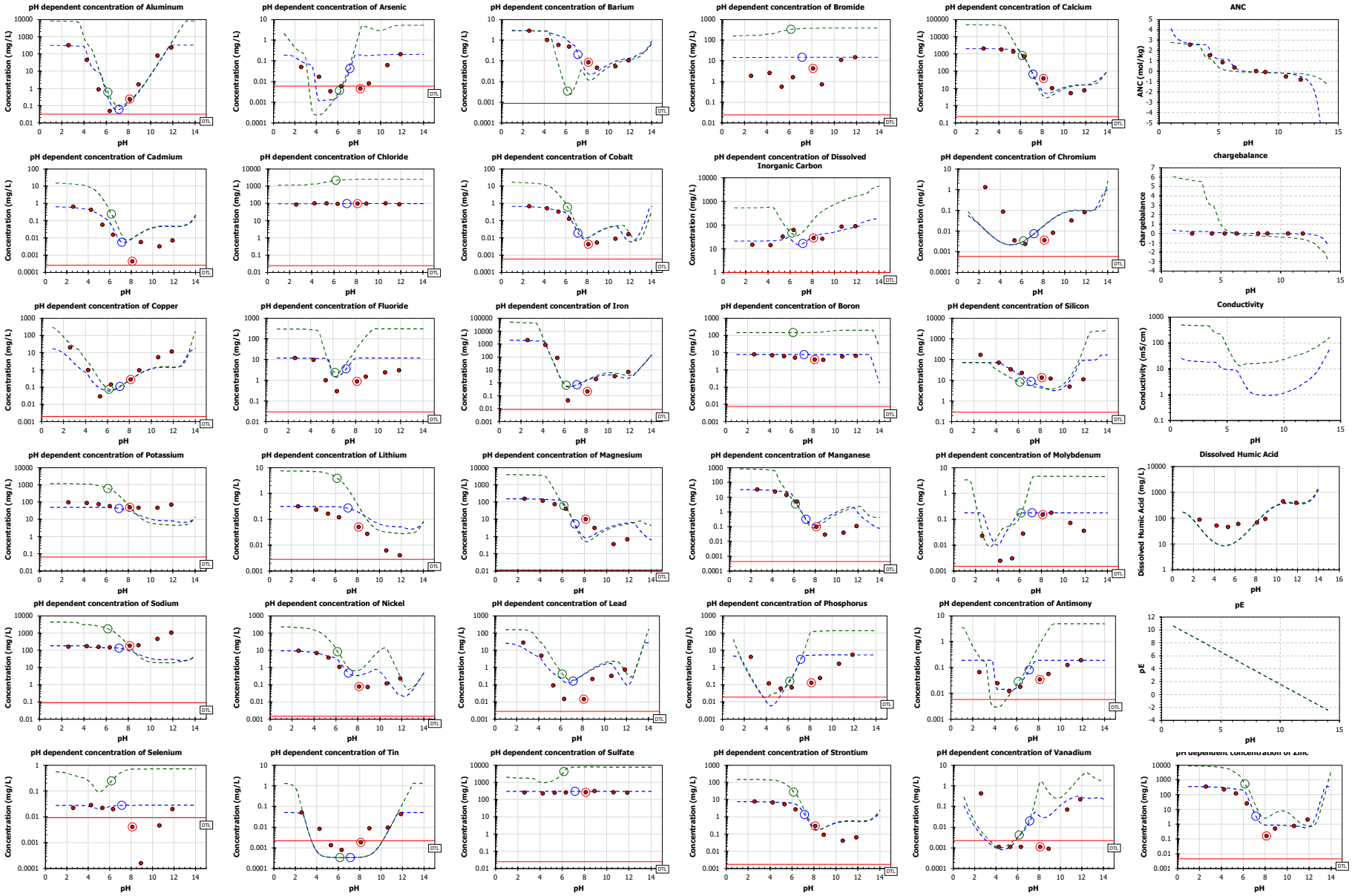
MUNICIPAL SOLID WASTE LANDGRAAF PILOT 8yrs NL

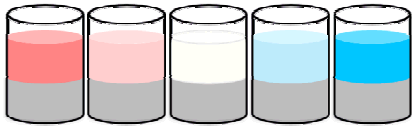
COMPARISON pH DEPENDENCE WITH MODEL



Object pH Dependent Leaching Test Model

Name Municipal solid waste Landgraaf 8 yrs after placement NL

pH Dependent Leaching Test Scenario



Lab Test

Extra L/S Simulation

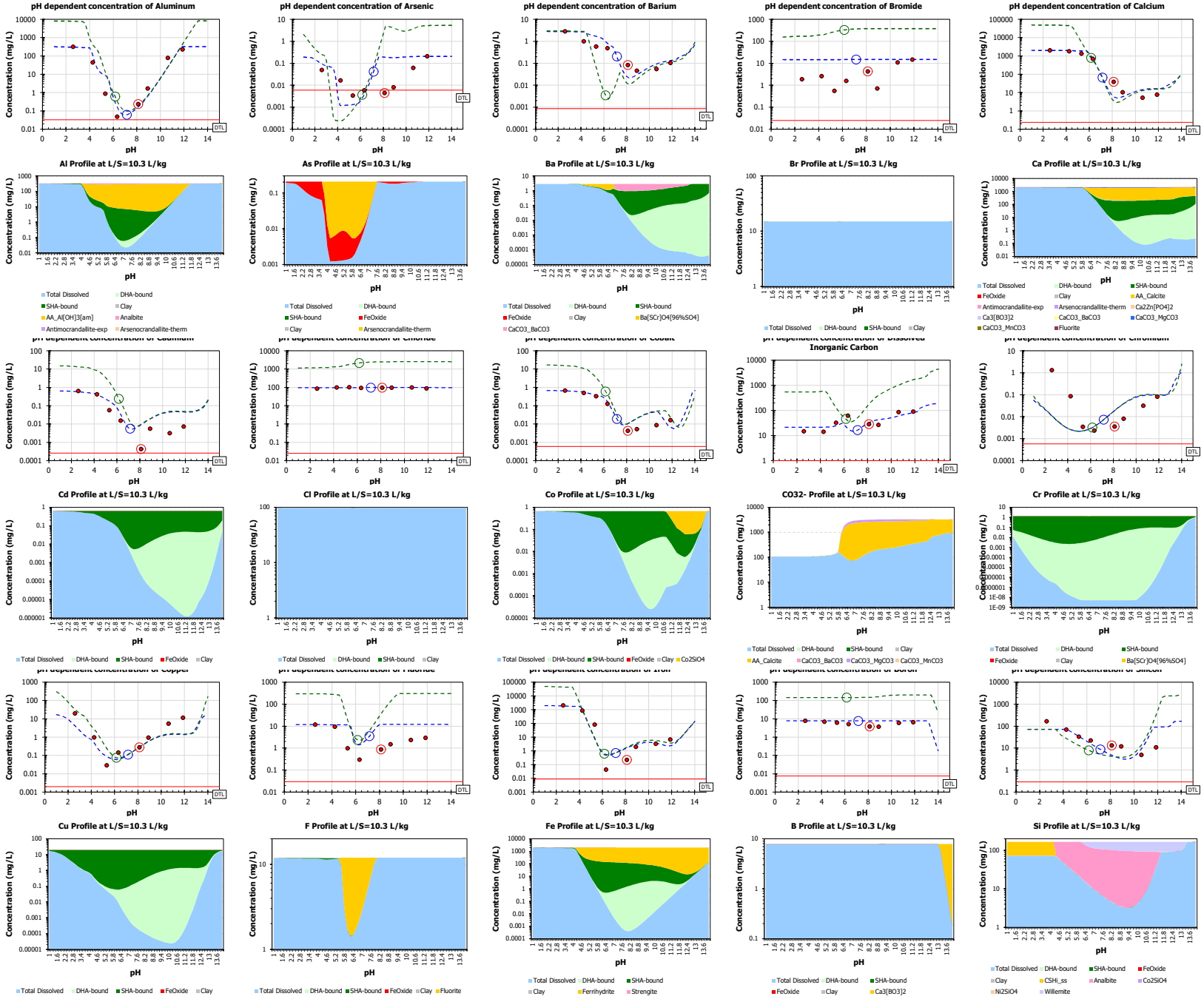
Lab Test

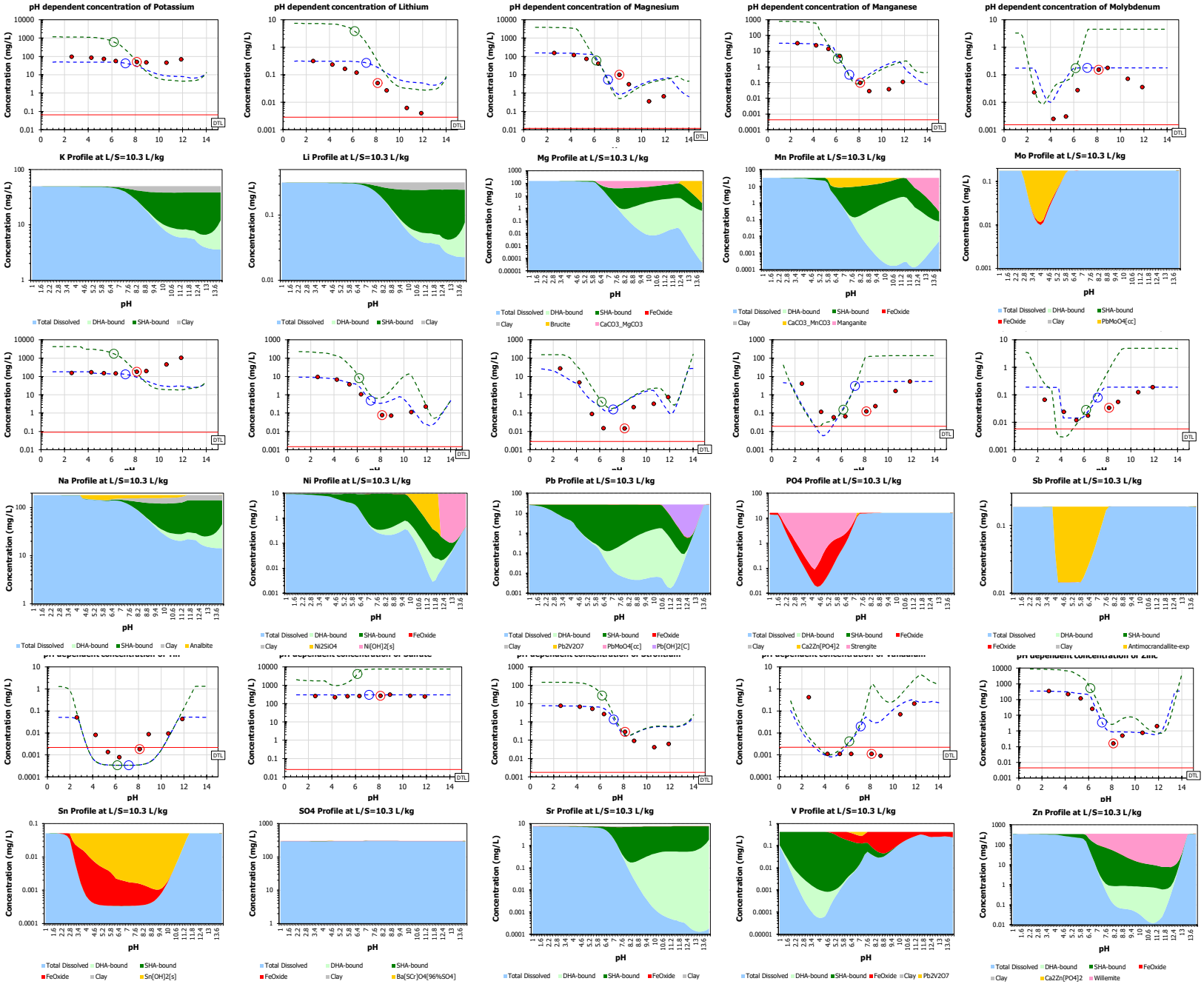
Model Parameters

Entity	Unit	Default	Available Content Entity	mg/kg	Entity	mg/kg	Entity	mg/kg
c0		-4.439	Al	3324	Fe	2.104E+04	Pb	279.9
c1		0.9070	As	2.136	B	80.68	PO4	168.5
c2		-0.6731	Ba	29.46	Si	1715	Sb	1.953
c3		0.1378	Br	153.7	Hg	2.006E-07	Se	0.2892
c4		-0.01086	Ca	2.120E+04	K	514.1	Sn	0.5283
c5		0.0002966	Cd	6.613	Li	3.265	SO4	3089
Clay	mg/kg	1.000E+05	Cl	1004	Mg	1601	Sr	78.70
Hydrous Ferric Oxide	mg/kg	200.0	Co	6.984	Mn	333.6	Th	2.320E-07
L/S	L/kg	10.25	CO32-	3.404E+04	Mo	1.828	U	2.380E-07
pE		3.490	Cr	13.52	Na	1878	V	4.326
pH		8.110	Cu	202.0	Ni	96.26	Zn	3626
Solid Humic Acid	mg/kg	5.295E+04	F	123.0	NO3	6.200E-08		
Simulated Low L/S	L/kg	0.4000						

Minerals

Name	Log(K)	Reaction	Name	Log(K)	Reaction
AA_Al[OH]3[am]	13.76	AA_Al[OH]3[am] + 1 H2O -> 1 Al[OH]4- + 1 H+	CaCO3_MnCO3	21.48	CaCO3_MnCO3 -> 2 CO3-2 + 1 Ca+2 + 1 Mn+2
AA_Anhydrite	4.410	AA_Anhydrite -> 1 Ca+2 + 1 SO4-2	CaSb[OH]6[s]2	18.41	CaSb[OH]6[s]2 + 6 H2O -> 1 Ca+2 + 2 Sb[OH]6-
AA_Calcite	9.481	AA_Calcite -> 1 CO3-2 + 1 Ca+2	Co2SiO4	5.289	Co2SiO4 + 2 H+ -> 2 Co+2 + 1 H2SiO4-2
Analbite	84.35	Analbite + 8 H2O -> 1 Al[OH]4- + 6 H+ + 3 H2SiO4-2 + 1 Na+	Ferrihydrite	16.71	Ferrihydrite + 1 H2O -> 1 Fe[OH]4- + 1 H+
Anglesite	7.790	Anglesite -> 1 Pb+2 + 1 SO4-2	Fluorite	10.96	Fluorite -> 1 Ca+2 + 2 F-
Antimocrandallite-exp	63.00	Antimocrandallite-exp + 8 H2O -> 3 Al[OH]4- + 1 Ca+2 + 3 H+ + 2 Sb[OH]6-	Manganite	-25.27	Manganite + 3 H+ + 1 e- -> 2 H2O + 1 Mn+2
Arsenocrandallite-thern	95.56	Arsenocrandallite-therm + 6 H2O -> 3 Al[OH]4- + 2 AsO4-3 + 1 Ca+2 + 7 H+	Ni[OH]2[s]	-10.80	Ni[OH]2[s] + 2 H+ -> 2 H2O + 1 Ni+2
Ba[SCr]O4[96%SO4]	9.790	Ba[SCr]O4[96%SO4] -> 1 Ba+2 + 0.04 CrO4-2 + 0.96 SO4-2	Ni2SiO4	5.498	Ni2SiO4 + 2 H+ -> 1 H2SiO4-2 + 2 Ni+2
BaSrSO4[50%Ba]	8.221	BaSrSO4[50%Ba] -> 0.5 Ba+2 + 1 SO4-2 + 0.5 Sr+2	Pb[OH]2[C]	-8.150	Pb[OH]2[C] + 2 H+ -> 2 H2O + 1 Pb+2
Brucite	-16.79	Brucite + 2 H+ -> 2 H2O + 1 Mg+2	Pb2V2O7	0.9500	Pb2V2O7 + 3 H+ -> 1.5 H2O + 1 Pb+2 + 1 VO2+
Ca2Zn[PO4]2	31.12	Ca2Zn[PO4]2 -> 2 Ca+2 + 2 PO4-3 + 1 Zn+2	PbMoO4[cc]	13.36	PbMoO4[cc] -> 1 MoO4-2 + 1 Pb+2
Ca3[BO3]2	-24.52	Ca3[BO3]2 + 4 H+ -> 3 Ca+2 + 2 H2BO3-	Sn[OH]2[s]	1.447	Sn[OH]2[s] + 2 H+ -> 2 H2O + 1 Sn+2
CaCO3_BaCO3	22.00	CaCO3_BaCO3 -> 1 Ba+2 + 2 CO3-2 + 1 Ca+2	Strengite	48.00	Strengite + 2 H2O -> 1 Fe[OH]4- + 4 H+ + 1 PO4-3
CaCO3_MgCO3	19.84	CaCO3_MgCO3 -> 2 CO3-2 + 1 Ca+2 + 1 Mg+2	Willemite	6.289	Willemite + 2 H+ -> 1 H2SiO4-2 + 2 Zn+2


pH dependent concentration of Aluminum
pH dependent concentration of Arsenic
pH dependent concentration of Barium
pH dependent concentration of Bromide
pH dependent concentration of Calcium
Al Profile at L/S=10.3 L/kg
As Profile at L/S=10.3 L/kg
Ba Profile at L/S=10.3 L/kg
Br Profile at L/S=10.3 L/kg
Ca Profile at L/S=10.3 L/kg
Inorganic Carbon
Cd Profile at L/S=10.3 L/kg
Cl Profile at L/S=10.3 L/kg
Co Profile at L/S=10.3 L/kg
CO32- Profile at L/S=10.3 L/kg
Cr Profile at L/S=10.3 L/kg
Cu Profile at L/S=10.3 L/kg
F Profile at L/S=10.3 L/kg
Fe Profile at L/S=10.3 L/kg
B Profile at L/S=10.3 L/kg
Si Profile at L/S=10.3 L/kg
Concentration (mg/L)
pH
DTL
Total Dissolved
DHA-bound
SHA-bound
Clay
AA_Al[OH]3[am]
Analbite
Antimocrandallite-exp
Arsenocrandallite-therm
FeOxide
Ba[SCr]O4[96%SO4]
CaCO3_BaCO3
AA_Calcite
CaCO3_MgCO3
CaCO3_MnCO3
Ca3[BO3]2
Ca2Zn[PO4]2
Fluorite
Co2SiO4
Ferrihydrite
Strengite
CSHi_ss
Ni2SiO4
Willemite


pH dependent concentration of Potassium
pH dependent concentration of Lithium
pH dependent concentration of Magnesium
pH dependent concentration of Manganese
pH dependent concentration of Molybdenum
K Profile at L/S=10.3 L/kg
Li Profile at L/S=10.3 L/kg
Mg Profile at L/S=10.3 L/kg
Mn Profile at L/S=10.3 L/kg
Mo Profile at L/S=10.3 L/kg
Na Profile at L/S=10.3 L/kg
Ni Profile at L/S=10.3 L/kg
Pb Profile at L/S=10.3 L/kg
PO4 Profile at L/S=10.3 L/kg
Sb Profile at L/S=10.3 L/kg
Sn Profile at L/S=10.3 L/kg
SO4 Profile at L/S=10.3 L/kg
Sr Profile at L/S=10.3 L/kg
V Profile at L/S=10.3 L/kg
Zn Profile at L/S=10.3 L/kg
Concentration (mg/L)
pH
DTL
Total Dissolved
DHA-bound
SHA-bound
FeOxide
Clay
Brucite
CaCO3_MgCO3
CaCO3_MnCO3
Manganite
PbMoO4[cc]
Analbite
Ni2SiO4
Ni[OH]2[s]
Pb2V2O7
PbMoO4[cc]
Pb[OH]2[C]
CaZn[PO4]2
Strengite
Antimocrandallite-exp
Sn[OH]2[s]
Ba[SCr]O4[96%SO4]
Willemite

Model Comparison: residuals - Concentration

Name **Municipal solid waste Landgraaf 8 yrs after placement NL**

Legend

Total Average Deviation Square root of the sum of the squared values of residuals divided by the number of values, over the entire X range.
User Average Deviation Square root of the sum of the squared values of residuals divided by the number of values, over the user defined X range.
Fractional Average Devi Square root of the sum of the squared values of residuals divided by the number of values, over the fraction.
Note that the Total and User Average Deviation columns are averages as well.

Residual details, concentrations

Residuals as log(model/sample)

Fraction	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	*Total Avg*
pH	*2.59*	*4.24*	*5.32*	*6.31*	*8.11*	*8.90*	*10.6*	*11.9*	*Deviation*
Al	-0.03	0.42	0.98	0.55	-0.16	-0.44	-0.49	0.14	0.17
As	0.28	-1.14	-0.41	-0.20	1.63	1.35	0.51	0.00	0.31
Ba	-0.01	0.42	0.45	0.22	-0.56	-0.18	0.23	0.11	0.11
Br	0.89	0.76	1.42	0.97	0.54	1.32	0.13	0.00	0.32
Ca	-0.01	0.03	0.14	-0.02	-0.80	-0.24	0.43	0.33	0.13
Cd	-0.05	-0.01	0.49	0.35	1.33	0.53	1.15	0.80	0.26
Cl	0.05	-0.02	-0.02	0.01	0.00	0.01	-0.01	0.05	0.01
Co	-0.03	0.04	0.06	0.12	0.39	0.58	0.73	-0.38	0.14
Cr	-2.08	-1.52	-0.19	0.19	0.73	0.68	0.46	0.06	0.35
Cu	-0.66	-0.30	0.48	-0.37	0.01	-0.22	-0.60	-0.92	0.18
F	-0.01	0.08	1.06	0.68	1.14	0.90	0.70	0.60	0.27
Fe	-0.04	0.11	-1.01	1.05	0.87	0.17	0.05	-0.46	0.22
B	-0.01	0.04	0.10	0.18	0.30	0.31	0.12	0.08	0.06
Si	-0.37	0.00	0.01	-0.15	-0.45	-0.55	0.28	0.91	0.16
K	-0.30	-0.25	-0.19	-0.08	-0.23	-0.41	-0.72	-0.94	0.17
Li	-0.01	0.12	0.27	0.40	0.56	0.63	0.96	1.10	0.22
Mg	-0.01	0.09	0.26	0.10	-1.06	-0.36	1.08	0.97	0.23
Mn	-0.02	0.08	0.20	-0.26	0.21	1.09	1.61	1.02	0.28
Mo	0.88	0.69	1.39	0.80	0.07	0.00	0.39	0.69	0.26
Na	0.05	0.00	-0.03	-0.02	-0.30	-0.53	-1.20	-1.54	0.26
Ni	-0.03	0.02	0.09	0.31	0.65	0.83	0.24	-0.97	0.19
Pb	-0.30	-0.21	0.72	1.00	1.43	0.58	0.72	-0.79	0.28
Sb	0.45	-0.23	0.08	0.14	0.75	0.54	0.18	0.00	0.13
Se	0.10	-0.06	-0.02	0.13	0.83	2.24	0.79	0.15	0.32
Sn	-0.09	-1.21	-0.59	-0.37	-0.71	-1.29	-0.19	0.08	0.26
SO4	0.06	0.12	0.07	0.06	0.06	-0.01	0.06	0.08	0.02
Sr	-0.01	0.03	0.11	0.29	-0.19	0.39	1.10	0.92	0.19
V	-2.00	-0.10	0.01	0.63	1.47	1.58	0.44	0.14	0.38
Zn	-0.02	0.13	0.30	0.56	0.72	0.23	0.00	-0.52	0.14
Avg Deviati	0.11	0.09	0.10	0.09	0.14	0.15	0.13	0.12	0.21

Yellow = own pH All residuals within + 1 or - 1 are considered to represent a good fit. 0 of coarse the best.