Hongjae	11.0	0.995	0	0.98	0.99	-	ND
		69.0					-	ND
	Gwangmyeong Cheolsan	13.5	1.000	0	1.00	0.99	K1,S2	UC
		84.0					K1,S2	UC
	Gimpo Gimpo	15.9	0.915	0	1.11	0.84	K1,S2	UC
		80.0					K1,S2	UC
	Namyangju Byeolnae	12.0	0.970	0	0.53	0.94	K1,O1,S2,M2	SC
		70.0					K1,O1,S2,M2	SC
	Donghae Gwiun	12.0	0.999	0	1.02	0.99	-	ND
		17.0					-	ND
	Bucheon Okgil	22.3	1.000	0	0.99	0.99	K1	ND
		70.0					K1	ND
	Samcheok Gagok	10.4	0.930	0	0.86	0.86	-	ND
		70.0					K1	ND
	Seoul Magok	20.0	0.998	0	0.98	0.99	M2,K1, S2	C
		70.0					M2,K1, S2	C
	Sokcho Nohak	12.0	0.995	0	0.95	0.98	K1,S2	UC
		70.0					K1,S2	UC
	Siheung Gunja	16.4	0.953	0	0.60	0.90	K1,S2	UC
		62.0					K1,S2	UC
	Anseong Samjuk	17.0	0.995	0	0.93	0.99	K1,S2	UC
		49.0					K1,S2	UC
	Yangyang Sonyang	11.0	0.988	0	1.05	0.97	-	ND
		68.0					-	ND
	Yangju Gwangjeok	10.0	0.999	0	1.07	0.99	S2	ND
		70.0					K1,S2	UC
	Yangpyeong Gaegun	9.5	0.999	0	1.04	0.99	K1	ND
		70.0					K1,S2	UC
	Yangpyeong Yangdong	11.4	0.967	0	2.09	0.93	K1,S2	UC
		69.0					K1,S2	UC
Yangpyeong Yangseo	11.0	0.973	0	0.95	0.94	K1,S2	UC	
	70.0					K1,S2	UC	
Yeoju Jeomdong	15.0	0.999	0	0.98	0.99	-	ND	
	70.0					-	ND	
Yongin Namsa	12.0	0.623	0	1.04	0.38	-	ND	
	70.0					K1,S2	UC	
Yongin Mapyeong	9.5	0.591	0	0.58	0.34	-	ND	
	63.0					-	ND	
Wonju Myeongryun	20.0	0.988	0	0.95	0.97	K1,S2	UC	
	70.0					K1,S2	UC	
Wonju Munmak	8.8	0.992	0	1.12	0.98	K1	ND	
	63.0					K1,S2	UC	
Eumseong Saenggeuk	16.0	1.000	0	1.00	0.99	-	ND	
	70.0					-	ND	

Table S1. Cont.

Watershed	Well Station	Depth	Cross-Correlation*		Regression*		Harmonic Analysis**	
			CCF.	Time Lag	Slope	R ²	Tidal Effect	Aquifer Type
Han River Basin	Uijeongbu Singok	11.0	0.960	0	0.99	0.92	-	ND
		70.0					K1,S2	UC
	Ichoen Yulhyeon	9.6	0.998	0	1.00	0.99	K1	ND
		63.0					K1	ND
	Injae Nammyeon	15.8	1.000	0	1.00	0.99	K1	ND
		70.0					K1	ND
	Injae Injae	10.0	0.993	0	0.96	0.98	-	ND
		70.0					-	ND
	Incheon Yeonsu	15.0	0.964	0	1.08	0.93	M2,K1,S2,O1	C
		70.0					M2,K1,S2,O1	C
	Jeongseon Jeongseon	42.7	0.939	0	0.24	0.88	-	ND
		70.0					K1,S2	UC
	Jecheon Goam	11.4	0.972	0	1.16	0.94	S2,M2	SC
		70.0					S2,M2	SC
	Cheonan Seonggeo	18.4	0.999	0	0.99	0.99	-	ND
		70.0					-	ND
	Chuncheon Sindong	10.0	0.986	0	1.00	0.97	K1,S2	UC
		70.0					K1,S2,M2	SC
	Chuncheon Udu	12.0	0.986	0	0.94	0.97	K1	ND
		70.0					K1,S2	UC
	Chungju Gageum	14.5	1.000	0	1.02	0.99	S2	ND
		70.0					S2,M2	SC
	Chungju Dongryang	11.9	1.000	0	1.02	0.99	K1,S2	UC
		72.5					K1,S2	UC
	Paju Maekgeum	15.0	0.677	0	0.16	0.45	K1,S2	UC
		40.0					S2,K1,M2	SC
	Pyeongchang Bongpyeong	15.0	0.926	0	1.02	0.85	K1,S2	UC
		70.0					K1,S2	UC
	Pyeongchang Pyeongchang	15.0	0.992	0	0.96	0.98	-	ND
		70.0					K1,S2,M2	SC
	Pyeongtaek Anjung	15.0	0.988	0	1.16	0.97	S2	ND
		70.0					K1,S2	UC
Pyeongtaek Tongbok	10.3	1.000	0	1.02	0.99	K1,S2>M2	SC	
	69.0					K1,S2>M2	SC	
Pocheon Yeongbuk	23.0	1.000	0	1.01	0.99	K1,S2>M2	SC	
	70.0					K1,S2>M2	SC	
Hongcheon Hongcheon	12.0	0.993	0	0.98	0.98	K1	ND	
	70.0					K1	ND	
Hwaseong Yanggam	10.0	0.859	0	0.84	0.74	K1,S2	UC	
	70.0					K1,S2	UC	
Hwaseong Ujeong	15.0	1.000	0	0.99	1.00	K1,S2	UC	
	70.0					K1,S2	UC	
Hwaseong Paltan	10.0	0.954	0	0.78	0.91	K1,O1,S2,M2	SC	
	70.0					K1,O1,S2,M2	SC	
Hwacheon Gandong	21.4	0.955	0	1.15	0.91	K1,S2	UC	
	70.0					K1,S2	UC	
Hwacheon Sangseo	12.0	0.537	0	0.63	0.29	K1	ND	
	70.0					K1,S2	UC	

Table S1. Cont.

Watershed	Well Station	Depth	Cross-Correlation*		Regression*		Harmonic Analysis**	
			CCF.	Time Lag	Slope	R ²	Tidal Effect	Aquifer Type
Nakdong River Basin	Geojae Sinhyeon	10.0	0.457	0	0.78	0.20	K1,S2	UC
		68.0					-	ND
	Geochang Geochang	10.6	0.997	0	1.02	0.99	-	ND
		69.0					-	ND
	Gyeongsan Namsan	11.0	0.763	0	0.82	0.58	K1,S2,M2	SC
		70.0					M2,S2,K1	C
	Gyeongju Geoncheon	12.0	0.198	0	0.16	0.03	K1,S2	UC
		70.0					K1,S2,M2	SC
	Gyeongju Sannae	6.8	0.569	1	0.39	0.31	-	ND
		65.0					M2,O1,S2,K1	C
	Gyeongju Yangbuk	25.0	0.412	0	0.36	0.17	-	ND
		70.0					K1,S2,M2	SC
	Gyeongju Cheonbuk	8.8	0.260	-2	0.08	0.05	-	ND
		60.0					-	ND
	Goryeong Goryeong	7.0	0.986	0	1.01	0.97	K1,S2	UC
		65.0					K1,S2	UC
	Gumi Dogae	18.5	0.748	0	0.63	0.56	K1,O1,S2	ND
		100.0					M2,S2,O1,K1	C
	Gumi Wonpyeong	8.5	0.996	0	0.96	0.99	-	ND
		70.0					S2,K1, M2	SC
	Gunwi Uiheung	10.0	0.792	0	0.55	0.62	K1,S2	UC
		76.0					O1,K1,M2,S2	SC
	Gimcheon Daedeok	11.0	0.941	0	1.09	0.88	K1,S2	UC
		70.0					K1,S2	UC
	Daegu Gachang	10.0	0.994	0	0.98	0.98	K1,S2	UC
		70.0					K1	ND
	Daegu Bisan	12.0	0.771	0	0.80	0.59	K1,S2	UC
		70.0					K1,S2	UC
	Mungyeong Nongam	10.0	0.964	0	0.70	0.92	-	ND
		51.0					-	ND
	Mungyeong Mungyeong	15.0	0.996	0	1.03	0.99	-	ND
		71.0					-	ND
Milyang Gagok	7.6	0.524	6	0.14	0.25	-	ND	
	68.0					K1,S2,M2	SC	
Milyang Hanam	20.0	0.999	0	0.96	0.99	K1	ND	
	70.0					K1	ND	
Bonghwa Myeongho	10.8	0.998	0	0.98	0.99	-	ND	
	73.0					-	ND	
Sancheong Danseong	10.0	0.965	0	0.80	0.93	-	ND	
	70.0					-	ND	
Sangju Gongseong	10.2	0.981	0	0.94	0.96	-	ND	
	71.0					-	ND	
Seongju Byeokjin	10.0	0.937	0	0.88	0.87	K1,S2	UC	
	76.0					K1,S2,M2	SC	
Andong Gilan	10.0	0.992	0	1.03	0.98	-	ND	
	70.0					-	ND	
Andong Taehwa	10.0	0.987	0	1.03	0.97	K1,S2	UC	
	63.0					K1,S2	UC	

Table S1. Cont.

Watershed	Well Station	Depth	Cross-Correlation*		Regression*		Harmonic Analysis**	
			CCF.	Time Lag	Slope	R ²	Tidal Effect	Aquifer Type
Nakdong River Basin	Yangsan	10.0	0.790	0	1.85	0.62	-	ND
	Ungsan	70.0					K1,S2,M2	SC
	Yeongdeok	15.0	1.000	0	1.00	0.99	K1,S2	UC
	Dalsan	70.0					K1,S2	UC
	Yeongju	13.0	0.835	0	0.78	0.69	-	ND
	Munjeong	69.0					-	ND
	Yecheon	12.0	0.956	0	0.83	0.91	K1,S2	UC
	Yecheon	70.0					K1,S2	UC
	Ulsan	19.3	0.991	0	1.02	0.98	-	ND
	Beomseo	79.0					-	ND
	Ulsan	13.5	0.507	7	0.01	0.17	-	ND
	Sangbuk	80.0					K1	ND
	Ulsan	9.0	0.930	0	0.92	0.86	-	ND
	Onyang	70.0					-	ND
	Uljin	15.0	0.997	0	0.99	0.99	-	ND
	Bukmyeon	70.0					-	ND
	Uiryong	20.0	0.761	0	0.50	0.57	K1	ND
	Nakseo	70.0					K1,O1,S2,M2	SC
	Uiryong	9.5	0.000	0	0.00	0.00	-	ND
	Bongsu	70.0					-	ND
	Uiryong	15.8	0.947	0	0.87	0.89	K1	ND
	Uiryong	70.0					K1	ND
	Jinju	12.0	0.979	0	0.89	0.95	K1,S2	UC
	Chojeon	70.0					K1,S2	UC
	Jinhae	12.9	0.976	0	1.29	0.95	K1	ND
	Jaeun	35.0					K1,S2	UC
	Changnyeong	11.5	0.852	0	0.65	0.72	-	ND
	Seongsan	70.0					-	ND
	Cheongdo	10.5	0.620	0	0.15	0.38	-	ND
	Cheongdo	70.0					-	ND
	Cheongsong	11.5	0.905	0	0.86	0.81	-	ND
	Pacheon	68.0					K1,S2	UC
Chilgok	10.0	0.991	0	1.10	0.98	K1,S2	UC	
Gasan	70.0					K1,S2	UC	
Chilgok	10.0	0.992	0	0.86	0.98	-	ND	
Waegwan	70.0					K1	ND	
Pohang	10.0	0.885	0	0.80	0.78	K1,S2	UC	
Gibuk	70.0					K1,S2	UC	
Pohang	30.0	0.994	0	1.15	0.98	-	ND	
Yeonil	70.0					-	ND	
Haman	11.0	0.998	0	0.98	0.99	-	ND	
Chilwon	70.0					-	ND	
Hamyang	19.0	1.000	0	0.99	0.99	-	ND	
Macheon	70.0					K1	ND	
Hamyang	10.0	0.585	0	0.40	0.34	-	ND	
Byeonggok	70.0					K1,S2	UC	
Hapcheon	16.8	0.998	0	1.06	0.99	K1	ND	
Jeokjung	71.0					K1	ND	

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Watershed	Well Station	Depth	Cross-Correlation*		Regression*		Harmonic Analysis**	
			CCF.	Time Lag	Slope	R ²	Tidal Effect	Aquifer Type
Nakdong River Basin	Hapcheon Hapcheon	11.5	0.949	0	0.85	0.90	-	ND
		68.0					-	ND
	Gochang Seongnae	17.8	1.000	0	0.99	0.99	S2>M2	SC
		70.0					S2>M2	SC
	Gongju Jeongan	10.0	0.995	0	1.01	0.99	S2	ND
		70.0					S2	ND
	Gunsan Impi	21.0	0.999	0	0.99	0.99	S2>M2	SC
		70.0					S2>M2	SC
	Geumsan Geumsan	10.0	0.982	0	1.10	0.96	K1	ND
		70.0					K1	ND
	Geumsan Boksu	25.0	0.878	0	0.80	0.77	K1	ND
		51.0					M2	ND
	Dangjin Sunseong	10.0	0.917	0	1.00	0.83	-	ND
		70.0					K1,S2,M2	SC
	Daejeon Munpyeong	23.5	0.916	0	1.41	0.84	K1	ND
		72.0					K1,S2	UC
	Boryeong Cheongra	12.0	0.998	0	1.02	0.99	-	ND
		70.0					-	ND
	Boryeong Cheongso	15.0	0.936	0	0.87	0.87	K1	ND
		70.0					K1,S2	UC
	Boeun Maro	16.5	0.816	0	0.93	0.66	-	ND
		70.0					O1,K1,S2,M2	SC
	Boeun Boeun	11.3	0.680	0	0.88	0.11	K1,S2	UC
		71.0					K1,S2,M2	SC
Geum River Basin	Buan Baeksan	15.0	0.999	0	0.97	0.99	K1,S2	UC
		70.0					K1,S2	UC
	Buan Sangseo	15.0	0.965	0	1.00	0.93	K1,S2	UC
		65.0					-	ND
	Buyeo Buyeo	27.0	0.594	0	0.44	0.35	K1,M2	ND
		90.0					-	ND
	Seocheon Masan	17.0	0.994	0	0.99	0.98	-	ND
		70.0					K1,S2,M2	SC
	Asan Dogo	11.5	0.979	0	0.90	0.96	K1,S2,M2	SC
		64.0					K1,S2,M2	SC
	Asan Deuksan	12.8	0.646	0	0.53	0.09	K1,S2	UC
		70.0					K1,S2	UC
	Yeongi Jochiwon	15.0	0.793	0	0.83	0.63	K1,S2	UC
		70.0					K1,S2	UC
	Yeongdong Yanggang	10.0	0.977	0	0.95	0.95	K1	ND
		71.0					K1,S2	UC
	Yesan Deoksan	13.8	0.982	0	1.38	0.96	-	ND
		65.0					-	ND
	Yesan Yesan	8.8	0.986	0	0.97	0.97	-	ND
		68.0					-	ND
	Yesan Oga	10.0	0.992	0	1.05	0.98	K1,S2,M2	SC
		70.0					K1,S2,M2	SC
	Okcheon Cheongseong	7.9	0.670	0	0.45	0.45	K1	ND
		41.0					M2,O1,K1,S2	C

Table S1. Cont.

Watershed	Well Station	Depth	Cross-Correlation*		Regression*		Harmonic Analysis**	
			CCF.	Time Lag	Slope	R ²	Tidal Effect	Aquifer Type
Geum River Basin	Wanju Samnye	15.0	1.000	0	0.99	0.99	K1	ND
		70.0					K1	ND
	Wanju Yongjin	12.0	0.998	0	1.04	0.99	O1,K1,S2,M2	SC
		70.0					O1,K1,S2,M2	SC
	Eumseong Daeso	21.2	0.994	0	0.98	0.98	O1,K1,S2,M2	SC
		68.0					O1,K1,S2,M2	SC
	Iksan Nangsa	13.0	0.998	0	1.11	0.99	O1,K1,S2,M2	SC
		70.0					O1,K1,S2,M2	SC
	Jangsu Jangsu	13.0	0.971	0	1.07	0.94	K1,S2	UC
		70.0					K1,S2	UC
	Jeonju Manseong	12.0	0.967	0	1.08	0.93	K1,S2,M2	SC
		68.0					K1,S2,M2	SC
	Jeongeup Sintaein	11.0	0.961	0	1.00	0.92	-	ND
		70.0					-	ND
	Jeongeup Ongdong	13.5	0.956	0	1.05	0.91	-	ND
		70.0					-	ND
	Jeungpyeong Jeungpyeong	20.0	0.997	0	1.07	0.99	K1,S2,M2	SC
		71.0					K1,S2,M2	SC
	Cheonan Susin	10.0	0.940	0	0.85	0.88	-	ND
		70.0					-	ND
Cheongwon Gadeok	25.0	1.000	0	1.00	0.99	K1,S2	UC	
	65.0					K1,S2	UC	
Cheongwon Gangnae	15.4	0.986	0	1.00	0.97	K1,S2	UC	
	70.0					K1,S2	UC	
Cheongwon Buyong	10.0	0.945	0	1.04	0.89	K1,S2	UC	
	70.0					K1,S2	UC	
Cheongju Naedeok	9.2	0.903	0	0.77	0.81	K1,S2	UC	
	72.0					K1,S2	UC	
Gangjin Seongjeon	9.8	0.976	0	1.20	0.95	M2>S2	C	
	67.0					M2>S2	C	
Gochang Gosu	10.0	0.990	0	1.02	0.98	-	ND	
	68.0					-	ND	
Gochang Sangha	10.0	1.000	0	0.97	0.99	-	ND	
	70.0					-	ND	
Gwangju Yudeok	10.0	0.996	0	1.01	0.99	K1,S2,N2	UC	
	70.0					K1>S2>M2	SC	
Naju Bonghwang	8.5	0.837	-1	0.81	0.68	K1,S2	UC	
	70.0					K1,S2>M2	SC	
Naju Samdo	10.4	0.996	0	0.93	0.99	S2	ND	
	67.0					S2	ND	
Jangseong Nammyeon	14.0	0.993	0	1.32	0.98	K1	ND	
	70.0					K1,S2	UC	
Jangseong Buki	10.0	0.988	0	0.87	0.97	-	ND	
	70.0					-	ND	
Jangseong Hwangryong	12.0	1.000	0	1.00	0.99	K1	ND	
	64.0					K1	ND	
Jangheung Jangheung	11.0	0.973	0	0.84	0.94	S2	ND	
	64.0					S2	ND	

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Watershed	Well Station	Depth	Cross-Correlation *		Regression *		Harmonic Analysis **	
			CCF.	Time Lag	Slope	R ²	Tidal Effect	Aquifer Type
Yeongsan-Seomjin River Basin	Hampyeong Singwang	12.0	0.971	0	0.96	0.94	-	ND
		70.0					-	ND
	Hwasun Neungju	6.4	0.698	2	1.08	0.48	K1,S2	UC
		62.0					K1	ND
	Hwasun Iyang	10.0	0.961	0	1.16	0.92	-	ND
		70.0					-	ND
	Gangjin Chilryang	12.0	0.995	0	0.97	0.99	K1 > S2 > M2	SC
		66.0					K1 > S2 > M2	SC
	Gokseong Godal	16.0	0.997	0	0.96	0.99	K1, S2	UC
		70.0					K1, S2	UC
	Gokseong Ipmyeon	8.6	0.984	0	0.93	0.96	K1	ND
		63.0					K1	ND
	Namwon Dotong	10.0	0.999	0	0.98	0.99	K1, S2	UC
		60.0					K1	ND
	Sunchang Sunchang	12.9	0.969	0	0.94	0.93	K1, S2	UC
		70.0					K1, S2	UC
	Sunchang Ssangchi	16.0	0.986	0	0.68	0.97	-	ND
		70.0					M2 > S2 > K1	C
	Suncheon Oeseo	12.0	0.994	0	0.88	0.98	K1, S2 > M2	SC
		70.0					K1, S2 > M2	SC
Suncheon Pungdeok	10.0	0.998	0	0.98	0.99	K1, S2	UC	
	60.0					K1, S2	UC	
Suncheon Hwangjeon	21.0	1.000	0	0.99	0.99	K1, S2	UC	
	70.0					K1, S2	UC	
Imsil Deokchi	10.0	0.997	0	0.95	0.99	K1	ND	
	120.0					K1	ND	
Jangsu Sanseo	10.5	0.654	0	0.49	0.42	K1	ND	
	69.0					K1	ND	
Hadong Hadong	10.7	0.992	0	1.00	0.98	M2 > S2 > K1	C	
	64.0					M2 > S2 > K1	C	
Hadong Hwagae	12.0	0.940	0	0.73	0.88	K1	ND	
	70.0					-	ND	

* Data period: Jan. ~ Dec., 2010, Daily mean data; ** Data period: Feb. ~ Apr., 2010, Hourly interval data; ND: not determined; UC: unconfined aquifer; SC: semi-confined aquifer; C: confined aquifer.