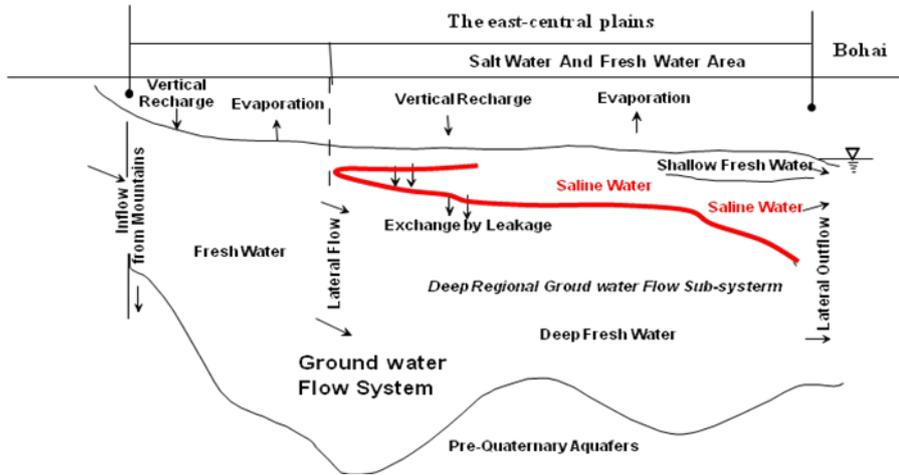
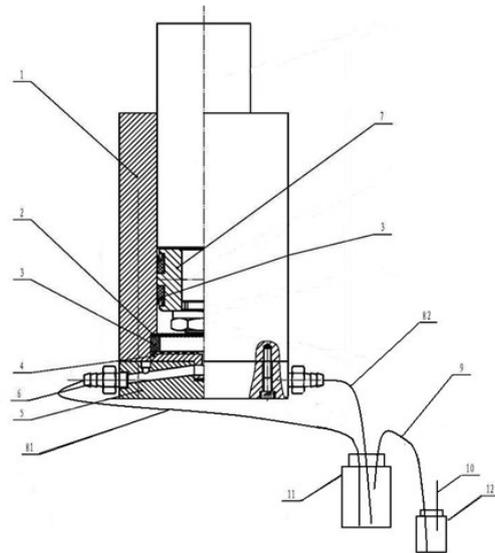


Fig. 1 Sampling depths used for geochemical analyses (chemical and stable isotope analyses) of clay pore waters

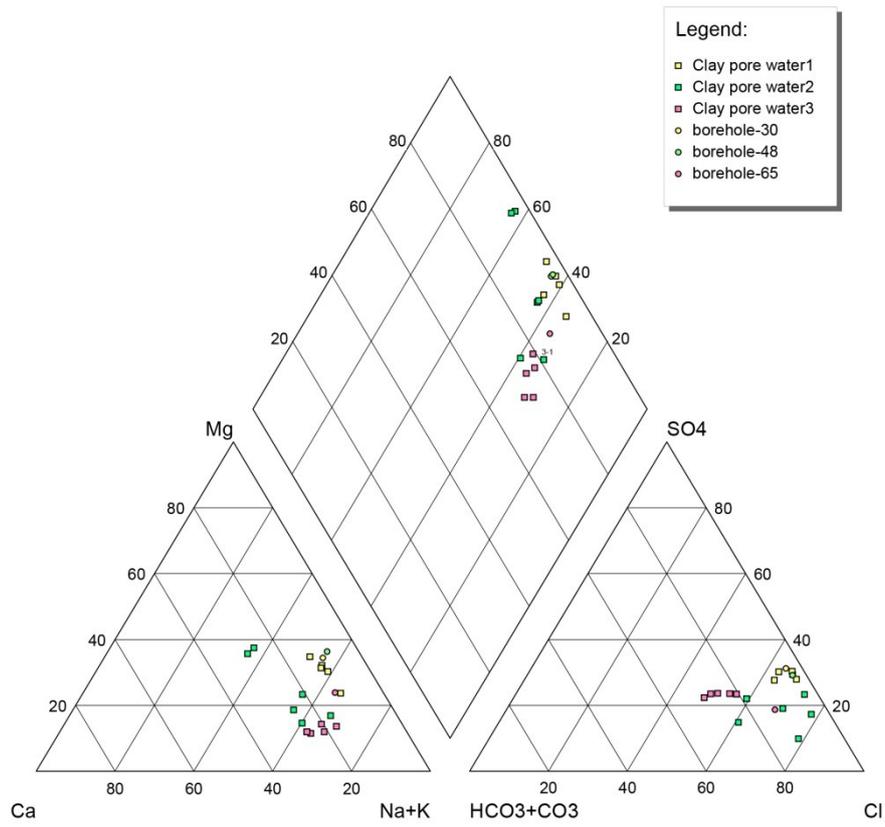


*Fig. 2. Schematic transect of ground flow in the North China Plain(zhang zonghu)*



1. Hollow column; 2. Filter membrane; 3. O-ring; 4. Filter ; 5. Base; 6. Outlet; 7. Piston; 8. Aqueduct; 9. Connecting pipe; 10. Exhaust pipe; 11. Collection bottles; 12. Non-evaporation bottles; 13. Joints

*Fig. 3. Set-up for the extraction of pore water by mechanical squeezing of clay cores*



*Fig. 4. Piper diagram of pore water from different levels of clay samples*

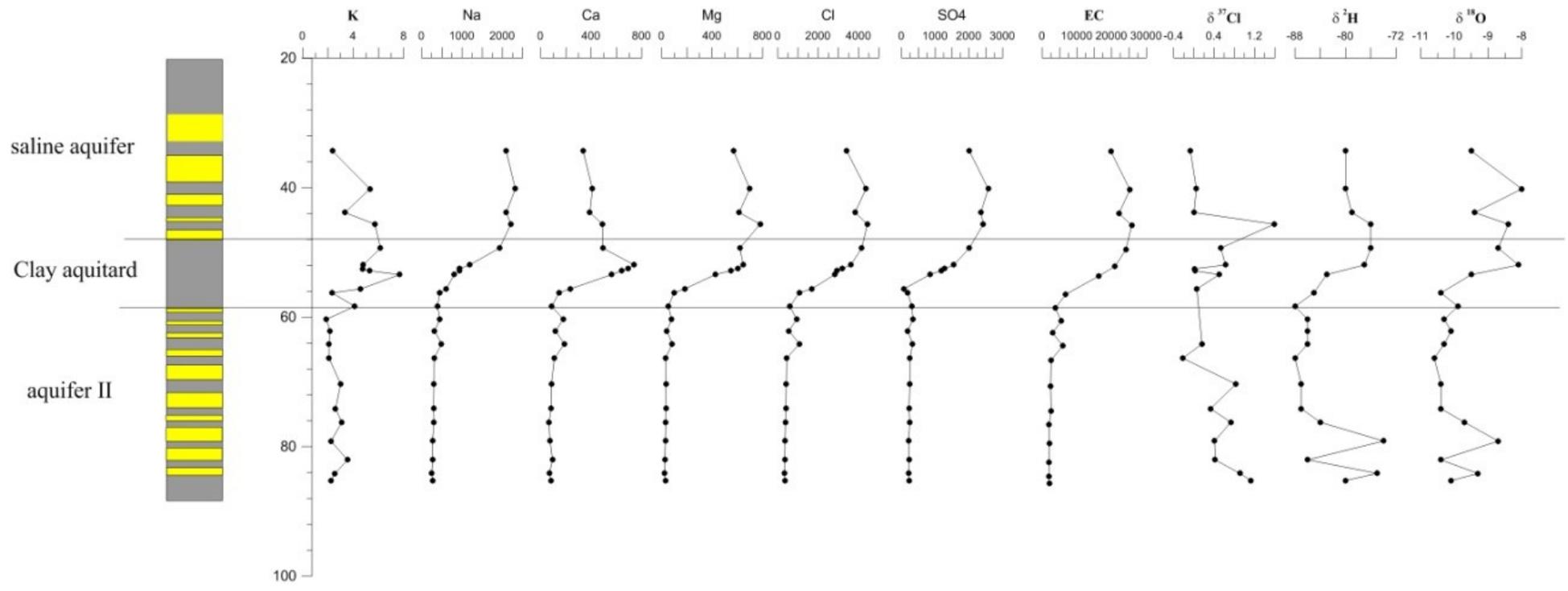


Fig. 5. Main compositions of clay layer pore water change with depth

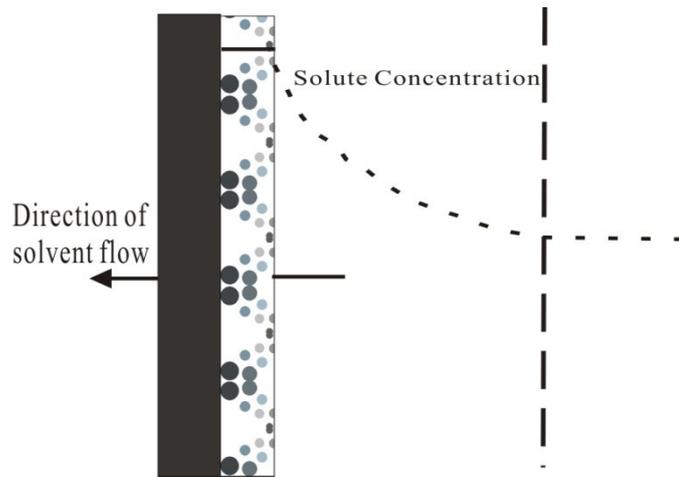


Fig. 6. Concentration polarization layer (CPL) at a clay membrane

Sample	D (H)	K+ (mg/L)	Na+ (mg/L)	Ca <sup>2+</sup> (mg/L)	Mg <sup>2+</sup> (mg/L)	Cl <sup>-</sup> (mg/L)	δD (‰)	δ <sup>18</sup> O (‰)	δ <sup>37</sup> Cl (‰)	Type
H1	30.00	2.15	2608.00	412.30	854.40	4622.00	-85.0	-11.3	0.08	aquifer
#1	34.35	2.36	2091.00	335.90	568.90	3404.00	-80.0	-9.50	-0.07	Clay pore water 1
#2	40.20	5.32	2318.00	409.80	698.00	4364.00	-80.0	-8.00	0.05	Clay pore water 1
#3	43.85	3.34	2094.00	389.10	613.10	3815.00	-79.0	-9.40		Clay pore water 1
#4	45.65	5.71	2208.00	487.50	779.80	4427.00	-76.0	-8.40	1.59	Clay pore water 1
H2	48.00	2.32	2493.00	312.80	860.70	4694.00	-74	-9.5	0.31	aquifer
#5	49.35	6.16	1928.00	491.70	619.00	4154.00	-76.0	-8.70	0.53	Clay pore water 2
#6	51.95	4.78	1189.00	740.20	646.20	3611.00	-77.0	-8.0	0.63	Clay pore water 2
#7	52.55	4.75	935.10	690.60	605.50	3182.00			0.01	Clay pore water 2
#8	52.85	5.31	940.70	642.50	548.10	2928.00			0.02	Clay pore water 2
#9	53.45	7.67	804.50	561.70	425.60	2811.00	-83.0	-9.50	0.05	Clay pore water

										2
#10	55.65	4.59	613.00	236.90	184.80	1685.00			0.06	Clay pore water 2
#11	56.25	2.32	450.80	146.50	99.56	1062.00	-85.00	-10.40	0.06	Clay pore water 2
#12	58.35	4.12	391.90	87.36	53.06	601.40	-88.00	-9.90		Clay pore water 2
#13	60.35	1.87	452.00	178.90	79.42	927.40	-86	-10.3		Clay pore water 3
#14	62.15	2.16	322.60	118.40	41.53	548.50	-86.00	-10.10		Clay pore water 3
#15	64.15	2.09	494.80	187.20	84.05	1070.00	-86.00	-10.30	0.16	Clay pore water 3
H3	65.00	0.32	300.90	50.19	59.42	520.60	-84	-10	0.67	aquife r
#16	66.35	2.09	310.30	109.70	31.39	440.50	-88	-10.60	0.22	Clay pore water 3
#17	70.35	3.00	307.10	84.56	35.73	419.20	-87.0	-10.40	0.83	Clay pore water 3
#18	74.15	2.60	299	83	36	404	-87.0	-10.40	0.33	Clay pore water 3
#19	76.25	3.10	309.00	66.47	32.24	379.20	-84.0	-9.70	0.73	Clay pore water 3

#20	79.15	2.24	271	74	30	359	-74.0	-8.70	0.41	Clay pore water 3
#21	82.05	3.54	278.20	93.94	26.56	356.00	-86.0	-10.40	0.42	Clay pore water 3
#22	84.15	2.56	248	69	24	323	-75.0	-9.30	0.91	Clay pore water 3
#23	85.25	2.24	273	84	31	367	-80.0	-10.10	1.13	Clay pore water 3

*Table 1. The chemical composition and isotopic of all analysed samples of the borehole and Clay pore water*

*Table 2. The chemical composition and isotopic of Clay pore water*

<b>Type</b>	<b><math>\delta D(\text{‰})</math></b>	<b><math>\delta^{18}O(\text{‰})</math></b>	<b><math>\delta^{37}Cl(\text{‰})</math></b>
Saline aquifer	-76 ~ -80	-8.4 ~ -9.5	-0.07 ~ 1.59
Clay aquitard	-76 ~ -88	-8.0 ~ -10.4	-0.01 ~ 0.63
Aquifer II	-74 ~ -88	-8.7 ~ -10.6	-0.22 ~ 1.13