

Qualitative evaluation of groundwater in terms of its suitability for drinking and irrigation. The case study of Sidi-Bel-Abbes alluvial aquifer (NW Algeria)

Valutazione qualitativa delle acque sotterranee in termini di idoneità alla potabilità e all'irrigazione. Il caso di studio dell'acquifero alluvionale di Sidi-Bel-Abbes (NO Algeria)

Abdelkader OTMANE ^{a,b} ✉, Radia GHERISSI ^{b,c}, Kamila BABA-HAMED^b, Abderrazak BOUANANI^b

^a Ibn Khaldoun Tiarret University. Faculty of Natural Sciences and Life. Karman, BP14000, Tiarret, Algeria -Email ✉ : otmanekadeur@outlook.fr

^b Laboratory 25: Water and Soil Resources, Science and Technology Faculty, University of Tlemcen, Chetouane, BP 230, 13000 Algeria - email: kambabamed@yahoo.fr; a_bouanamidz@yahoo.fr

^c University centre of Maghnia, Science and Technology Faculty, Maghnia, BP 13300, Tlemcen, Algeria - email: hydro_rad@yahoo.fr;

APPENDIX- APPENDICE

Appendix 1

Coordinat system (UTM zone 30 N)			Cations (mg/L)				Anions (mg/L)			Cations (meq/L)				Anions (meq/L)		
Water Point	X	Y	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	HCO ₃ ⁻	Cl ⁻	r%Ca ²⁺	r%Mg ²⁺	r%Na ⁺	r%K ⁺	r%SO ₄ ²⁻	r%HCO ₃ ⁻	r%Cl ⁻
240-11	696792.52	3888301.87	245	52	258	9	60	181	863	12.25	4.28	11.22	0.23	1.25	2.97	25.92
240-50	698705.44	3885557.18	1267	72	621	9	415	121	2876	63.35	5.92	27	0.23	8.65	1.98	86.37
241-2	706988.39	3889595.35	174	184	515	5	128	305	1241	8.7	15.13	22.39	0.13	2.67	5	37.27
241-10	706665.87	3886520.32	100	53	276	69	180	515	319	5	4.36	12	1.77	3.75	8.44	9.58
241-45	724480.87	3893817.57	84	202	437	6	194	503	934	4.2	16.61	19	0.15	4.04	8.25	28.05
241-68	714517.54	3894541.96	337	140	230	14	260	302	995	16.85	11.51	10	0.36	5.42	4.95	29.88
241-179	714201.39	3899985.2	180	216	271	5	204	369	934	9	17.76	11.78	0.13	4.25	6.05	28.05
241-199	704209.72	3885676.31	201	96	246	4	76	181	799	10.05	7.89	10.7	0.1	1.58	2.97	23.99
242-5	732396.18	3895579.81	129	91	117	4	225	332	259	6.45	7.48	5.09	0.1	4.69	5.44	7.78
242-10	730859.73	3891832.58	397	150	262	8	178	350	1214	19.85	12.34	11.39	0.21	3.71	5.74	36.46
242-23	741548.25	3896762.32	517	82	465	2	312	305	1500	25.85	6.74	20.22	0.05	6.5	5	45.05
271-27	694850.59	3879120.99	265	50	177	4	112	24	719	13.25	4.11	7.7	0.1	2.33	0.39	21.59
271-50	684565.25	3871961.29	123	99	304	34	78	317	703	8.14	8.14	13.22	0.87	1.63	5.2	21.11
272-34	701807.66	3875266.15	192	93	173	4	235	339	489	9.6	7.65	7.52	0.1	4.9	5.56	14.68
272-39	702106.61	3870974.88	135	82	131	4	257	332	277	6.75	6.74	5.7	0.1	5.35	5.44	8.32
272-43	691288.91	3873503.67	269	73	131	4	149	399	518	13.45	6	5.7	0.1	3.1	6.54	15.56
272-49	711626.47	3878741.5	80	62	347	5	462	366	375	4	5.1	15.09	0.13	9.63	6	11.26
272-74	709175.02	3868308.41	196	93	616	11	216	336	1169	9.8	7.65	26.78	0.28	4.5	5.51	35.11
Belarbi	732294.26	3893018.24	188	98	106	4	305	336	334	9.4	8.06	4.61	0.1	6.35	5.51	10.03
FZ12	712399.87	3894769.72	104	41	83	5	98	359	184	5.2	3.37	3.61	0.13	2.04	5.89	5.53
FMS	695186.51	3863309.46	237	75	235	4	213	306	634	11.85	6.17	10.22	0.1	4.44	5.02	19.04
AinTellout	686478.67	3866611.87	62	45	35	2	24	310	80	3.1	3.7	1.52	0.05	0.5	5.08	2.4

Appendix 2

Water Point	Dry residue (mg/l)	EC ($\mu\text{S/cm}$)	C.A.T ($^{\circ}\text{F}$)	E (%)	HT (mg/L)	HT (meq/L)	HT ($^{\circ}\text{F}$)	bei	SAR
240-11	1993.2	3020	14.85	-3.72	48.20	2.41	12.05	0.56	3.90
240-50	5194.2	7870	19.9	-0.26	182.55	9.13	45.64	0.68	4.59
241-2	2369.4	3590	25	1.54	83.98	4.20	21.00	0.40	6.49
241-10	1049.4	1590	42.2	3.03	30.43	1.52	7.61	-0.44	5.55
241-45	2257.2	3420	41.25	-0.47	78.84	3.94	19.71	0.32	5.89
241-68	2336.4	3540	24.75	-1.94	89.44	4.47	22.36	0.65	2.66
241-179	2072.4	3140	30.25	0.42	95.56	4.78	23.89	0.58	3.22
241-199	1927.2	2920	14.85	0.35	57.56	2.88	14.39	0.55	3.57
242-5	1425.6	2160	27.2	3.27	46.89	2.34	11.72	0.33	1.93
242-10	2818.2	4270	28.7	-2.36	100.34	5.02	25.09	0.68	2.84
242-23	2488.2	3770	25	-3.37	92.28	4.61	23.07	0.55	5.01
271-27	1518	2300	19.5	1.72	50.00	2.50	12.50	0.64	2.61
271-50	2059.2	3120	26	4.17	53.82	2.69	13.46	0.33	4.63
272-34	1689.6	2560	27.8	-0.54	55.45	2.77	13.86	0.48	2.56
272-39	1537.8	2330	27.2	0.47	44.59	2.23	11.15	0.30	2.19
272-43	1339.8	2030	32.7	0.10	58.27	2.91	14.57	0.63	1.83
272-49	1603.8	2430	30	-5.02	30.97	1.55	7.74	-0.35	7.07
272-74	1884.96	2856	27.55	-0.68	55.95	2.80	13.99	0.23	9.07
Belarbi	1224.3	1855	27.55	0.64	56.64	2.83	14.16	0.53	1.56
FZ12	1504.8	2280	29.45	-4.46	26.85	1.34	6.71	0.32	1.74
FMS	660	1000	25.1	-0.28	54.98	2.75	13.74	0.46	3.40
AinTellout	513.48	778	25.4	2.39	22.97	1.15	5.74	0.35	0.82