

Supplementary material

Table 1. Data of surface sand pit

Point	After 70.5 h/m		After 118.5 h/m		After 190.5 h/m		After 238.5 h/m	
	x position	y position	x position	y position	x position	y position	x position	y position
C1	0	0	-0.113	-0.1	-0.086	-0.105	-0.11	-0.131
C2	-36.892	32.298	-37.029	32.066	-37.027	32.069	-37.059	32.034
C3	-7.321	-105.796	-6.767	-104.895	-6.764	-104.891	-6.789	-104.913
C4	-61.538	-137.435	-61.534	-137.488	-61.524	-137.486	-61.559	-137.516
C5	150.491	-88.188	150.381	-88.234	150.442	-88.226	150.377	-88.263
C6	165.224	-102.681	165.196	-102.725	165.207	-102.715	165.182	-102.749
C7	131.797	40.691	131.746	40.63	131.802	40.637	131.745	40.595

Table 2. Data of water volume flux

time/h	12.43	14.75	15.25	16.92	18.62	21.17	22.27	24.22	25.18	27.42	27.98
water volume flux/(m ³ /h)	12.29	7.12	4.45	4.35	5.07	0.22	-0.40	-0.43	-0.26	-0.25	0.38
time/h	28.50	28.92	31.93	33.18	35.03	35.80	38.47	39.10	41.77	42.57	44.97
water volume flux/(m ³ /h)	3.03	0.68	0.54	0.30	0.26	0.23	0.00	0.28	0.00	0.33	0.34

Table 3. Waterline data of Wusu group aquifer

Date	Waterline of Wusu group aquifer/m			
	J1	J2	J3	S4
Sep.4	1204.825	1200.955	1204.285	
Sep.19	1201.725	1192.455	1205.335	
Oct.5	1195.425	1191.355	1203.335	
Oct.18	1193.925	1191.355	1201.785	
Oct.29	1193.825	1191.555	1200.285	1207.215
Nov.15			1197.885	1207.215
Nov.23			1197.385	
Nov.25			1197.185	

Table 4. Density data of sand-water mixture flow

Volume concentration of sand	0.029	0.057	0.108	0.195	0.266	0.326	0.377	0.421	0.459	0.492	0.521	0.548
Density of sand-water mixture /(kg/m ³)	1019	1048	1101	1217	1301	1374	1449	1507	1558	1625	1677	1695
Volume concentration of sand	0.571	0.592	0.611	0.629	0.645	0.659	0.673	0.685	0.697	0.708	0.718	0.727
Density of sand-water mixture /(kg/m ³)	1739	1780	1818	1854	1860	1883	1921	1941	1959	1969	1992	2022
Volume concentration of sand	0.736	0.744	0.752	0.769	0.784	0.787	0.797	0.809	0.819	0.829	0.837	0.845
Density of sand-water mixture /(kg/m ³)	2057	2069	2077	2096	2088	2078	2057	2014	1974	1971	1952	1935
Volume concentration of sand	0.852	0.858	0.864	0.869	0.874	0.879	0.883	0.887	0.891	0.894	0.898	0.901
Density of sand-water mixture /(kg/m ³)	1921	1907	1895	1884	1874	1865	1856	1848	1841	1834	1828	1822
Volume concentration of sand	0.904	0.906	0.909	0.911	0.914	0.916	0.918	0.920	0.922			
Density of sand-water mixture /(kg/m ³)	1817	1812	1807	1802	1798	1794	1790	1786	1783			

Table 5. Dynamic viscosity data of sand-water mixture flow

Volume concentration of sand	0.03	0.06	0.11	0.19	0.27	0.33	0.38	0.42	0.46	0.49	0.52
Dynamic viscosity ratio of sand- water mixture	1.1	1.2	1.3	1.7	2.1	2.8	3.1	3.4	4.4	5.2	6.1
Volume concentration of sand	0.55	0.57	0.59	0.61	0.63	0.64	0.66	0.67	0.69	0.70	0.71
Dynamic viscosity ratio of sand- water mixture	6.7	7.3	7.5	8	8.2	8.4	8.6	8.7	8.9	9	9.1
Volume concentration of sand	0.72	0.73	0.74	0.74	0.75	0.77	0.78	0.79	0.80		
Dynamic viscosity ratio of sand- water mixture	9.2	9.2	9.3	9.4	9.4	9.5	9.7	9.7	9.7		