

Table S1. Chemical compositions for all water samples. GW-H, UGW, LGW, TSR and HR represent groundwater in hilly area, upper groundwater of aquitard in low plain, lower groundwater of aquifer in low plain, Tongshun River and Han River, respectively.

Sample number	Sample type	Well depth (m)	pH	EC ( $\mu\text{s}/\text{cm}$ )	Eh (mv)	Concentrations (mg/L)													Concentrations ( $\mu\text{g}/\text{L}$ )		Isotopes (‰)		
						NH <sub>4</sub> -N	Fe <sup>2+</sup>	NO <sub>2</sub> -N	K <sup>+</sup>	Na <sup>+</sup>	Ca <sup>2+</sup>	Mg <sup>2+</sup>	Cl <sup>-</sup>	SO <sub>4</sub> <sup>2-</sup>	HCO <sub>3</sub> <sup>-</sup>	NO <sub>3</sub> -N	Mn	DOC	TN	As	S <sup>2-</sup>	$\delta^2\text{H}$	$\delta^{18}\text{O}$
15G02	GW-H	30	6.73	540	57.5	0.02	0.01	0.005	0.81	27.19	82.80	15.08	1.58	3.83	378.02	0.33	0.00	0.91	1.72	0.0	0	-53.4	-7.6
15G03	GW-H	45	6.50	333	66.6	0.03	0.02	0.004	0.70	18.87	66.53	6.404	9.03	16.53	228.09	0.70	0.00	15.56	3.03	0.6	6	-36.9	-5.3
15G23	GW-H	13	6.79	916	169.9	0.02	0.07	0.000	n.d.	n.d.	n.d.	n.d.	49.37	0.00	189.01	0.00	0.01	3.69	44.19	2.2	25	-35.4	-5.8
15G24	GW-H	16	6.83	783	104.7	0.17	0.00	0.023	0.79	13.71	126.90	25.88	6.10	0.00	557.42	0.00	2.78	0.99	0.79	0.0	3	-50.4	-7.7
15G06	UGW	12	6.45	702	40.9	0.10	0.10	0.181	1.51	6.93	113.30	24.59	24.66	55.71	343.42	9.44	3.41	1.65	26.74	0.0	2	-43.7	-6.9
15G07	UGW	8	6.41	1260	49.7	0.06	0.10	0.130	41.66	50.47	179.80	25.98	60.43	78.22	629.18	20.55	1.37	1.79	50.88	0.0	3	-46.2	-7.2
15G20	UGW	10	6.63	1020	-132.3	11.60	10.90	0.008	3.36	16.55	137.50	19.03	30.57	0.72	586.25	0.17	0.74	6.08	12.34	65.9	37	-38.1	-6.2
15G22	UGW	10	6.62	1315	-101.8	8.70	13.35	0.012	3.34	16.93	187.20	27.44	33.68	0.00	815.30	0.00	0.96	5.83	12.74	20.5	26	-41.8	-6.6
SH01C	UGW	4	6.96	905	-106.7	2.33	6.00	0.000	4.84	25.09	114.30	20.14	28.23	0.85	581.44	0.00	2.96	10.22	1.73	20.6	53	-24.1	-4.2
SH02C	UGW	4	6.84	1197	-98.4	1.75	6.25	0.000	3.58	18.51	164.30	26.40	72.47	0.00	661.53	0.00	1.34	12.09	2.96	6.0	1	-29.1	-3.7
SH03C	UGW	4	7.01	969	-96.8	1.23	2.80	0.000	6.37	40.14	131.40	22.12	85.63	55.37	514.17	0.09	3.64	4.65	2.03	4.0	43	-27.9	-4.9
PC057	UGW	6	6.53	735	n.d.	1.53	5.34	n.d.	0.80	13.09	104.60	22.81	4.02	3.68	496.24	0.04	0.34	23.29	n.d.	20.7	2	-42.4	-6.6
JH01	UGW	6	6.74	1513	n.d.	0.10	0.00	n.d.	n.d.	n.d.	n.d.	n.d.	104.11	141.95	592.02	21.65	0.38	2.46	n.d.	4.50	0	n.d.	n.d.
JH02	UGW	7	6.70	1128	27.3	0.85	0.66	n.d.	0.74	15.31	212.77	41.72	39.27	101.60	768.67	0.25	6.68	7.72	n.d.	4.04	18	n.d.	n.d.

JH03	UGW	11	6.76	614	-104.9	0.21	0.06	0.000	0.53	16.30	75.30	34.60	4.41	1.19	438.18	0.24	6.32	26.05	2.90	0.0	0	-44.1	-6.8
JH04	UGW	8.5	6.27	1351	-122.8	0.50	5.25	0.000	0.37	48.50	177.00	56.40	95.34	67.61	642.26	0.15	5.82	15.23	0.47	9.0	0	-39.6	-6.3
15G01	LGW	30	6.44	745	-203.1	8.70	8.10	0.000	2.42	15.45	117.90	21.47	1.97	0.00	559.34	0.04	0.16	5.08	10.07	60.4	6	-45.7	-6.9
15G04	LGW	30	6.26	1002	-132.7	3.65	19.40	0.000	2.13	9.38	151.30	23.21	17.53	4.73	606.75	0.04	0.92	3.59	4.60	141.5	11	-37.8	-5.9
15G08	LGW	30	6.44	1022	-85.3	14.10	17.10	0.007	3.03	16.89	126.50	26.15	1.88	0.00	658.65	0.00	0.97	8.59	16.19	24.9	5	-37.1	-5.7
15G09	LGW	30	6.41	712	-89.9	8.95	10.95	0.000	2.18	15.27	111.10	21.88	1.07	0.00	538.20	0.11	0.45	5.11	13.14	25.8	4	-47.0	-7.1
15G10	LGW	30	6.65	714	-52.1	2.60	6.05	0.002	1.70	29.87	88.52	21.90	0.41	0.00	457.47	0.00	0.26	12.15	4.01	20.0	2	-41.6	-6.2
15G11	LGW	25	6.43	722	-71.7	0.98	3.00	0.002	1.45	23.23	113.50	26.45	0.52	0.00	566.39	0.05	0.09	3.15	2.36	3.9	9	-50.4	-7.6
15G12	LGW	30	6.48	955	-87.6	2.35	14.60	0.008	1.25	12.76	129.60	30.64	5.74	0.00	616.36	0.05	0.42	3.42	3.38	20.4	3	-42.5	-6.6
15G13	LGW	18	6.41	725	-70.1	1.50	13.65	0.005	1.18	12.51	127.10	34.09	5.77	0.00	639.11	0.05	0.31	3.23	2.75	25.3	0	n.d.	n.d.
15G14	LGW	20	6.37	1118	-56.7	2.95	7.15	0.005	1.40	30.84	156.60	31.28	1.08	0.00	789.35	0.00	0.23	3.69	4.99	16.7	4	-48.6	-7.2
15G15	LGW	20	6.51	1047	-80.8	0.55	4.65	0.013	0.53	36.25	170.20	27.04	0.61	0.00	795.12	0.00	4.77	1.95	1.28	33.1	3	n.d.	n.d.
15G16	LGW	30	6.56	885	-100.4	6.55	11.45	0.000	4.15	9.18	137.50	25.87	2.90	0.00	630.78	0.10	0.32	2.79	8.65	49.3	4	n.d.	n.d.
15G17	LGW	20	6.59	832	-65.7	3.65	5.15	0.000	1.35	21.54	154.80	29.34	1.05	0.00	706.38	0.04	0.46	14.41	5.55	38.7	4	-45.9	-6.9
15G18	LGW	28	6.40	1158	-104.2	2.35	8.35	0.000	1.15	33.20	186.10	28.99	1.13	0.00	874.57	0.00	1.73	14.41	4.10	220.3	1	-52.2	-7.8
15G19	LGW	25	6.83	885	-134.9	3.00	5.50	0.010	1.50	18.84	134.00	20.31	1.81	0.00	584.65	0.00	0.23	3.85	3.79	93.0	30	-50.9	-7.9
15G21	LGW	25	6.99	739	-138.8	2.45	5.25	0.002	1.41	20.91	136.30	20.43	1.54	0.00	608.67	0.05	8.22	2.43	5.11	1025.0	17	-46.9	-7.4
15G25	LGW	15	6.69	782	-112.4	3.75	11.95	0.000	1.41	16.47	118.70	21.32	3.61	0.00	510.97	0.00	0.31	2.76	n.d.	27.6	16	-46.8	-7.2

15G39	LGW	15	6.93	1006	-119.8	1.75	7.50	0.000	1.07	20.90	158.00	25.52	1.43	0.00	730.26	0.00	0.50	6.50	3.54	8.9	14	-49.1	-7.5
15G40	LGW	15	6.05	296	-41.2	6.50	15.75	0.000	n.d.	n.d.	n.d.	n.d.	2.67	0.00	165.82	0.03	0.25	16.90	415.93	0.0	n.d.	-63.8	-9.6
15G41	LGW	30	7.14	928	-126.5	1.30	3.55	0.000	0.84	27.90	141.10	25.73	0.99	0.00	680.83	0.03	1.14	3.13	26.48	235.1	29	-48.2	-7.4
SH01A	LGW	25	7.23	1104	-164.4	4.20	11.8	0.000	2.24	33.28	145.60	25.78	1.82	0.00	728.81	0.00	2.33	2.86	3.57	355.2	5	-46.5	-7.1
SH02A	LGW	25	8.40	1697	-267.6	2.10	0.26	0.010	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.13	8.89	2.65	2.7	100	n.d.	n.d.
SH03A	LGW	25	7.18	1073	-160.1	1.58	7.75	0.000	1.26	33.61	146.00	25.79	4.44	4.25	730.41	0.00	3.43	2.44	1.71	762.3	16	-45.9	-7.3
15S01	TSR	0	6.68	350	34.7	0.07	0.10	0.000	2.43	7.65	50.13	9.05	8.30	35.64	143.52	1.15	0.01	2.24	8.53	1.5	18.5	-52.5	-7.8
15S04	TSR	0	6.79	667	1.5	3.20	0.05	0.181	11.31	33.28	98.18	18.04	45.50	65.12	348.55	0.58	0.52	22.08	8.94	6.6	15	-29.7	-5.0
15S05	TSR	0	6.62	732	2.6	10.25	0.07	0.020	7.08	43.58	77.13	14.42	38.60	0.00	261.41	0.00	0.59	11.40	17.50	10.3	27	-41.7	-6.6
15S06	TSR	0	6.69	654	25.0	7.05	0.23	0.131	6.87	27.56	79.73	14.33	32.92	63.20	259.49	0.00	0.62	8.41	13.41	6.4	45	-38.2	-6.0
15S07	TSR	0	6.65	467	-27.1	4.28	0.09	0.046	7.40	17.65	80.14	13.60	34.47	35.79	283.83	0.83	0.48	4.11	12.44	9.7	29	-44.5	-6.7
15S08	TSR	0	6.56	632	69.1	3.75	0.17	0.127	7.35	24.38	83.61	14.96	34.62	50.23	275.51	0.00	0.50	6.55	7.88	8.6	23	-34.6	-5.1
15S09	TSR	0	6.78	442	-17.3	3.53	0.04	0.061	7.77	17.35	70.98	12.14	34.64	24.94	233.22	0.25	0.30	7.24	6.98	9.0	15	-17.5	-3.4
15S10	TSR	0	6.66	467	44.3	3.23	0.08	0.061	8.08	15.48	72.49	12.56	37.38	27.37	231.30	0.42	0.32	6.72	7.16	8.7	14	-18.1	-3.2
15S11	TSR	0	6.71	509	25.1	3.18	0.03	0.064	7.49	14.49	67.16	11.66	33.49	22.15	214.64	0.42	0.32	6.04	6.78	10.4	10	-15.7	-3.1
15S12	TSR	0	6.68	382	109.9	0.38	n.d.	0.000	7.51	14.68	73.48	11.02	45.94	22.13	200.22	0.92	0.03	17.25	6.41	9.0	41	-19.0	-3.7
15S03	HR	0	6.87	240	104.7	0.15	0.04	0.000	2.32	7.50	43.18	9.02	7.81	34.78	140.96	1.09	0.00	2.66	n.d.	3.0	n.d.	-52.4	-8.3

n.d. means no data