

Supplement of Hydrol. Earth Syst. Sci., 22, 3473–3491, 2018  
<https://doi.org/10.5194/hess-22-3473-2018-supplement>  
© Author(s) 2018. This work is distributed under  
the Creative Commons Attribution 4.0 License.



*Supplement of*

## **Delineating multiple salinization processes in a coastal plain aquifer, northern China: hydrochemical and isotopic evidence**

**Dongmei Han and Matthew J. Currell**

*Correspondence to:* Dongmei Han (handm@igsnr.ac.cn)

The copyright of individual parts of the supplement might differ from the CC BY 4.0 License.

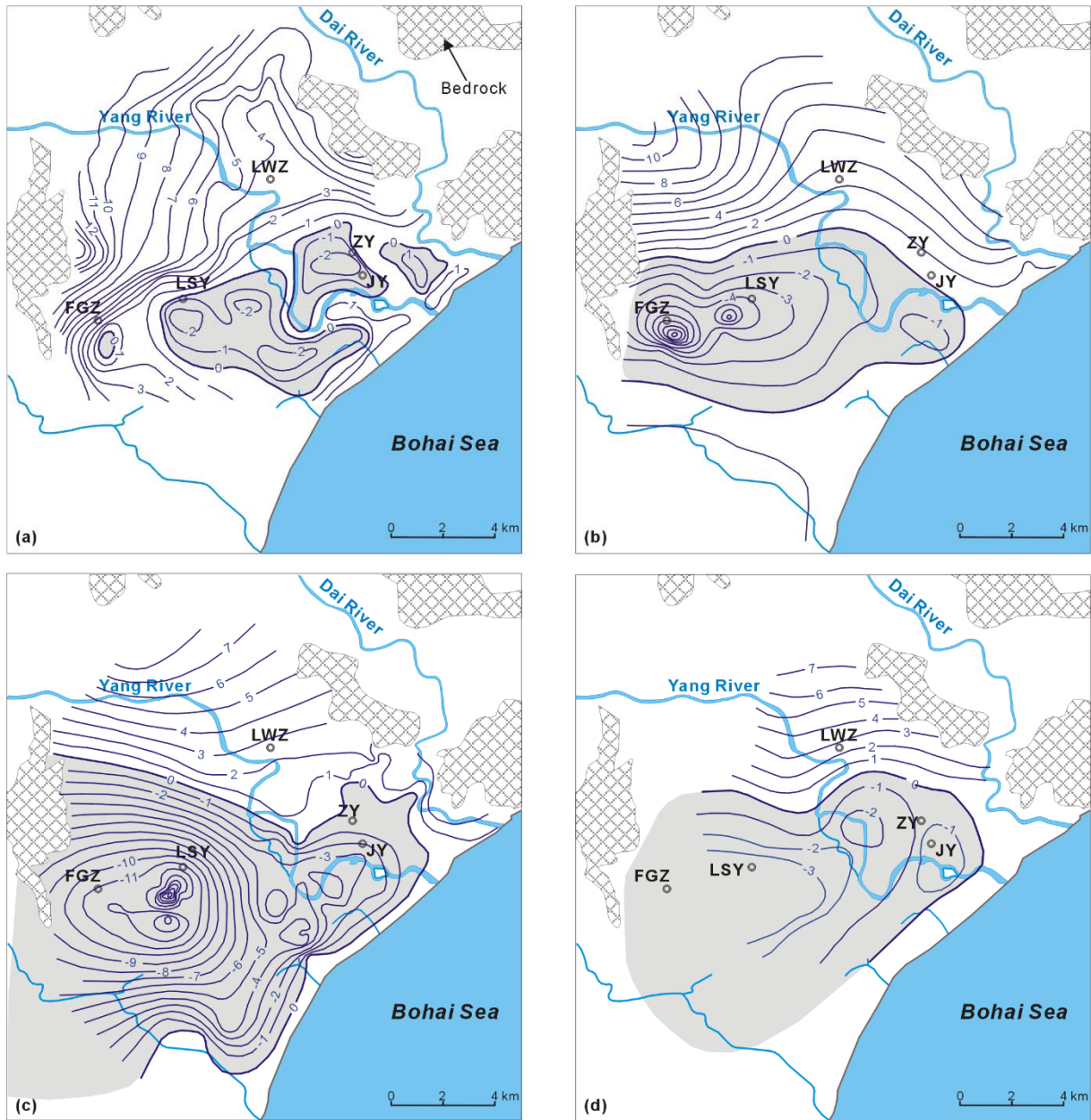


Fig. S1 Maps showing the distribution of water table contours in shallow aquifer (a) in 1986 (from Han, 1988), (b) in 1998 (from Zuo, 2006), (c) in 2004 (from Zuo, 2006), and (d) in 2010 (this study). The depression area (gray zone) refers to the potential area enclosed by 0 m.a.s.l. contour line of water tables.

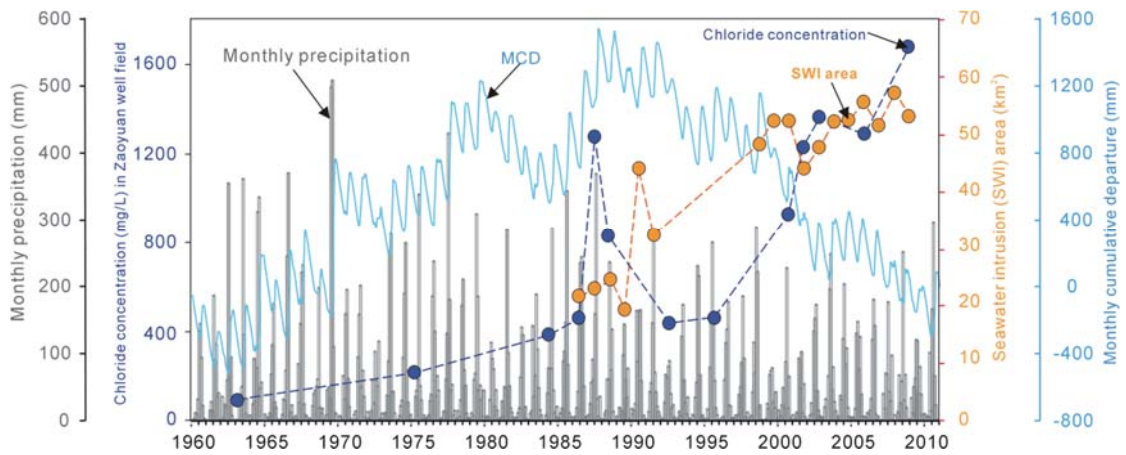


Fig. S2 Graph showing the temporal variation of monthly cumulative rainfall departure (CRD, Weber and Stewart, 2004), monthly precipitation, average concentration of chloride in groundwater (dark blue) and surface area with >250 mg Cl/L (yellow) between 1963 and 2008 (data from Zang et al., 2010).

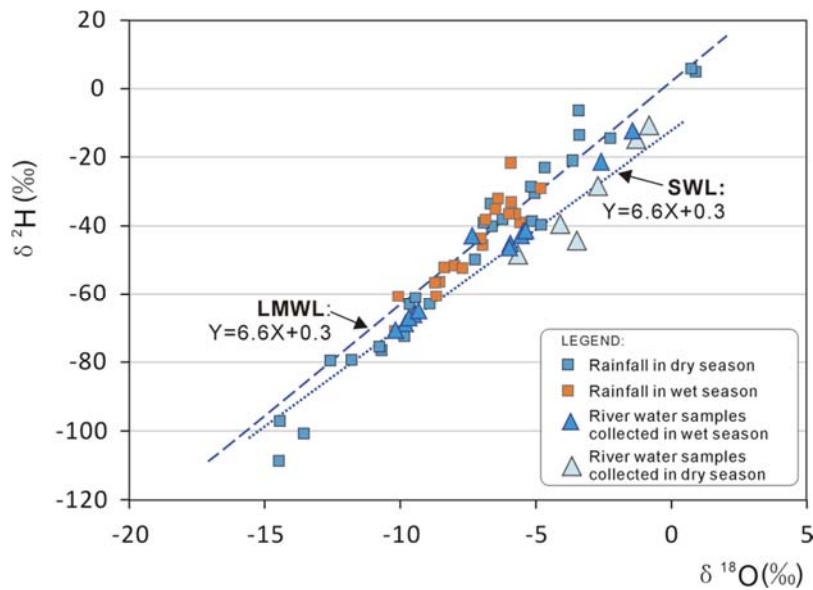


Fig. S3 Graph showing  $\delta^2\text{H}$  vs.  $\delta^{18}\text{O}$  of water samples in rainfall and river water. Dry season- July to October; wet season- November to June.

Table S1. NO<sub>3</sub>/Cl and Sr/Cl ratios in water samples

WaterType	ID	Sampling Time	Cl mg/L	NO <sub>3</sub> mg/L	Sr mg/L	NO <sub>3</sub> /Cl	Sr/Cl (×10 <sup>-3</sup> )
<i>Shallow groundwater samples:</i>							
Fresh Groundwater	G4	Aug.2010	124.3	92.6	0.67	0.745	5.41
	G27	Aug.2010	177.5	163.0	1.22	0.918	6.88
	G12	Aug.2010	276.9	31.9	0.25	0.115	0.90
	G17	Aug.2010	88.8	39.5	0.33	0.445	3.68
	G18	Aug.2010	124.3	137.8	0.71	1.109	5.71
	G1	Sep.2009	220.1	2.0	0.66	0.009	3.00
	G4	Sep.2009	124.3	178.5	0.85	1.437	6.83
	G5	Sep.2009	303.4	162.3	1.14	0.535	3.74
	G23	Sep.2009	88.8	163.4	0.55	1.841	6.17
	G7	Sep.2009	81.7	41.2	0.41	0.505	5.01
	G8	Sep.2009	334.6	85.4	1.19	0.255	3.57
	G11	Sep.2009	222.9	74.5	0.84	0.334	3.75
	G12	Sep.2009	174.0	46.0	0.53	0.264	3.06
	G28	Sep.2009	127.8	22.5	0.58	0.176	4.54
	G18	Sep.2009	110.1	152.9	0.65	1.389	5.94
	G20	Sep.2009	246.9	107.1	3.94	0.434	15.94
	G17	Sep.2009	243.5	126.4	0.71	0.519	2.91
	G3	Jun.2008	315.0		0.46		1.47
	G4	Jun.2008	74.6	75.8	0.47	1.017	6.29
	G5	Jun.2008	310.9	119.5	1.43	0.384	4.61
	G8	Jun.2008	349.7	55.9	1.08	0.160	3.07
	G12	Jun.2008	281.0	29.8	0.19	0.106	0.68
	G17	Jun.2008	227.9	92.6	0.57	0.406	2.50
	G18	Jun.2008	115.5	144.2	0.41	1.249	3.55
	G20	Jun.2008	234.3	18.2	2.10	0.078	8.95
Brackish Groundwater	G1	Aug.2010	312.4	120.0	0.54	0.384	1.71
	G3	Aug.2010	654.3	106.0	0.97	0.162	1.49
	G15	Aug.2010	435.7	181.3	1.60	0.416	3.67
	G26	Aug.2010	784.6	339.4	1.20	0.433	1.53
	G11	Aug.2010	646.1	414.1	1.51	0.641	2.34
	G20	Aug.2010	596.4	177.9	3.95	0.298	6.62
	G5	Aug.2010	447.3	253.3	0.78	0.566	1.74
	G8	Aug.2010	596.4	141.4	1.87	0.237	3.13
	G7	Aug.2010	299.6	338.3	0.66	1.129	2.20
	G19	Aug.2010	600.0	211.9	7.10	0.353	11.84
	G24	Aug.2010	646.1	952.1	2.44	1.474	3.78
	G22	Sep.2009	408.3	2.0	0.70	0.005	1.72
	G10	Sep.2009	2563.1	27.7	1.92	0.011	0.75
	G14	Sep.2009	291.1	109.8	0.82	0.377	2.81
	G24	Sep.2009	454.4	441.5	0.93	0.972	2.05
	G19	Sep.2009	622.0	91.5	4.87	0.147	7.83
	G1	Jun.2008	717.1	87.7	0.17	0.122	0.24
	G11	Jun.2008	451.2		1.00		2.21
	G14	Jun.2008	372.8	267.3	0.93	0.717	2.48
	G15	Jun.2008	1675.6	146.8	2.17	0.088	1.29

<b>Deep Groundwater samples:</b>							
Fresh Groundwater	G25	Aug.2010	68.1	71.0	0.25	1.042	3.66
	G16	Sep.2009	214.4		2.68		12.51
	G29	Sep.2009	255.6	26.3	0.20	0.103	0.77
Brackish Groundwater	G29	Aug.2010	803.4	143.0	6.95	0.178	8.65
	G16	Aug.2010	766.8	5.5	4.00	0.007	5.21
	G9	Jun.2008	823.6	47.4	7.40	0.058	8.98
	G9	Sep.2009	917.4	65.8	8.02	0.072	8.74
	G9	Aug.2010	1228.3	337.4	11.59	0.275	9.44
	G14'	Aug.2010	553.8	433.7	1.06	0.783	1.91
	G13	Aug.2010	908.8	210.6	0.26	0.232	0.29
	G13	Jun.2008	945.4		0.55		0.58
	G13	Sep.2009	882.0		0.35		0.39
	G2	Jun.2008	1093.4		1.03		0.94
<b>River water samples:</b>							
Fresh water samples							
Dai River	S9	Aug.2010	80.3	65.2	0.34	0.813	4.20
Dai River	S12	Aug.2010	71.3	41.9	0.30	0.588	4.14
Dai River	S8	Aug.2010	68.6	54.9	0.32	0.801	4.67
Yang River	S6	Aug.2010	66.0	51.9	0.30	0.786	4.53
Yang River	S2	Aug.2010	63.2	40.2	0.26	0.636	4.10
Yang River	S5	Sep.2009	85.2	12.9	0.36	0.152	4.27
Yang River	S4	Sep.2009	733.1	6.6		0.009	
Yang River	S6	Sep.2009	99.4	6.6	0.30	0.067	3.04
Dai River	S9	Sep.2009	88.8	6.8	0.36	0.077	4.03
Dai River	S8	Sep.2009	174.0	6.4	0.55	0.037	3.17
Yang River	S6	Jun.2008	81.7	12.6	0.31	0.154	3.82
Dai River	S10	Jun.2008	208.9	23.1	0.57	0.111	2.72
Dai River	S9	Jun.2008	92.3	7.5	0.35	0.081	3.81
Brackish and salt water samples							
Yang River	S3	Sep.2009	11289.4		4.29		0.38
Dai River	S12	Sep.2009	16766.3		7.64		0.46
Dai River	S11	Sep.2009	1601.5	2.8	0.93	0.002	0.58
Yang River	S1	Jun.2008	14953.5		5.55		0.37
Yang River	S2	Jun.2008	8328.3		3.37		0.40
Dai River	S7	Jun.2008	16677.1		6.36		0.38
<b>Seawater:</b>	SW1	Aug.2010	14768.3	810.1	5.79	0.055	0.39
	SW1	Sep.2009	16568.0		6.45		0.39
	SW2	Sep.2009	14484.8		5.43		0.37

Note: NO<sub>3</sub>/Cl and Sr/Cl – mass ratios