



PLAN DE SEGUIMIENTO AMBIENTAL SALAR DE ATACAMA

Anexo I Análisis estadístico

**Proyecto Cambios y Mejoras de la Operación Minera
en el Salar de Atacama**



ANEXO I ANÁLISIS ESTADISTICO

A continuación se presentan los resultados de los análisis estadísticos utilizados en el presente informe.

I.1 Análisis no paramétrico. Método de Tukey



HUMEDAD POZOS 2009 13:55 Tuesday, February 2, 2010 31

The GLM Procedure

pozo 18 L1-3 L1027 L2-25 L2-26 L2-27 L2-28 L2-4 L3-15 L3-3 L3-5 L4-17 L4-3 L5-6 L5-7 L7-14 L7-7 L9-1 L9-2

Dependent Variable: hume

Source	DF	Sum of		F Value	Pr > F
		Squares	Mean Square		
Model	26	12.49535707	0.48059066	53.10	<.0001
Error	153	1.38469004	0.00905026		
Corrected Total	179	13.88004711			

R-Square	Coeff Var	Root MSE	hume Mean
0.900239	30.46960	0.095133	0.312222

Source	DF	Type I SS	Mean Square	F Value	Pr > F
pozo	17	12.43211051	0.73130062	80.80	<.0001
camp	9	0.06324656	0.00702740	0.78	0.6383

Source	DF	Type III SS	Mean Square	F Value	Pr > F
pozo	17	12.43211051	0.73130062	80.80	<.0001
camp	9	0.06324656	0.00702740	0.78	0.6383

Means with the same letter are not significantly different.

Tukey Grouping	Mean	N	pozo
A	0.82490	10	L1027
A			
A	0.72300	10	L2-4
A			
B	A	0.69300	10 L2-25
B	A		
B	A	0.68730	10 L7-7
B			
B	C	0.54590	10 L2-27
C			
C	0.45890	10	L3-5
D	0.28930	10	L5-7
D			
D	0.28830	10	L7-14
D			
E	D	0.22110	10 L4-17
E	D		
E	D F	0.17830	10 L5-6
E	D F		
E	G D F	0.15780	10 L2-28
E	G D F		
H	E G D F	0.14230	10 L2-26
H	E G		
H	E G	F	0.12050 10 L3-3
H	E G	F	
H	E G	F	0.11770 10 L9-1
H	E G	F	
H	E G	F	0.10030 10 L9-2
H	G	F	
H	G	F	0.04390 10 L3-15
H	G		
H	G	0.02110	10 L1-3
H			
H		0.00640	10 L4-3

1.2 Modelo de regresión cúbico.

HUMEDAD POZOS 2009 06:45 Wednesday, February 3, 2010 11
 camp=c18 (Enero 2008)

The REG Procedure
 Model: MODEL1.2
 Dependent Variable: hume

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1.15714	0.38571	12.39	0.0003
Error	14	0.43594	0.03114		
Corrected Total	17	1.59308			

Root MSE 0.17646 R-Square 0.7264
 Dependent Mean 0.31006 Adj R-Sq 0.6677
 Coeff Var 56.91249

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	0.83372	0.10637	7.84	<.0001
nap	1	-0.39731	0.10200	-3.90	0.0016
napsq	1	0.05798	0.02207	2.63	0.0199
napcu	1	-0.00227	0.00102	-2.23	0.0429

camp=c19 (Enero 2009)

The REG Procedure
 Model: MODEL1.2
 Dependent Variable: hume

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1.05746	0.35249	17.69	<.0001
Error	14	0.27895	0.01993		
Corrected Total	17	1.33641			

Root MSE 0.14116 R-Square 0.7913
 Dependent Mean 0.28100 Adj R-Sq 0.7465
 Coeff Var 50.23368

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	0.76371	0.08270	9.24	<.0001
nap	1	-0.35980	0.07934	-4.54	0.0005
napsq	1	0.05087	0.01726	2.95	0.0106
napcu	1	-0.00196	0.00080045	-2.45	0.0282

camp=c28 (Abril 2008)

The REG Procedure
 Model: MODEL1.2
 Dependent Variable: hume

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1.02569	0.34190	14.57	0.0001
Error	14	0.32848	0.02346		
Corrected Total	17	1.35417			

Root MSE 0.15318 R-Square 0.7574
 Dependent Mean 0.30789 Adj R-Sq 0.7054
 Coeff Var 49.75067

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	0.80815	0.09718	8.32	<.0001
nap	1	-0.35285	0.09089	-3.88	0.0017



napsq	1	0.04840	0.01955	2.48	0.0267
napcu	1	-0.00184	0.00090371	-2.04	0.0607

camp=c29 (Abril 2009)

The REG Procedure
Model: MODEL1.2
Dependent Variable: hume

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.91956	0.30652	5.83	0.0084
Error	14	0.73614	0.05258		
Corrected Total	17	1.65570			

Root MSE	0.22931	R-Square	0.5554
Dependent Mean	0.31483	Adj R-Sq	0.4601
Coeff Var	72.83427		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	0.78012	0.14402	5.42	<.0001
nap	1	-0.32123	0.13407	-2.40	0.0311
napsq	1	0.04340	0.02875	1.51	0.1534
napcu	1	-0.00164	0.00132	-1.24	0.2349

camp=c37 (Julio 2007)

The REG Procedure
Model: MODEL1.2
Dependent Variable: hume

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1.15219	0.38406	14.95	0.0001
Error	14	0.35961	0.02569		
Corrected Total	17	1.51180			

Root MSE	0.16027	R-Square	0.7621
Dependent Mean	0.32378	Adj R-Sq	0.7112
Coeff Var	49.49974		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	0.82755	0.09368	8.83	<.0001
nap	1	-0.38440	0.09080	-4.23	0.0008
napsq	1	0.05575	0.01972	2.83	0.0134
napcu	1	-0.00218	0.00091031	-2.39	0.0313

camp=c38 (Julio 2008)

The REG Procedure
Model: MODEL1.2
Dependent Variable: hume

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.80676	0.26892	16.79	<.0001
Error	14	0.22418	0.01601		

Corrected Total 17 1.03094

Root MSE 0.12654 R-Square 0.7825
 Dependent Mean 0.28261 Adj R-Sq 0.7360
 Coeff Var 44.77576

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	0.69936	0.07354	9.51	<.0001
nap	1	-0.31407	0.07117	-4.41	0.0006
napsq	1	0.04493	0.01548	2.90	0.0116
napcu	1	-0.00175	0.00071810	-2.44	0.0288

camp=c39 (Julio 2009)

The REG Procedure
 Model: MODEL1.2
 Dependent Variable: hume

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.88146	0.29382	9.47	0.0011
Error	14	0.43454	0.03104		
Corrected Total	17	1.31600			

Root MSE 0.17618 R-Square 0.6698
 Dependent Mean 0.32750 Adj R-Sq 0.5990
 Coeff Var 53.79488

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	0.74914	0.10199	7.35	<.0001
nap	1	-0.30558	0.09898	-3.09	0.0080
napsq	1	0.04221	0.02159	1.96	0.0708
napcu	1	-0.00162	0.00099947	-1.62	0.1268

camp=c47 (octubre 2007)

The REG Procedure
 Model: MODEL1.2
 Dependent Variable: hume

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1.19274	0.39758	18.28	<.0001
Error	14	0.30453	0.02175		
Corrected Total	17	1.49727			

Root MSE 0.14749 R-Square 0.7966
 Dependent Mean 0.33506 Adj R-Sq 0.7530
 Coeff Var 44.01849

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	0.82132	0.08332	9.86	<.0001
nap	1	-0.36582	0.08181	-4.47	0.0005
napsq	1	0.05124	0.01795	2.85	0.0127
napcu	1	-0.00197	0.00083509	-2.36	0.0331

camp=c48 (Octubre 2008)

The REG Procedure
Model: MODEL1.2
Dependent Variable: hume

Analysis of Variance

Source	DF	Sum of	Mean	F Value	Pr > F
		Squares	Square		
Model	3	0.93497	0.31166	12.86	0.0003
Error	14	0.33932	0.02424		
Corrected Total	17	1.27429			

Root MSE	0.15568	R-Square	0.7337
Dependent Mean	0.30200	Adj R-Sq	0.6767
Coeff Var	51.55039		

Parameter Estimates

Variable	DF	Parameter	Standard	t Value	Pr > t
		Estimate	Error		
Intercept	1	0.73823	0.08853	8.34	<.0001
nap	1	-0.32879	0.08636	-3.81	0.0019
napcq	1	0.04664	0.01889	2.47	0.0270
napcu	1	-0.00181	0.00087784	-2.06	0.0582

camp=c49 (Octubre 2009)

The REG Procedure
Model: MODEL1.2
Dependent Variable: hume

Analysis of Variance

Source	DF	Sum of	Mean	F Value	Pr > F
		Squares	Square		
Model	3	1.05987	0.35329	26.41	<.0001
Error	14	0.18727	0.01338		
Corrected Total	17	1.24714			

Root MSE	0.11566	R-Square	0.8498
Dependent Mean	0.33750	Adj R-Sq	0.8177
Coeff Var	34.26888		

Parameter Estimates

Variable	DF	Parameter	Standard	t Value	Pr > t
		Estimate	Error		
Intercept	1	0.80766	0.06586	12.26	<.0001
nap	1	-0.35803	0.06439	-5.56	<.0001
napcq	1	0.05233	0.01409	3.71	0.0023
napcu	1	-0.00206	0.00065138	-3.16	0.0069