Calibration Report: Low N Basalt Site Base Case

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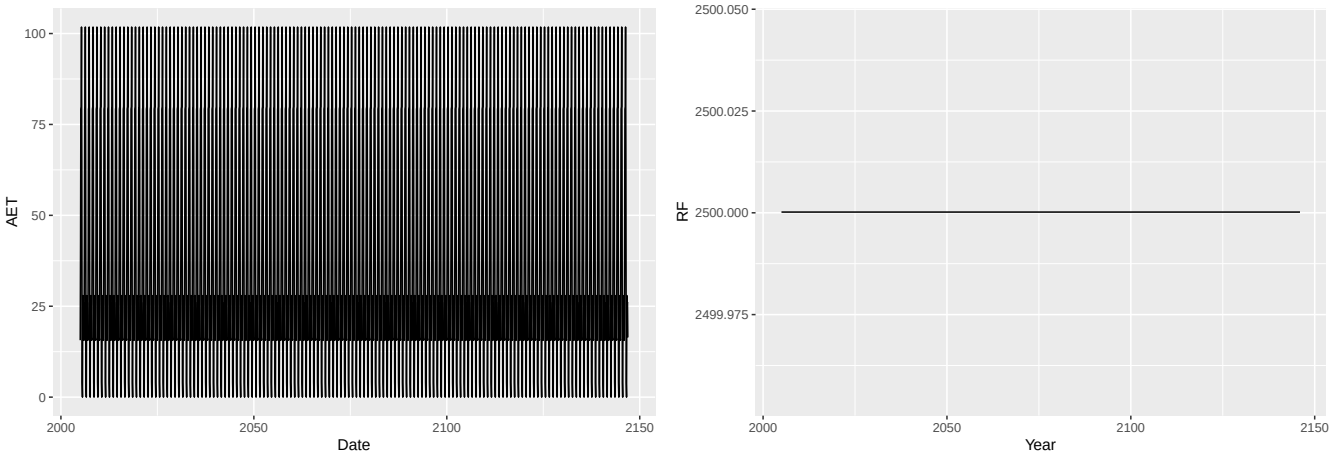
Hydrology



Soil Solution Results

Table 1: Average Soil Solution Concentrations of Reliable Months (2005-2006)

	μmol/L															
Soil Layer	Ca	Mg	K	Na	NO3	NH4	SO4	Cl	PO4	DOC	Al	Si	H+	pH	R	HR
Layer 1	21.1	21.0	21.4	60.0	2.756	2.8196	10.6	58.6	0.900	136.2	6.74	18.3	9.98	5.00	105.3	30.88
Layer 2	25.3	25.3	24.4	83.5	2.159	1.7524	13.9	64.5	0.940	160.5	4.43	35.9	6.92	5.16	129.0	31.52
Layer 3	24.6	24.7	24.3	102.9	1.643	1.0364	14.1	71.1	0.481	153.9	2.80	37.8	4.66	5.33	127.6	26.31
Layer 4	17.8	17.8	15.2	97.9	1.110	0.3306	14.8	66.2	0.338	110.7	3.14	32.9	5.01	5.30	90.2	20.51
Layer 5	17.2	17.2	14.8	106.4	0.840	0.1650	14.9	72.4	0.200	111.3	3.52	34.3	5.43	5.27	89.9	21.48
Layer 6	15.0	15.0	13.9	109.5	0.644	0.0813	15.0	78.7	0.263	84.2	2.04	36.2	3.51	5.45	71.1	13.10
Layer 7	14.5	14.5	13.7	111.9	0.513	0.0734	15.1	84.9	0.257	79.1	2.52	38.4	4.16	5.38	65.7	13.40
Layer 8	13.0	12.9	13.1	112.4	0.421	0.0733	15.0	88.0	0.193	62.1	1.64	39.8	2.89	5.54	53.1	9.02

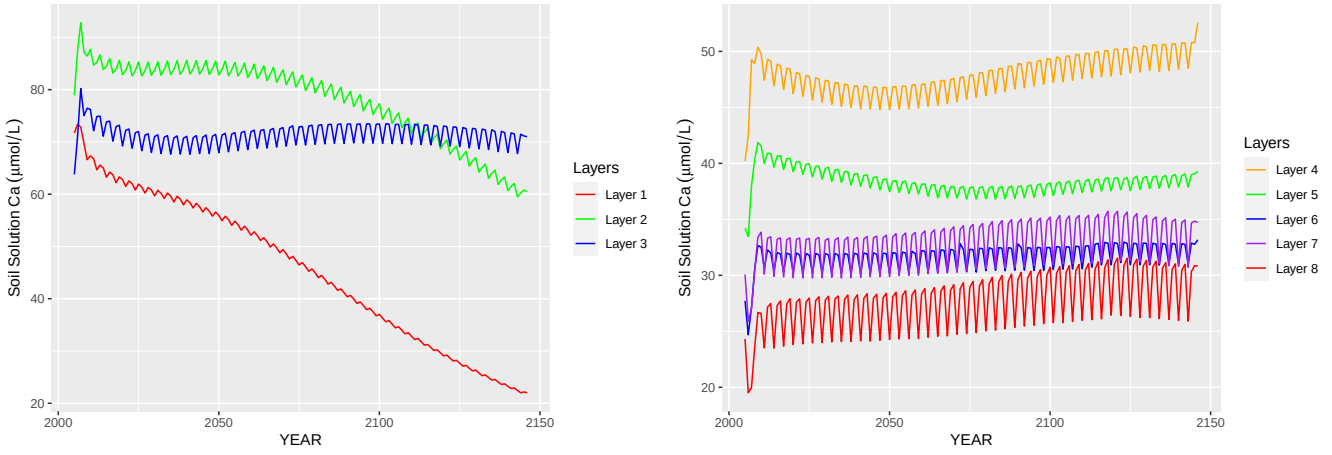


Figure 1: Monthly Calcium Concentrations by Soil Layer

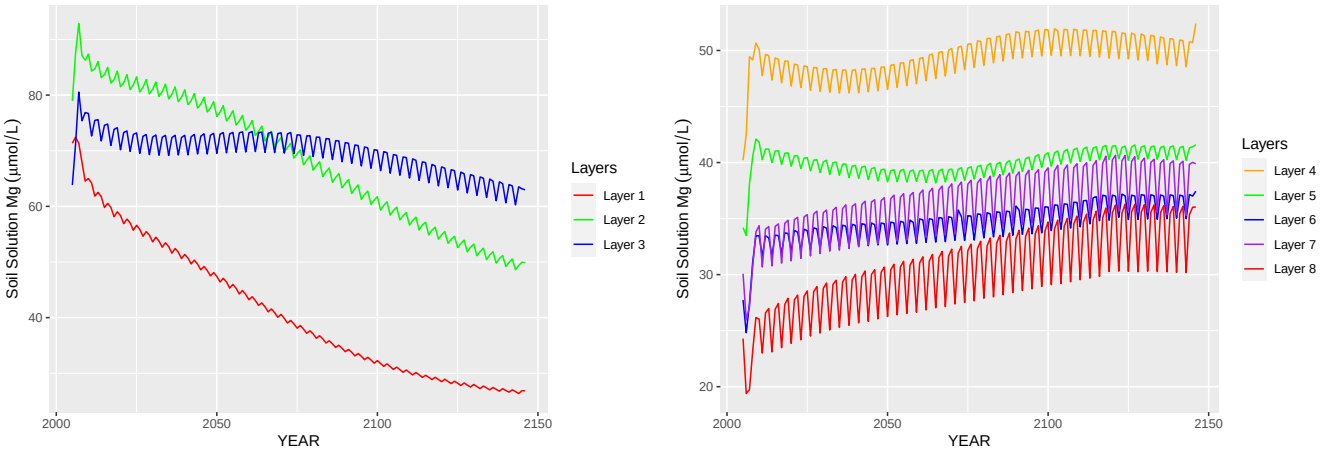


Figure 2: Monthly Magnesium Concentrations by Soil Layer

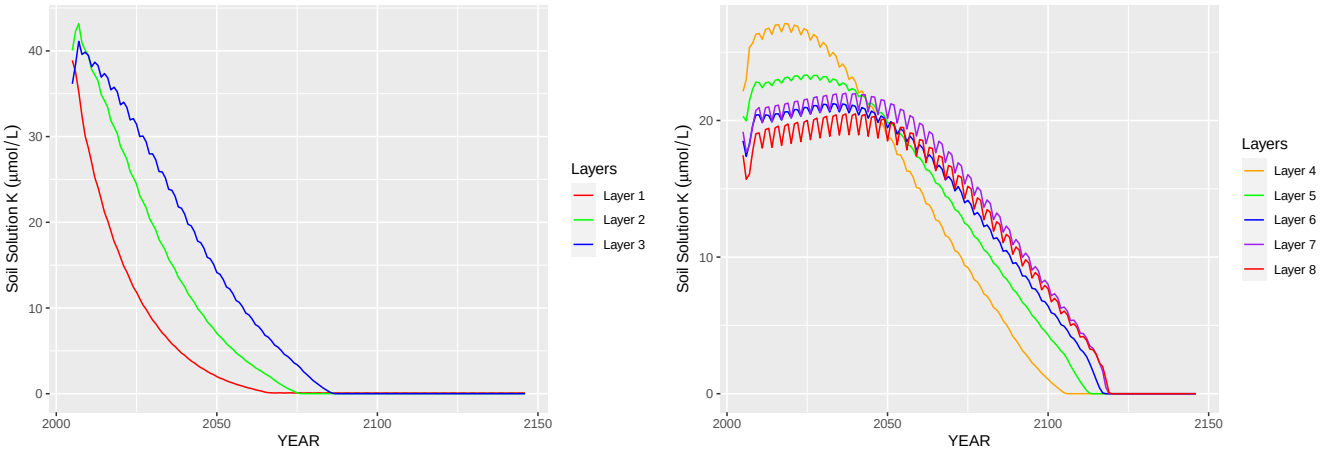


Figure 3: Monthly Potassium Concentrations by Soil Layer

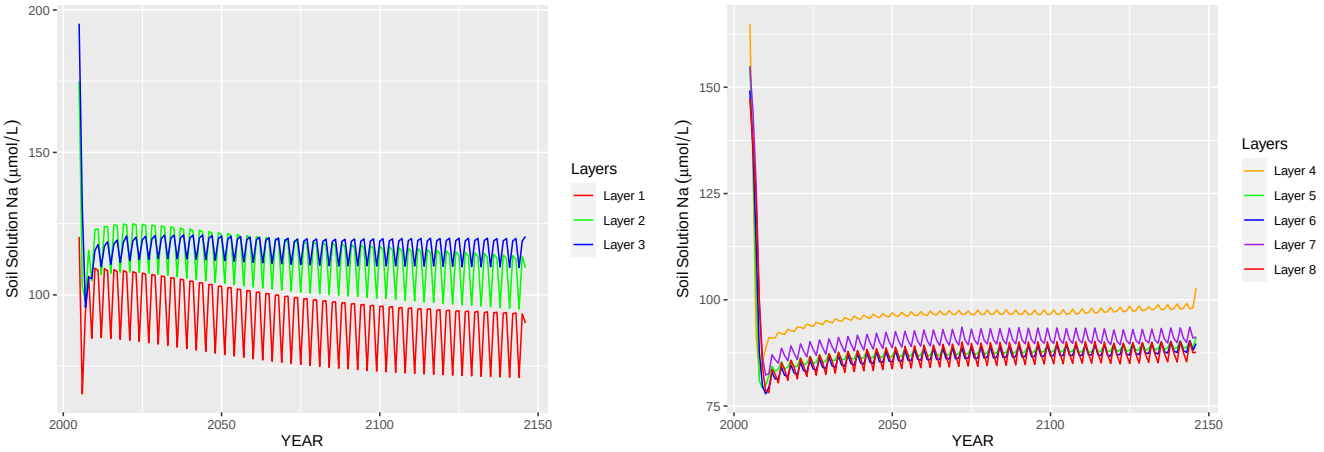


Figure 4: Monthly Sodium Concentrations by Soil Layer

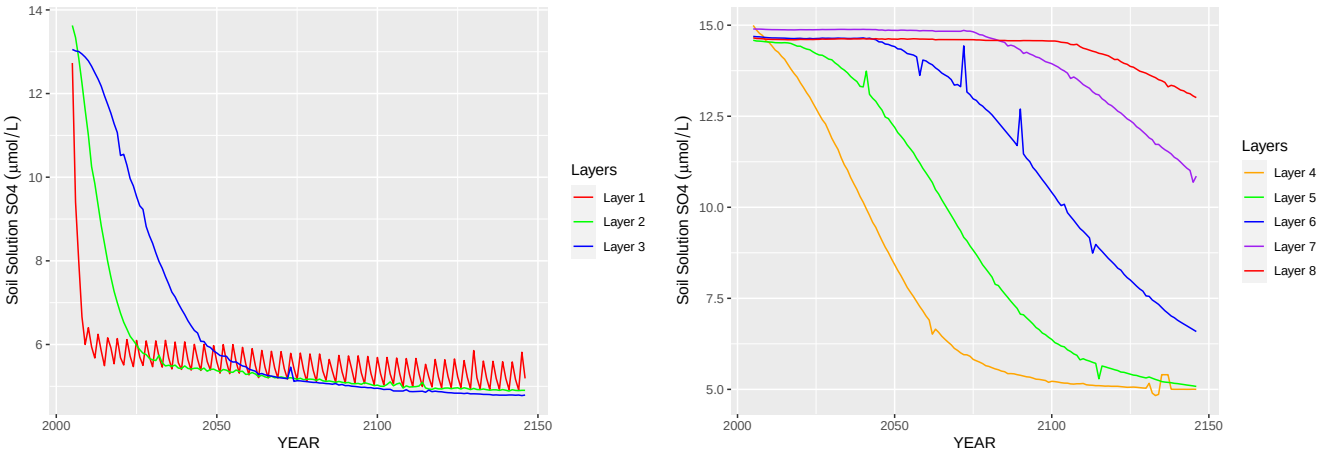


Figure 5: Monthly Sulfate Concentrations by Soil Layer

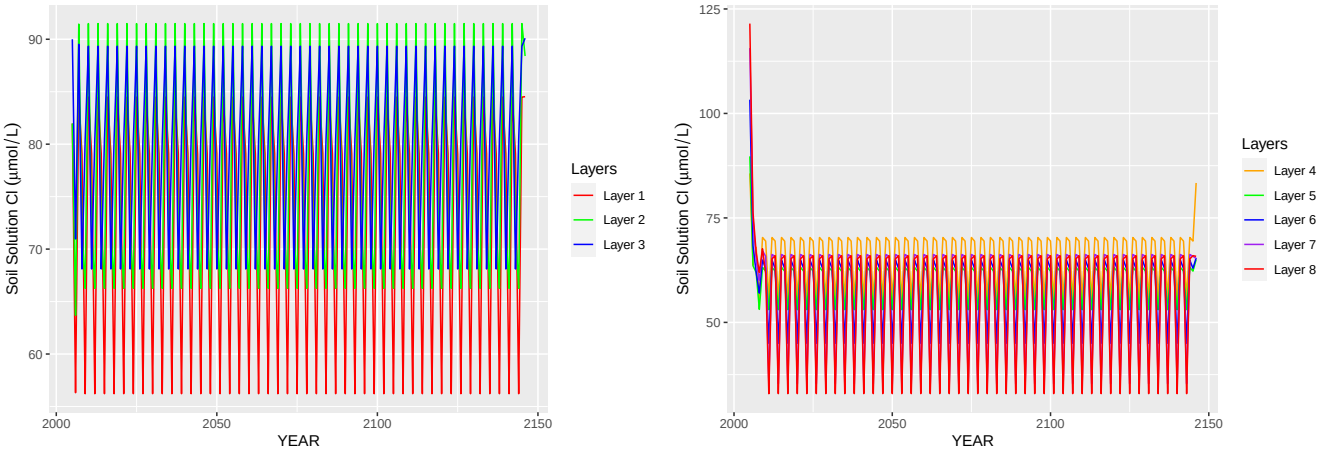


Figure 6: Monthly Chloride Concentrations by Soil Layer

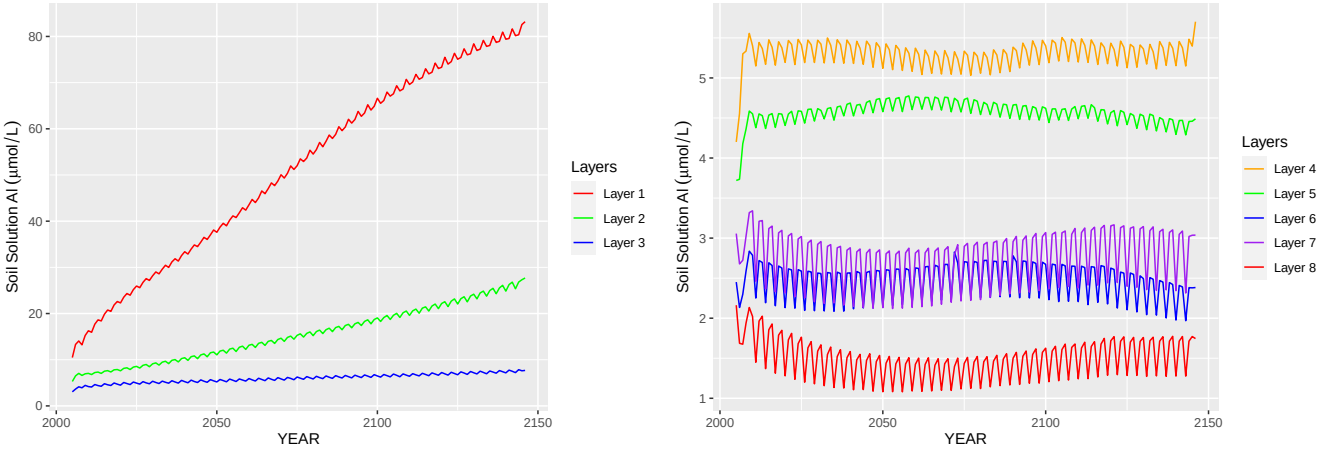


Figure 7: Monthly Aluminum Concentrations by Soil Layer

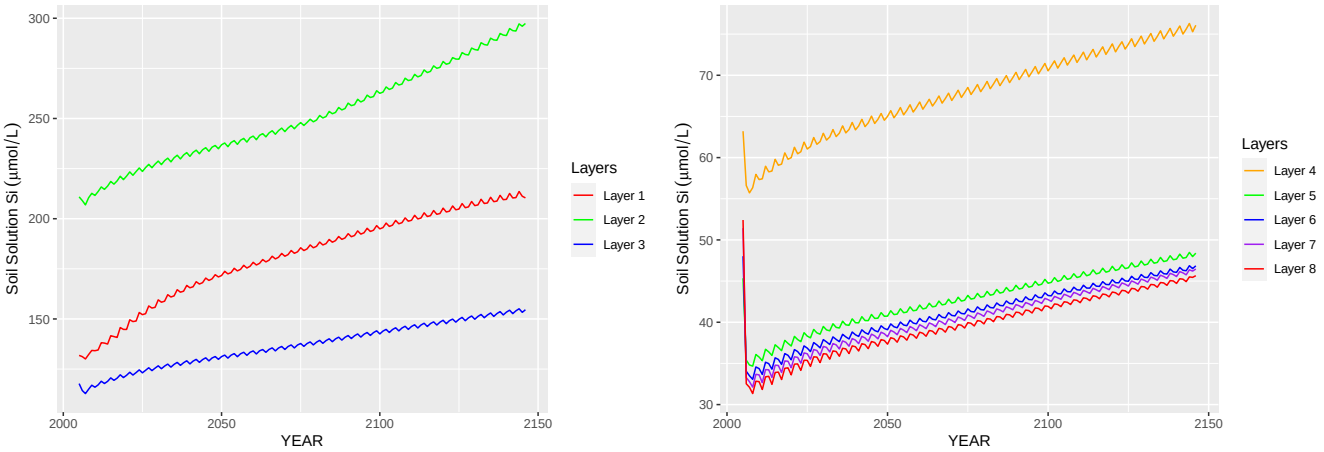


Figure 8: Monthly SiO2 Concentrations by Soil Layer

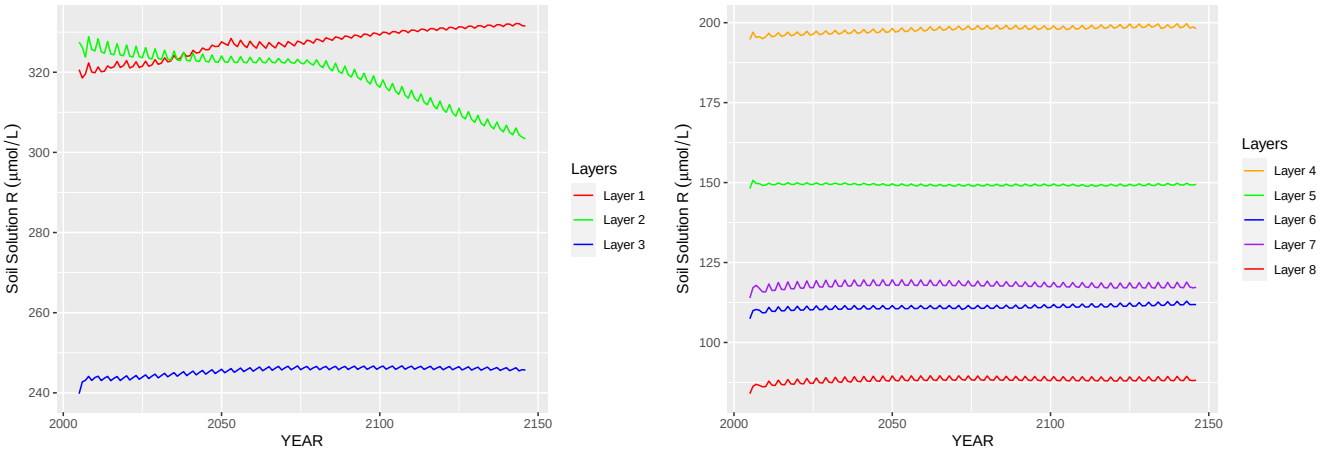


Figure 9: Monthly Organic Acid Base (R-) Concentrations by Soil Layer

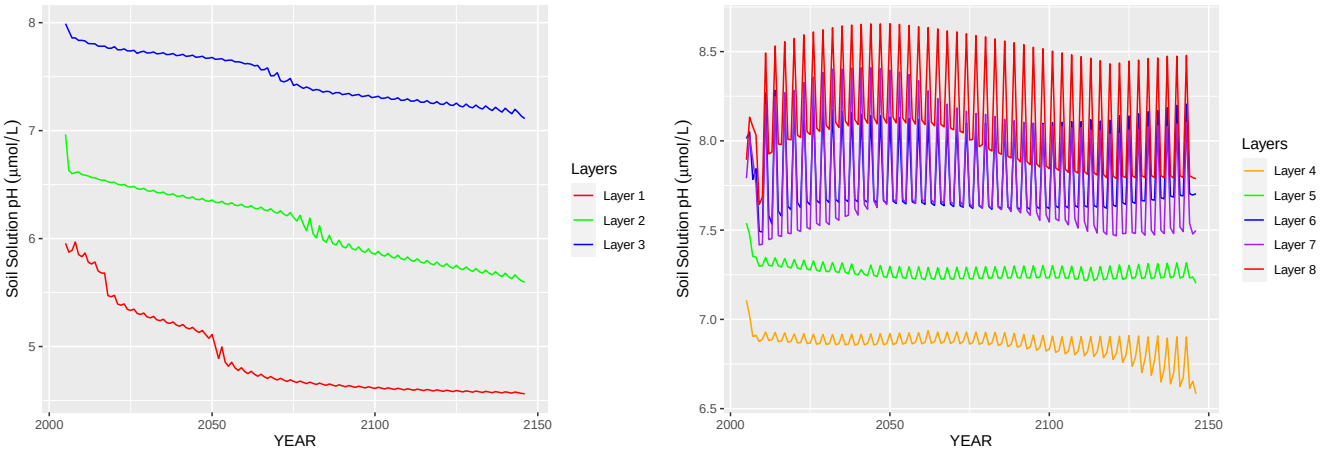


Figure 10: Monthly pH by Soil Layer

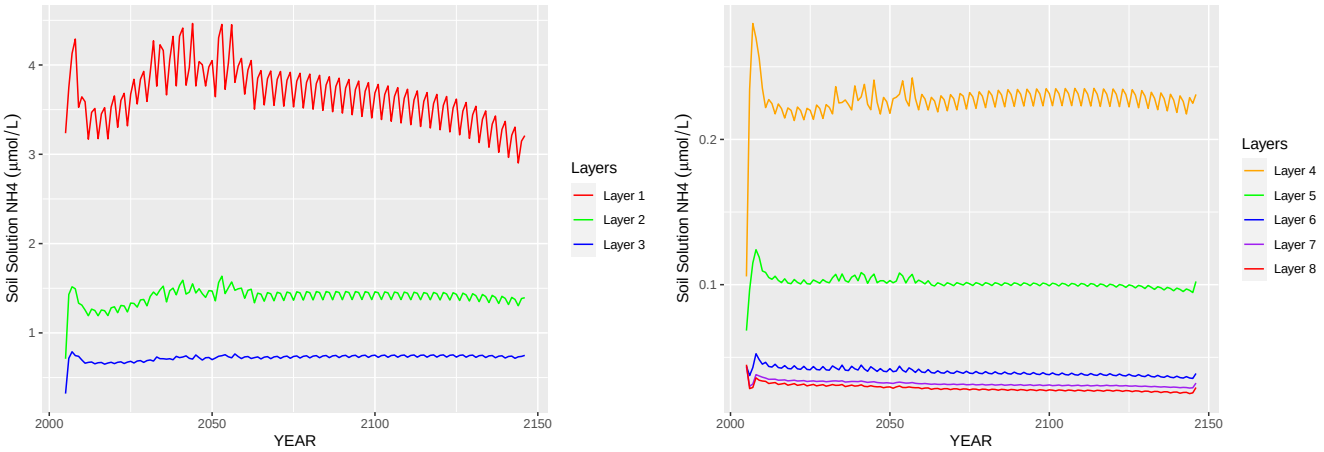


Figure 11: Yearly Ammonium concentration by Soil Layer

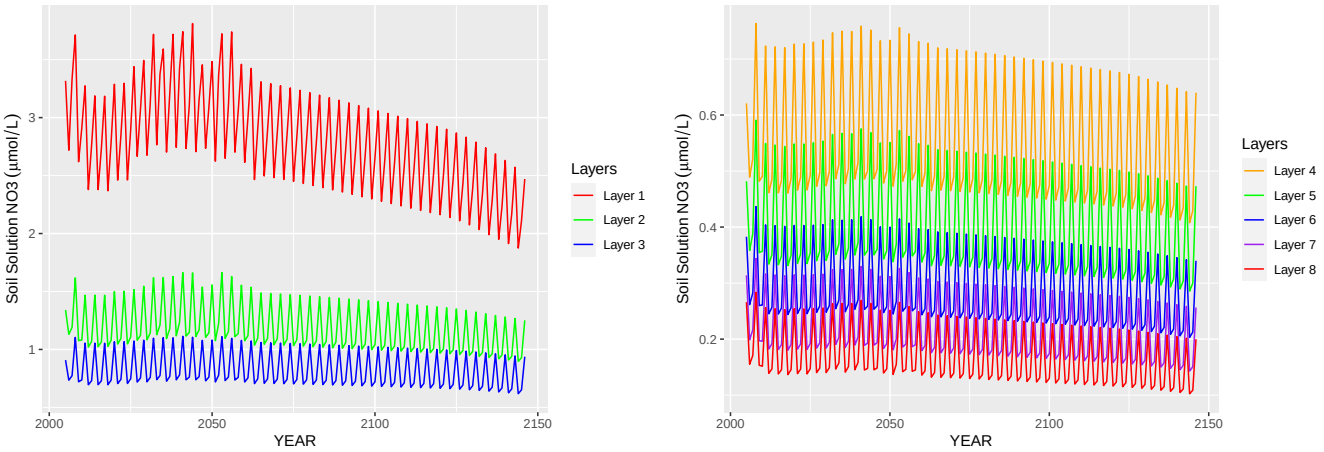
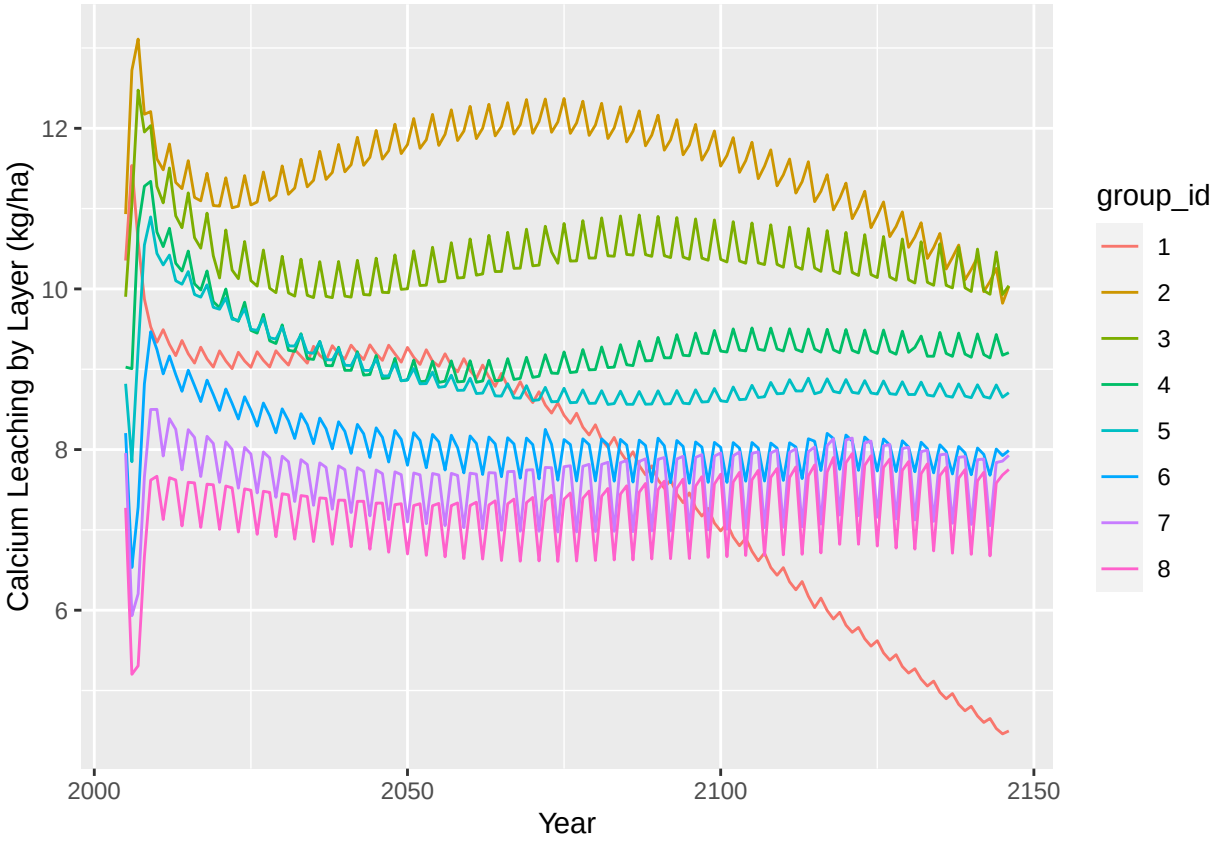


Figure 12: Yearly Nitrate concentration by Soil Layer

Lysimeter Comparisons



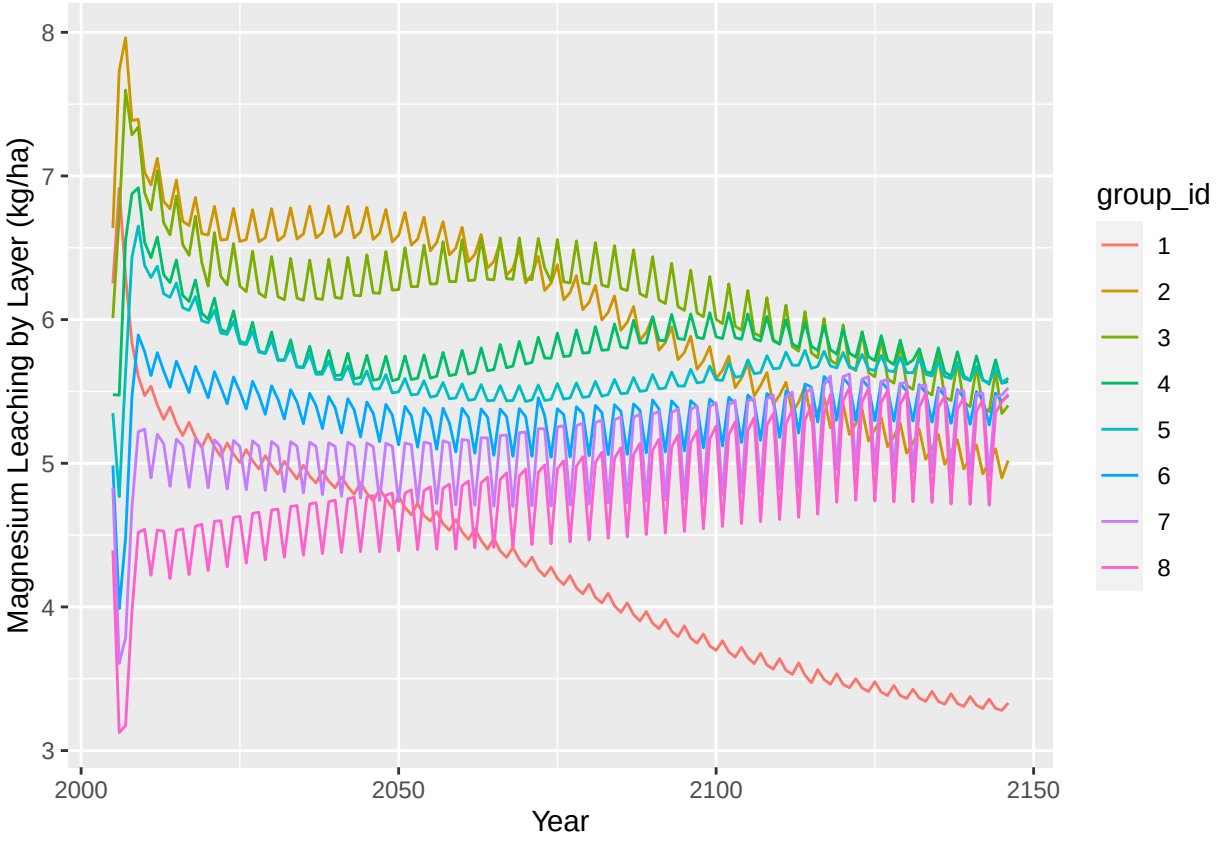


Table 2: Simulated Lysimeter Fluxes by Depth (2005-2006)

		kg/ha											
Depth	YEAR	Ca	Mg	K	Na	NO3	NH4	SO4	Cl	P	DOC	Al	Si
2	2005	11	6.6	11	29	0.37	0.19	6.1	36	0.28	18	0.017	16
2	2006	13	7.7	12	17	0.28	0.31	5.9	30	0.28	18	0.021	15
8	2005	7.3	4.4	7.1	36	0.112	0.0153	6.5	49	0.066	5.9	0.0070	20
8	2006	5.2	3.1	6.0	31	0.074	0.0099	6.5	33	0.066	5.7	0.0055	15

Weathering Results

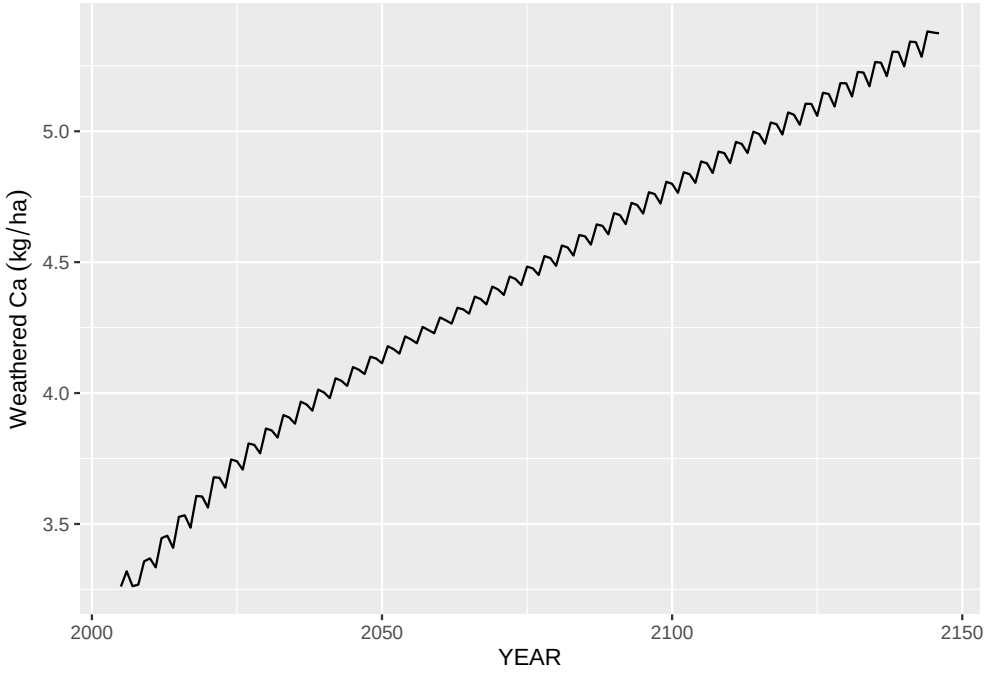


Figure 13: Calcium Weathering (All Layer)

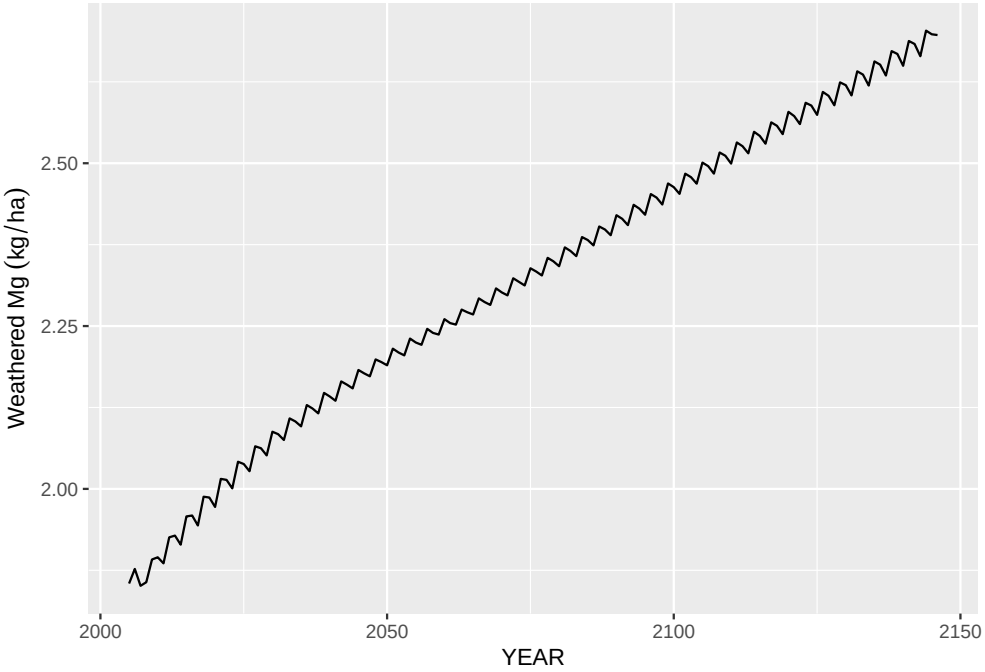


Figure 14: Magnesium Weathering (All Layer)

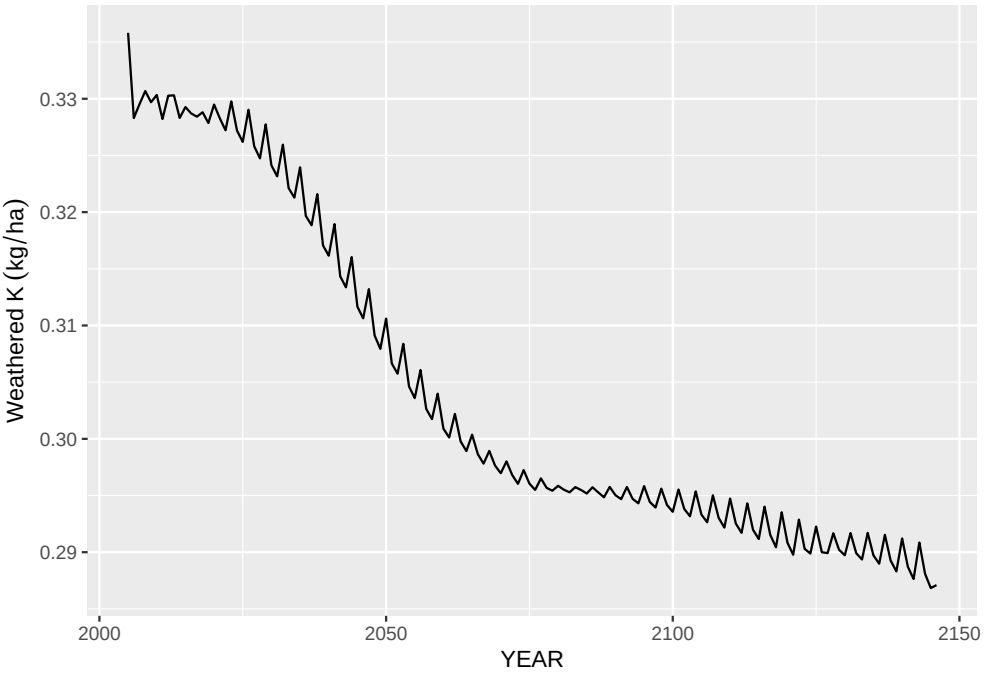


Figure 15: Potassium Weathering (All Layer)

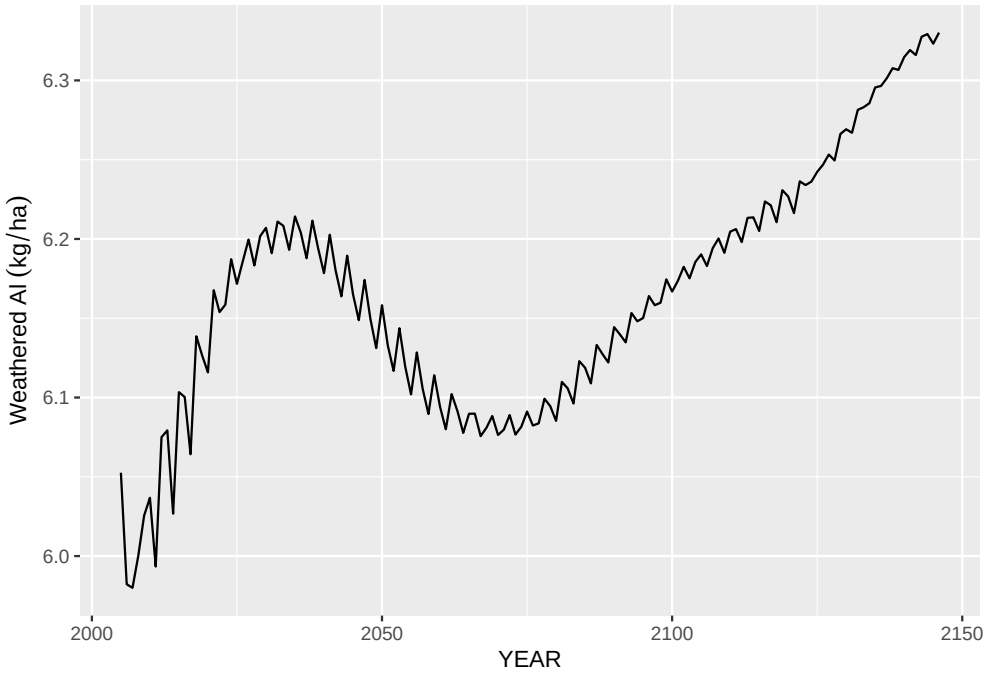


Figure 16: Aluminum Weathering (All Layer)

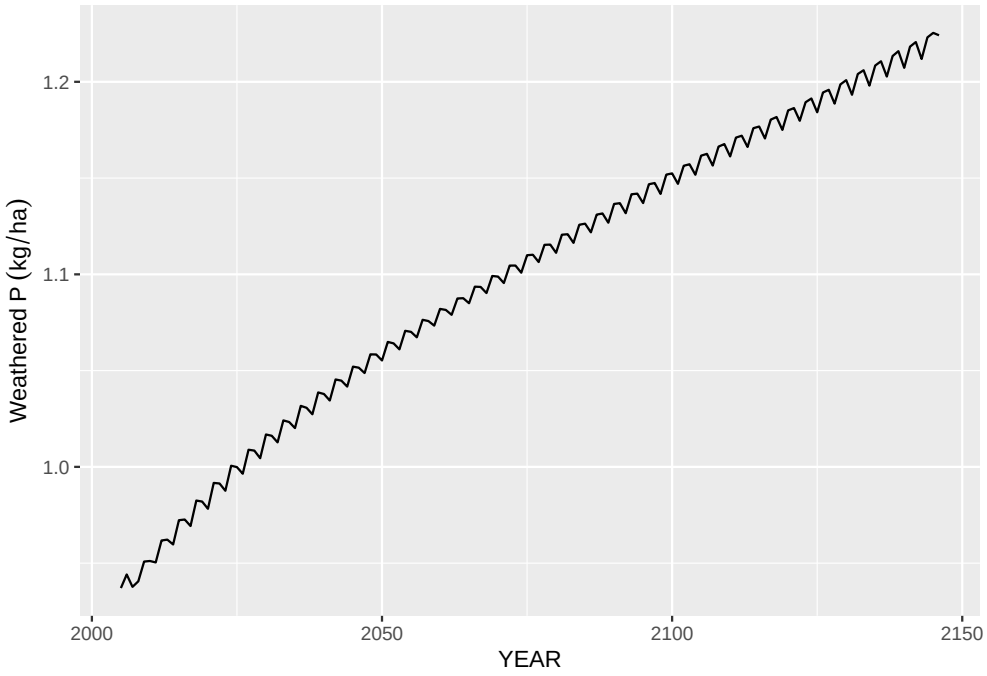


Figure 17: Phosphate Weathering (All Layer)

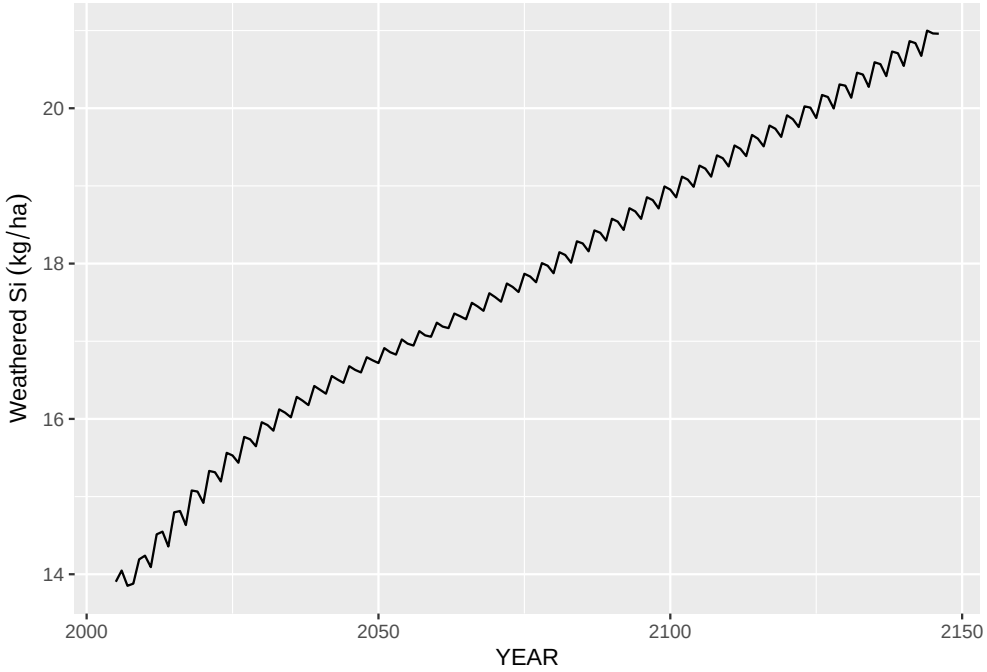


Figure 18: Silica Weathering (All Layer)

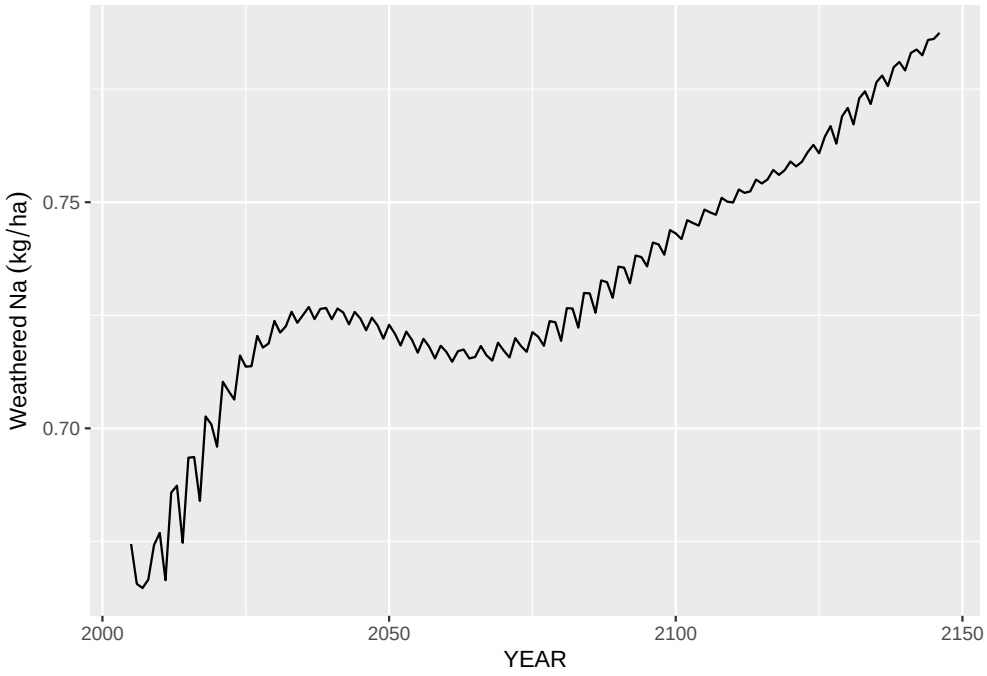
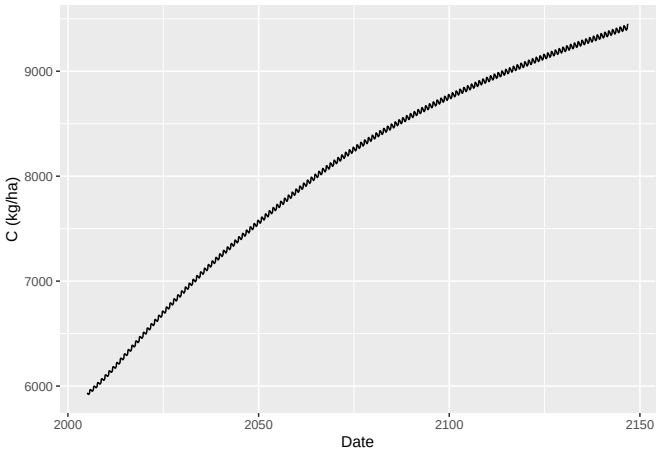
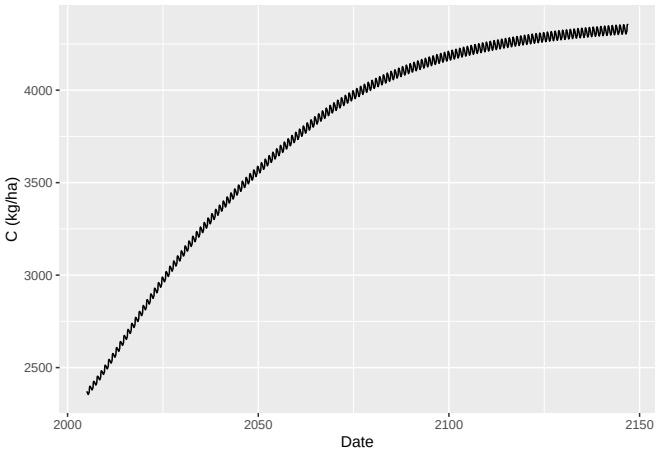


Figure 19: Sodium Weathering (All Layer)

Litter Pool Results

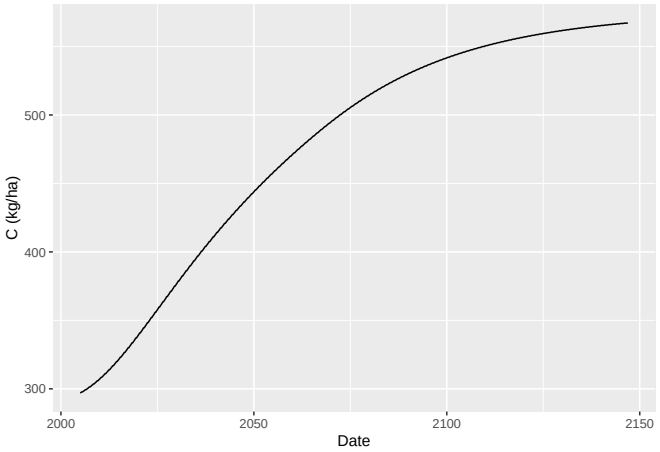


(a) Total forest floor carbon content (kg/ha)

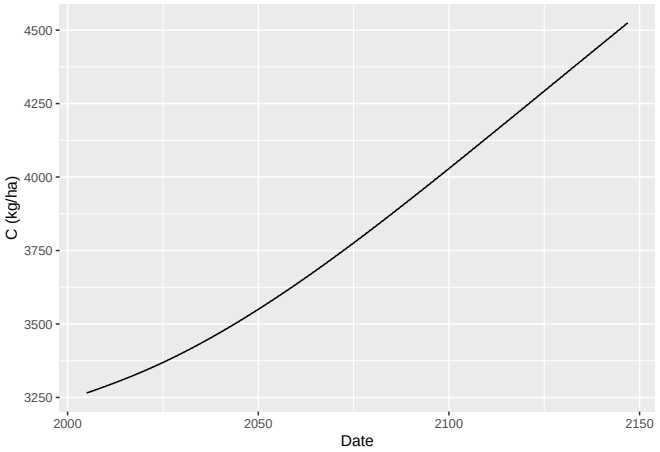


(b) Carbon content of coarse litter (kg/ha)

Figure 20: Forest Floor (O-Layer) Carbon Content Over Simulation Period

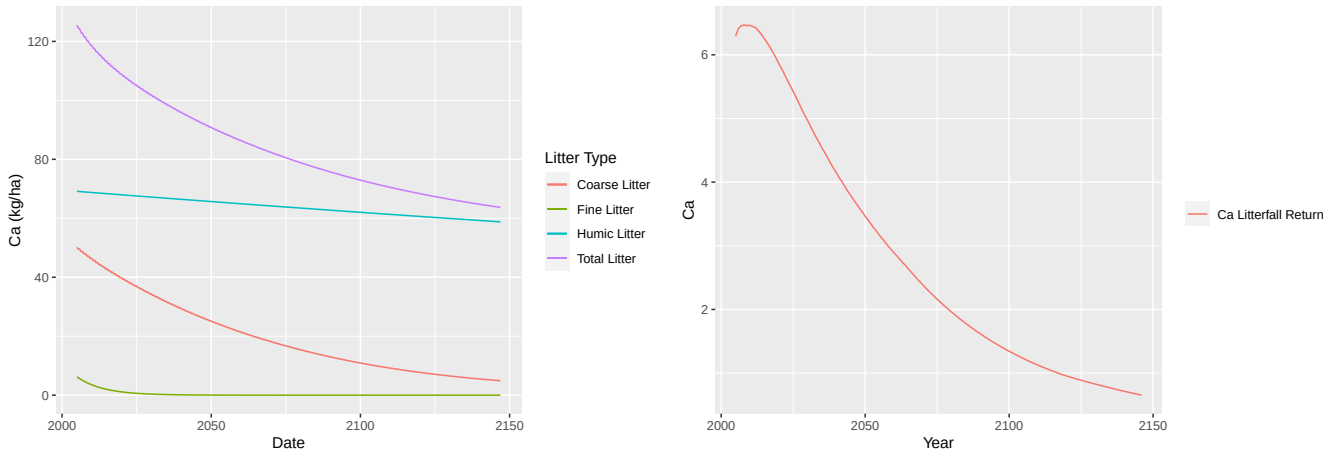


(a) Carbon content of fine litter (kg/ha)



(b) Carbon content of humic litter (kg/ha)

Figure 21: Forest Floor (O-Layer) Carbon Content Over Simulation Period

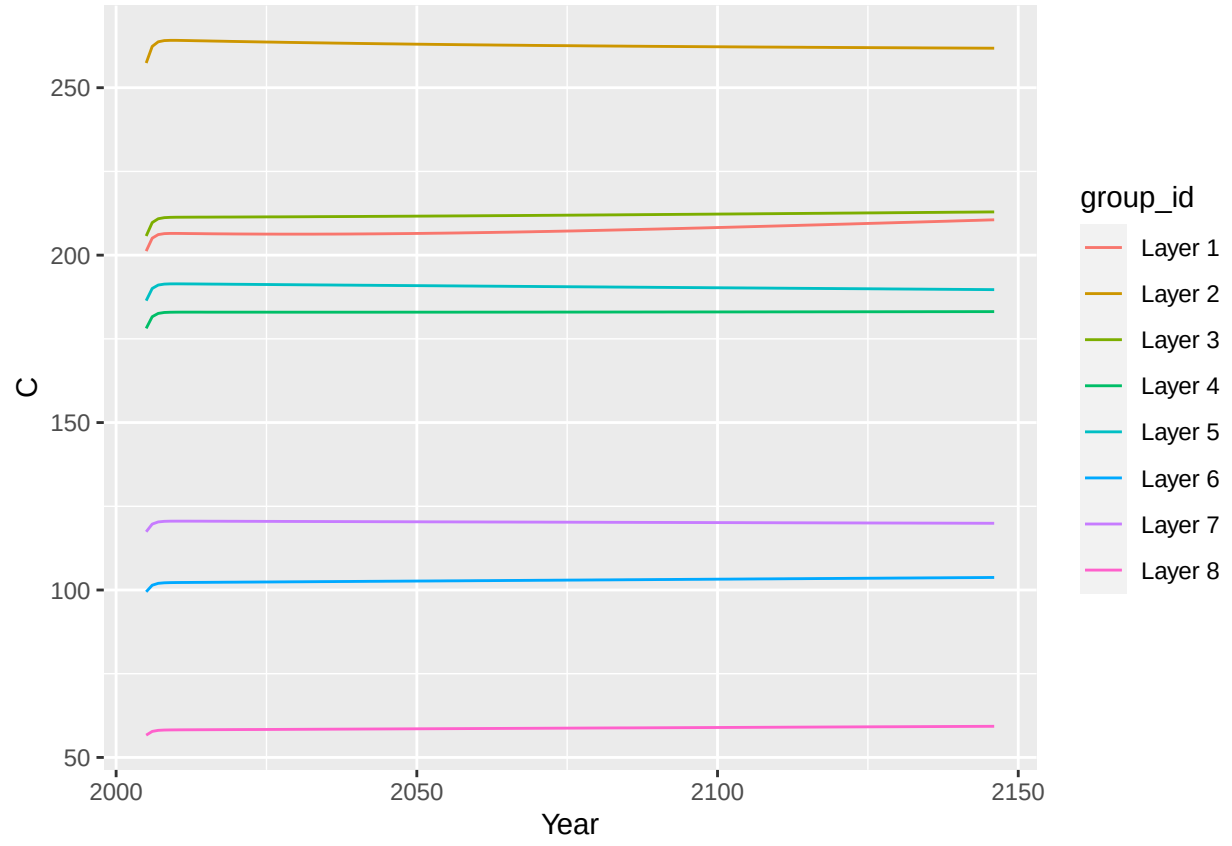


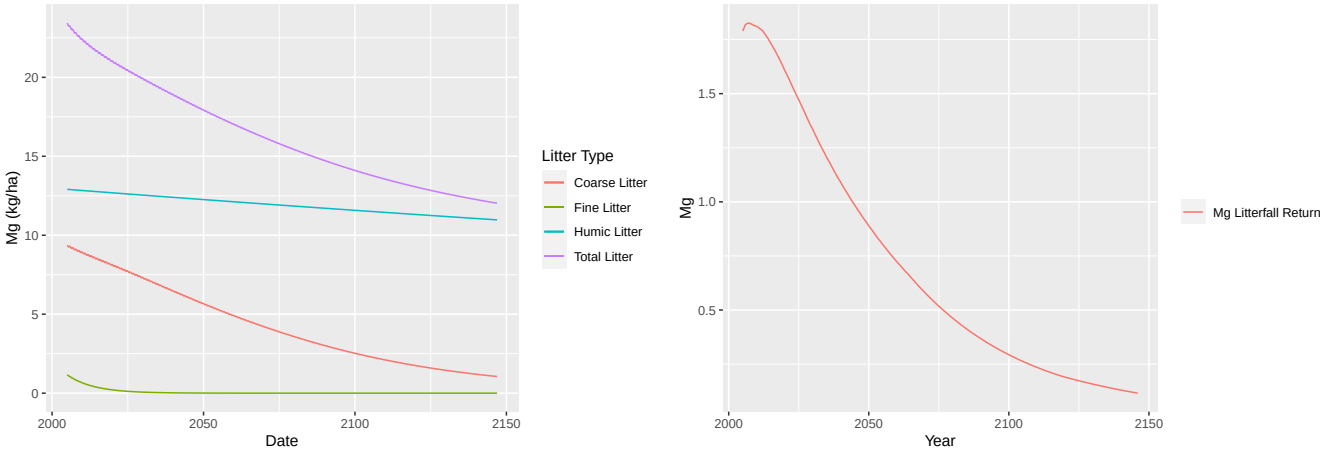
(a) Ca Content in each litter decomposition stage (kg/ha)

(b) Ca net annual return in litterfall (kg/ha)

Figure 22: Forest Floor/O-horizon Ca content over time (a). and net annual Ca return in litterfall (b).

Soil Organic Matter Results

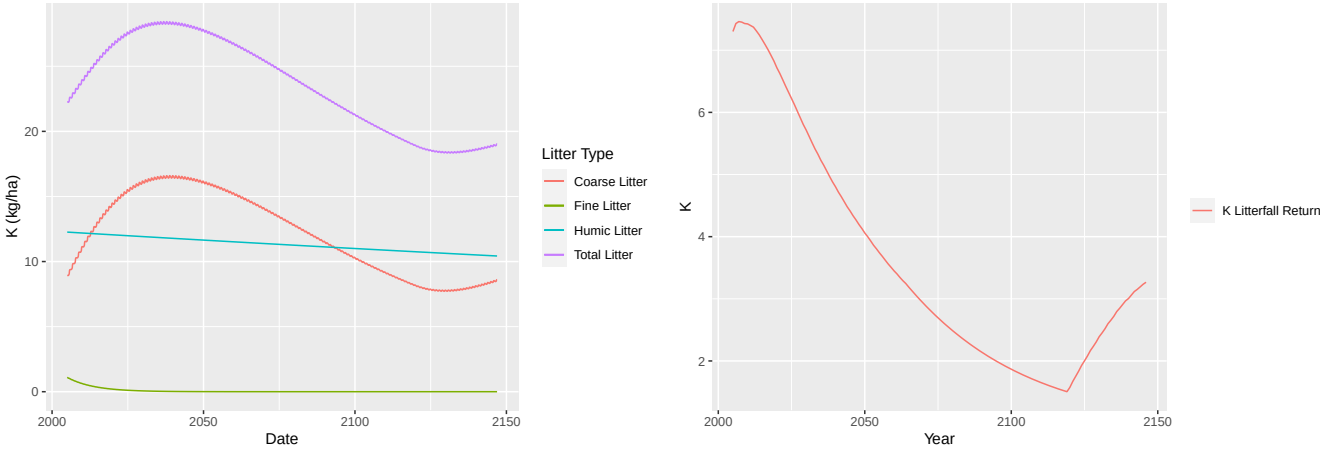




(a) Mg Content in each litter decomposition stage (kg/ha)

(b) Mg net annual return in litterfall (kg/ha)

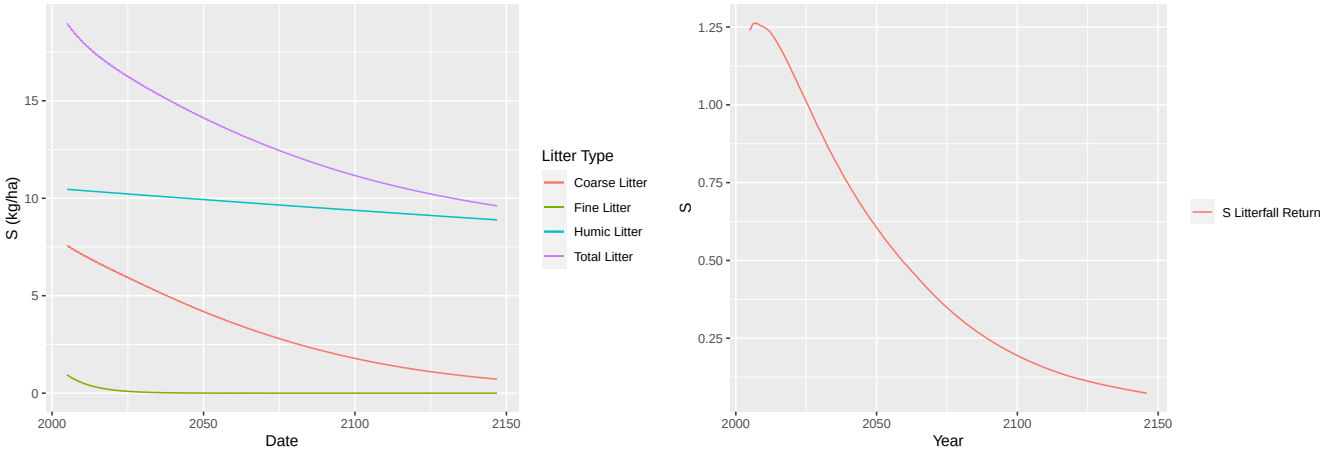
Figure 23: Forest Floor/O-horizon Mg content over time (a). and net annual Mg return in litterfall (b).



(a) K Content in each litter decomposition stage (kg/ha)

(b) K net annual return in litterfall (kg/ha)

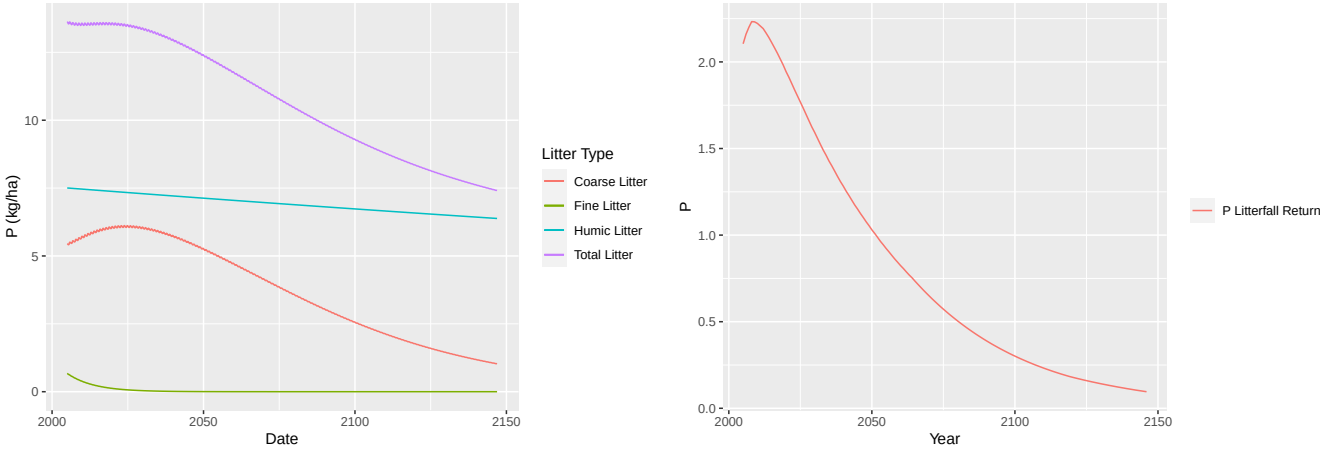
Figure 24: Forest Floor/O-horizon K content over time (a). and net annual K return in litterfall (b).



(a) S Content in each litter decomposition stage (kg/ha)

(b) S net annual return in litterfall (kg/ha)

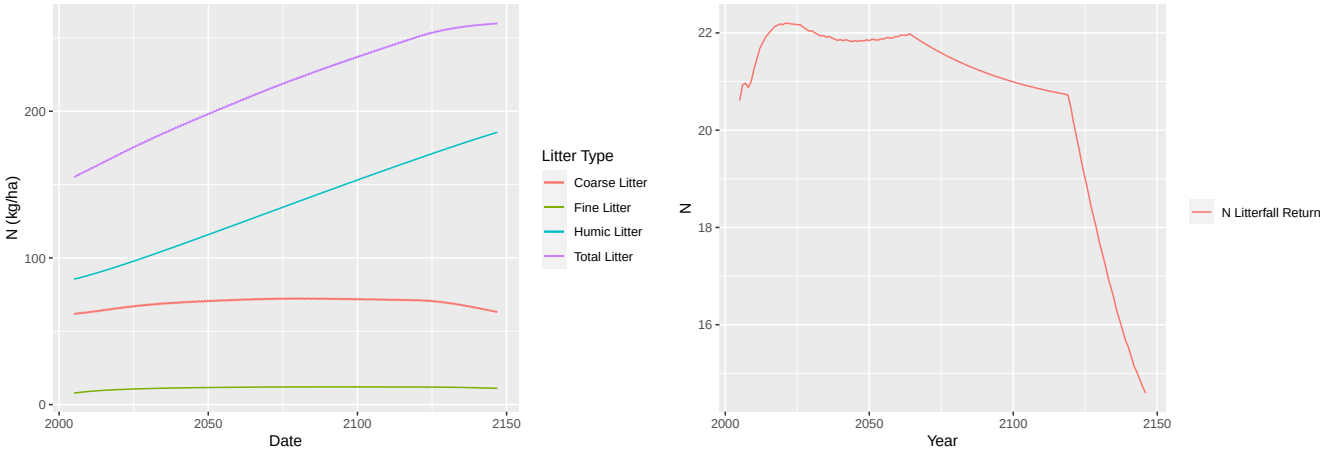
Figure 25: Forest Floor/O-horizon S content over time (a). and net annual S return in litterfall (b).



(a) P Content in each litter decomposition stage (kg/ha)

(b) P net annual return in litterfall (kg/ha)

Figure 26: Forest Floor/O-horizon P content over time (a). and net annual P return in litterfall (b).

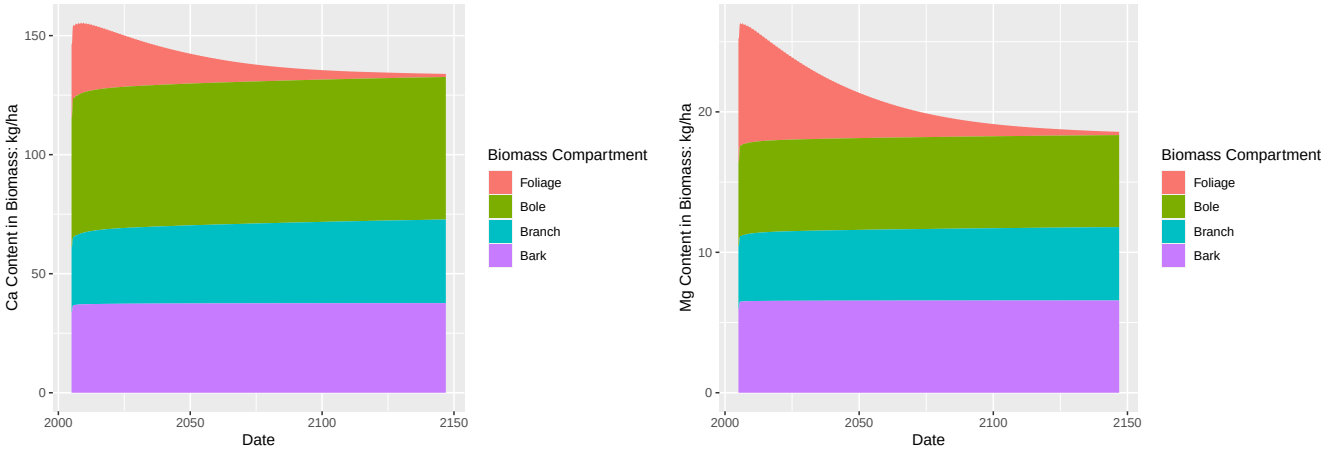


(a) N Content in each litter decomposition stage (kg/ha)

(b) N net annual return in litterfall (kg/ha)

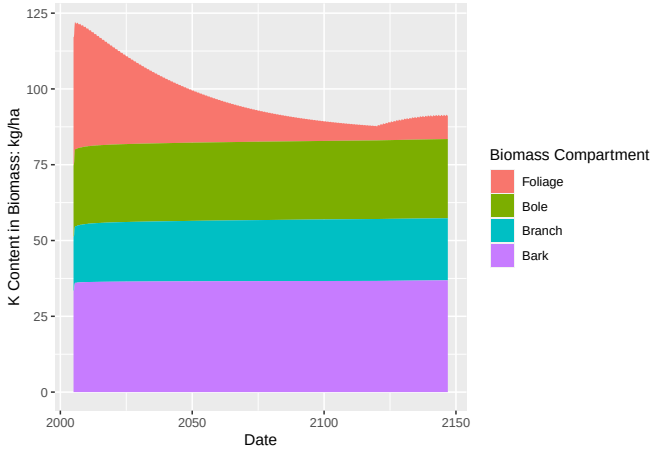
Figure 27: Forest Floor/O-horizon N content over time (a). and net annual N return in litterfall (b).

Tree Nutrient Content



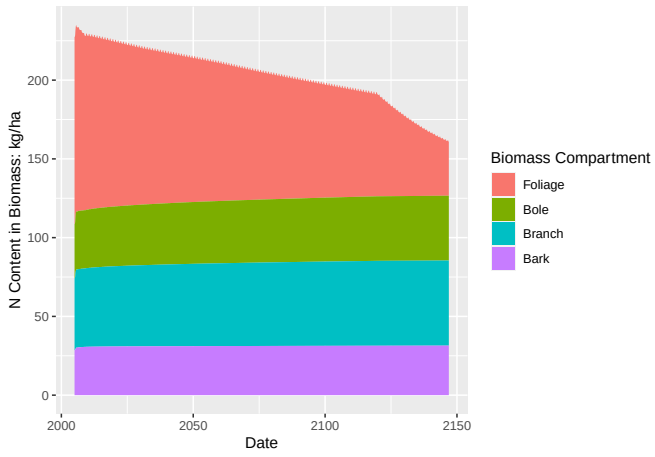
(a) Calcium content in each biomass compartment

(b) Magnesium content in each biomass compartment

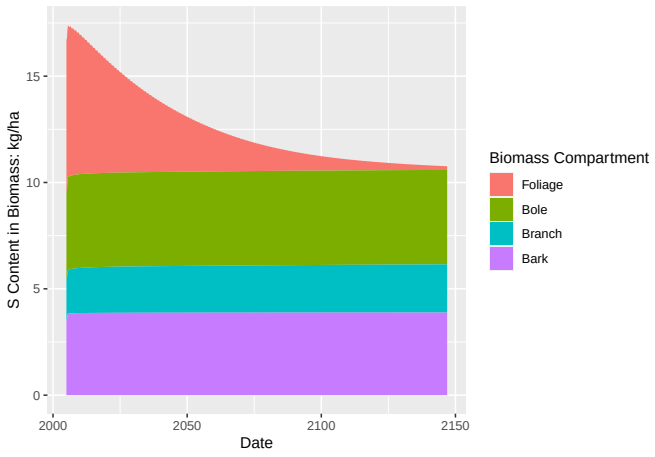


(c) Potassium content in each biomass compartment

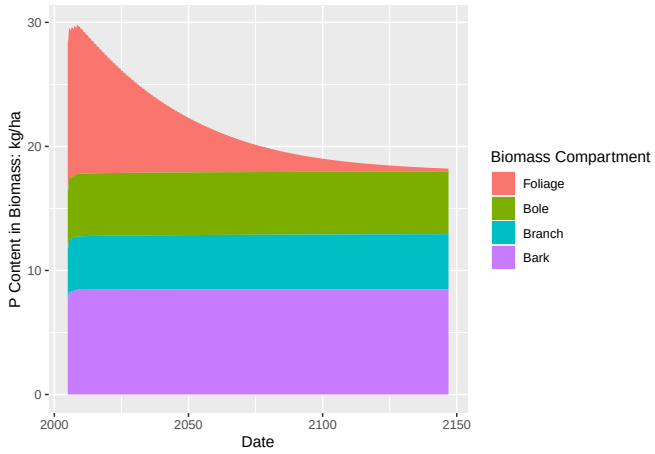
Figure 28: Base Cation Nutrient Content in Simulated Forest



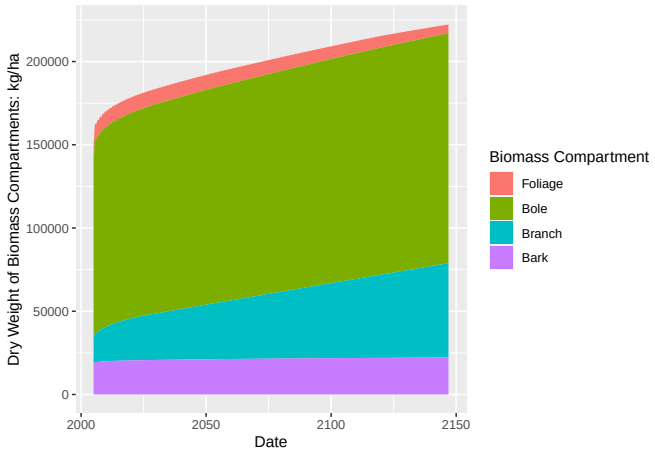
(a) Nitrogen content in each biomass compartment



(b) Sulfur content in each biomass compartment



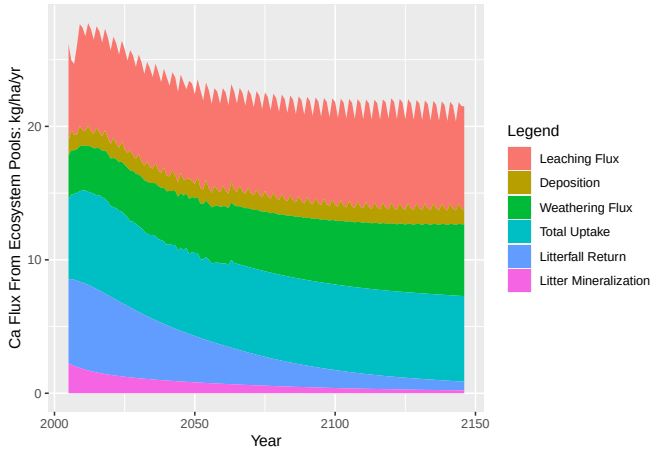
(c) Phosphorous content in each biomass compartment



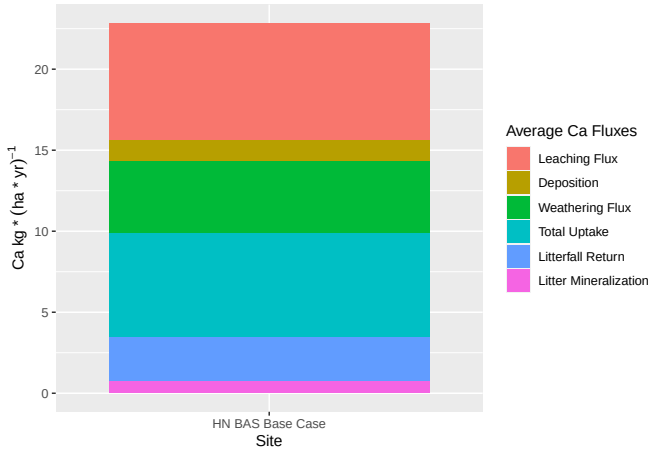
(d) Biomass of each compartment

Figure 29: N, S, and P Nutrient Contents and biomass per compartment

Analysis 1: Stack Flux Data

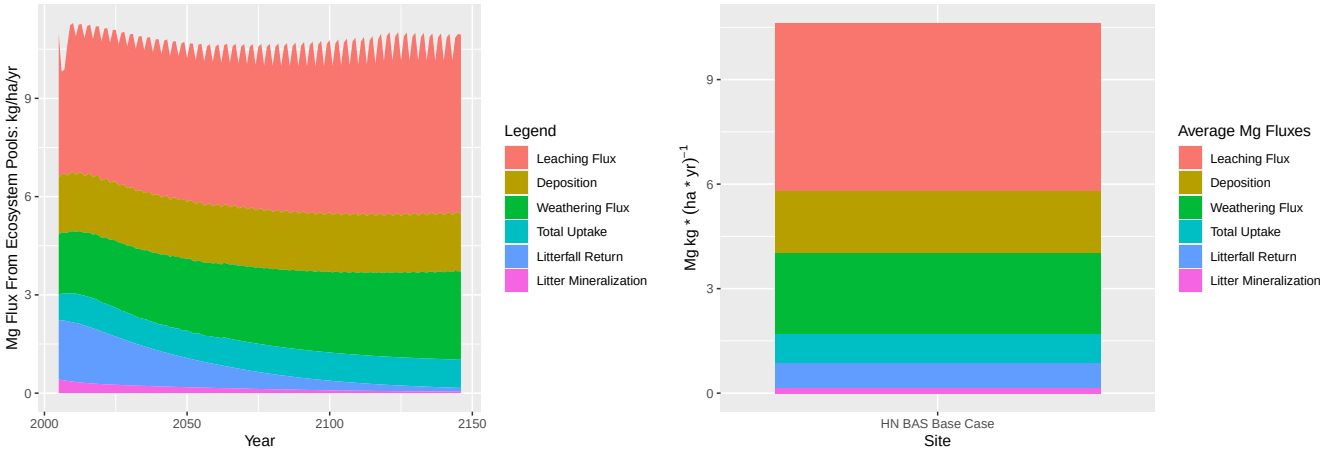


(a) Ca input and output fluxes over time



(b) Total Average Ca input and output fluxes

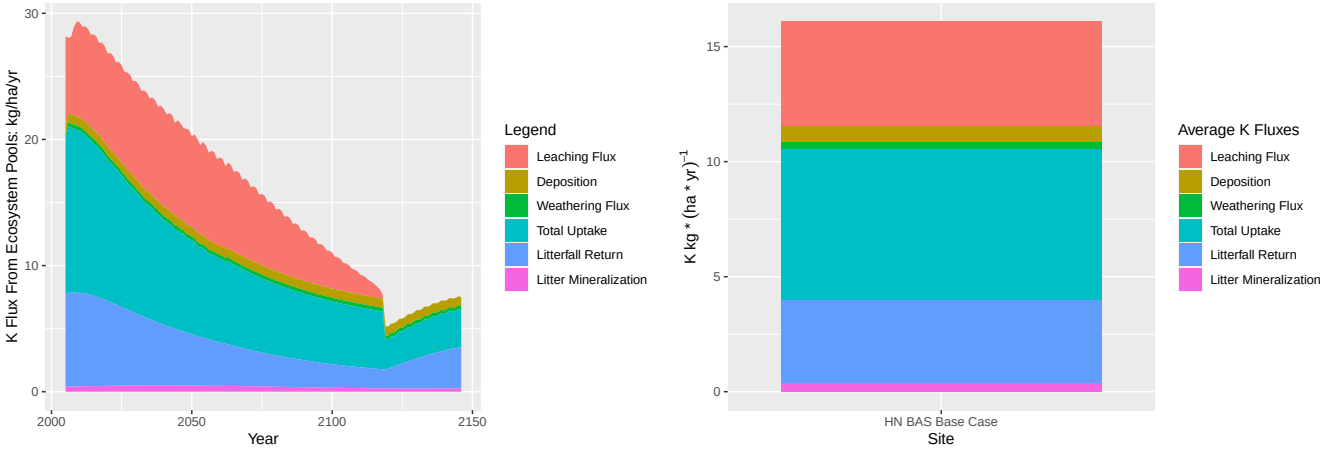
Figure 30: Calcium input and output comparison graphs



(a) Mg input and output fluxes over time

(b) Total Average Mg input and output fluxes

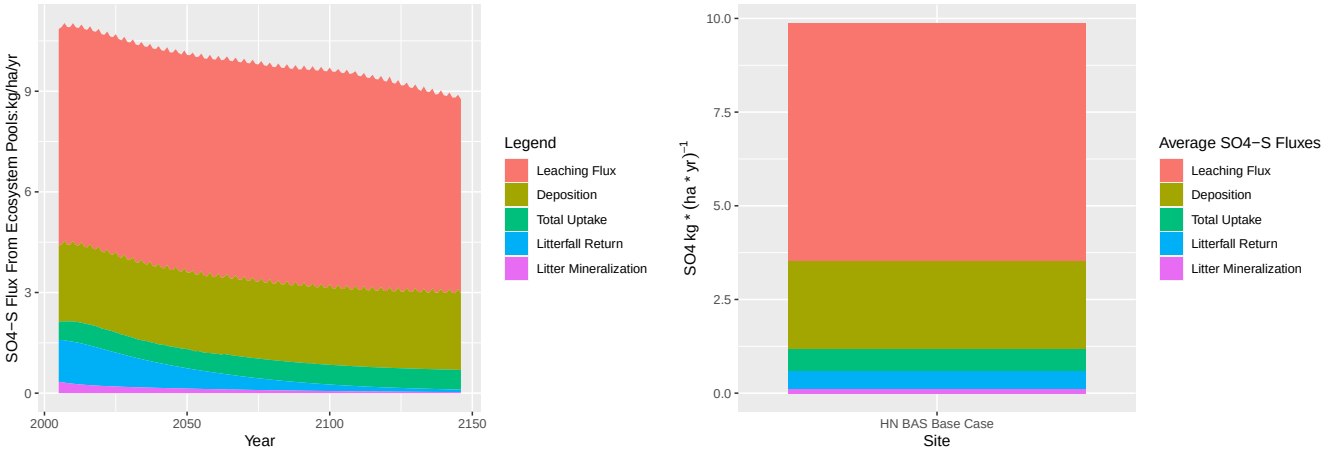
Figure 31: Magnesium input and output comparison graphs



(a) K input and output fluxes over time

(b) Total Average K input and output fluxes

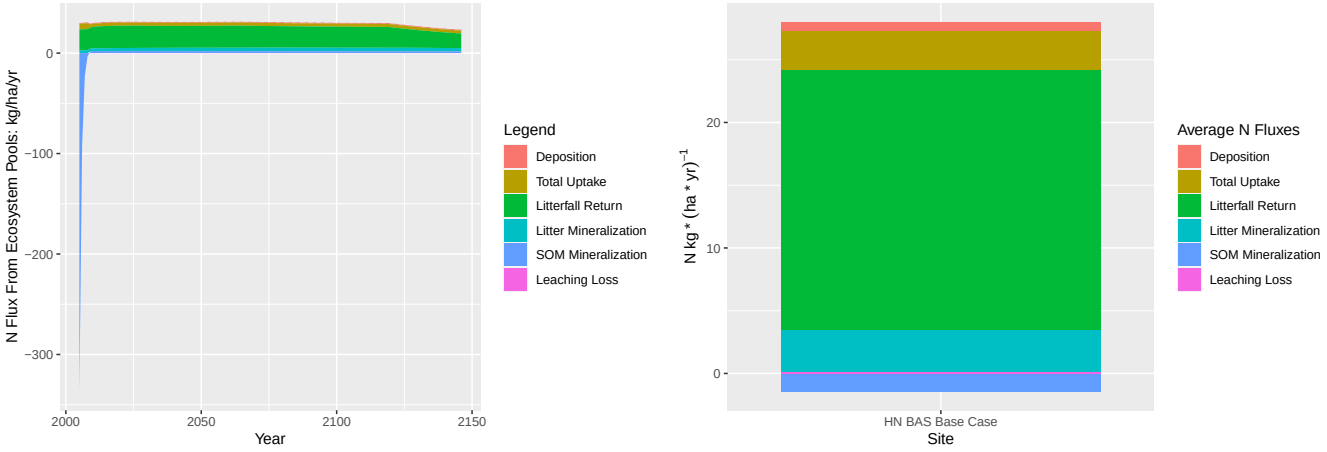
Figure 32: Potassium input and output comparison graphs



(a) S input and output fluxes over time

(b) Total Average S input and output fluxes

Figure 33: Sulfur input and output comparison graphs



(a) N input and output fluxes over time

(b) Total Average N input and output fluxes

Figure 34: Nitrogen input and output comparison graphs

Cation Exchange Capacity

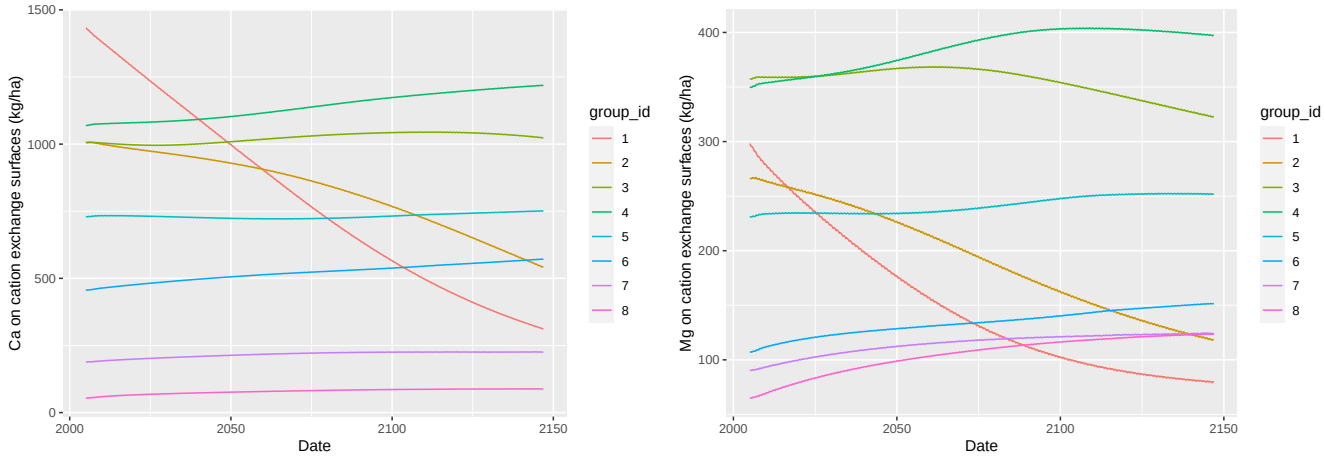


Figure 35: Calcium and Magnesium on exchangerover time

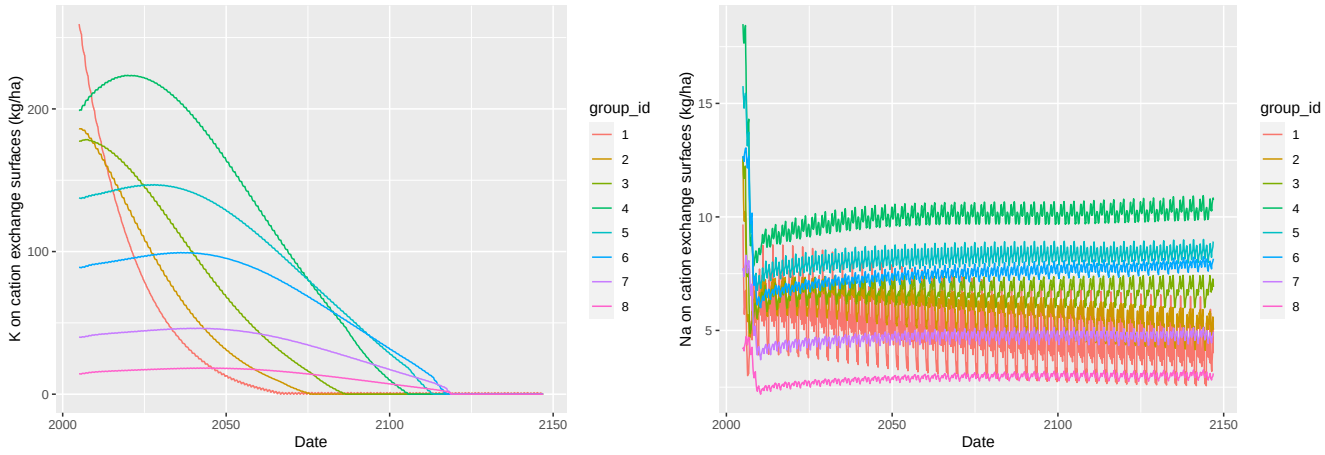


Figure 36: Potassium and Sodium on exchangerover time

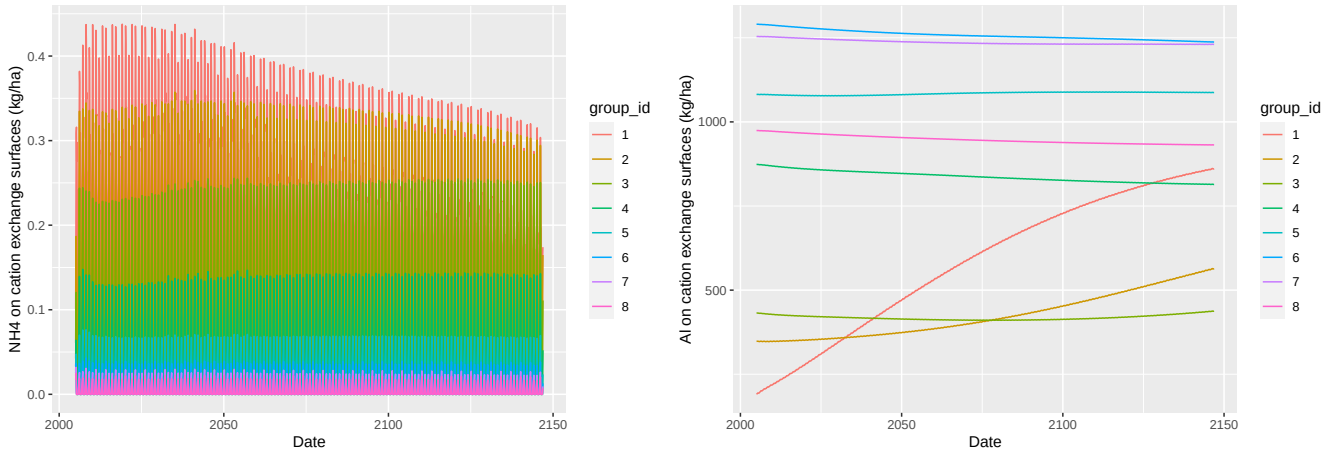
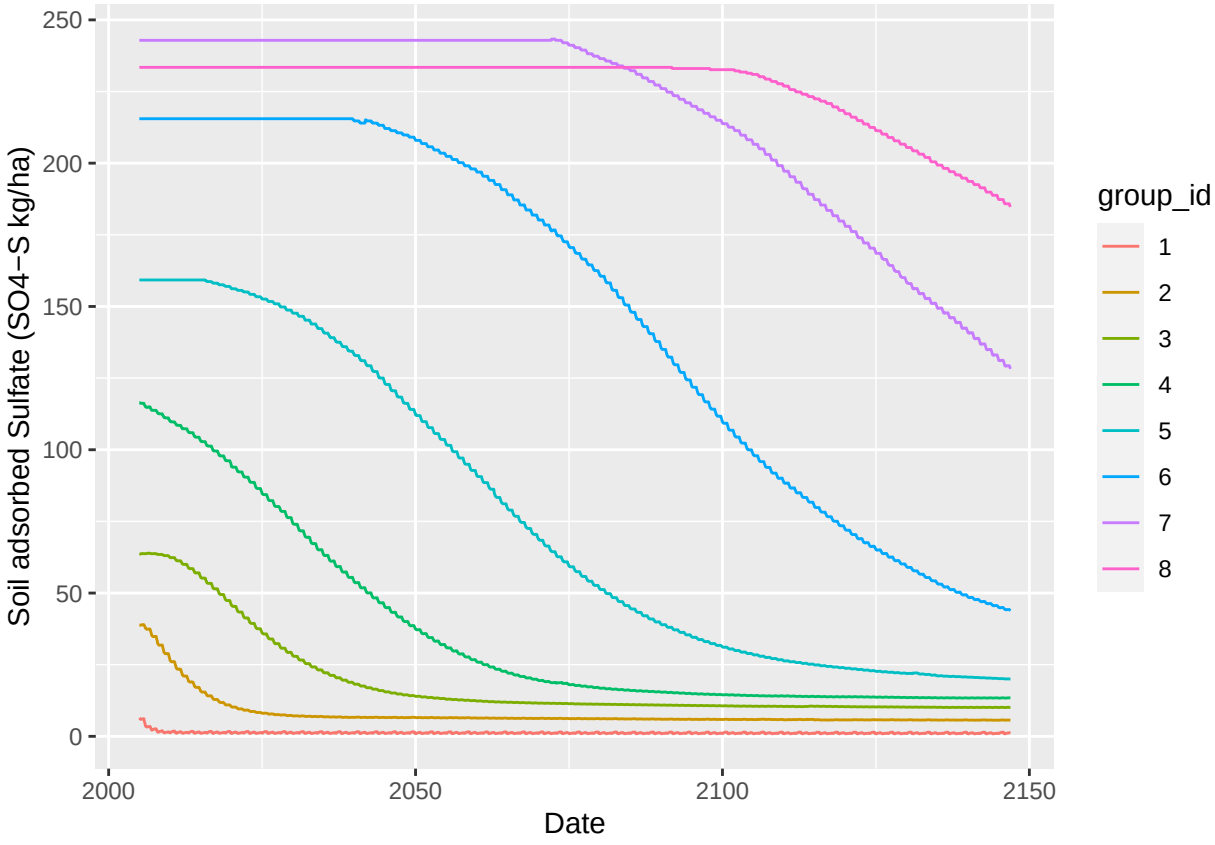
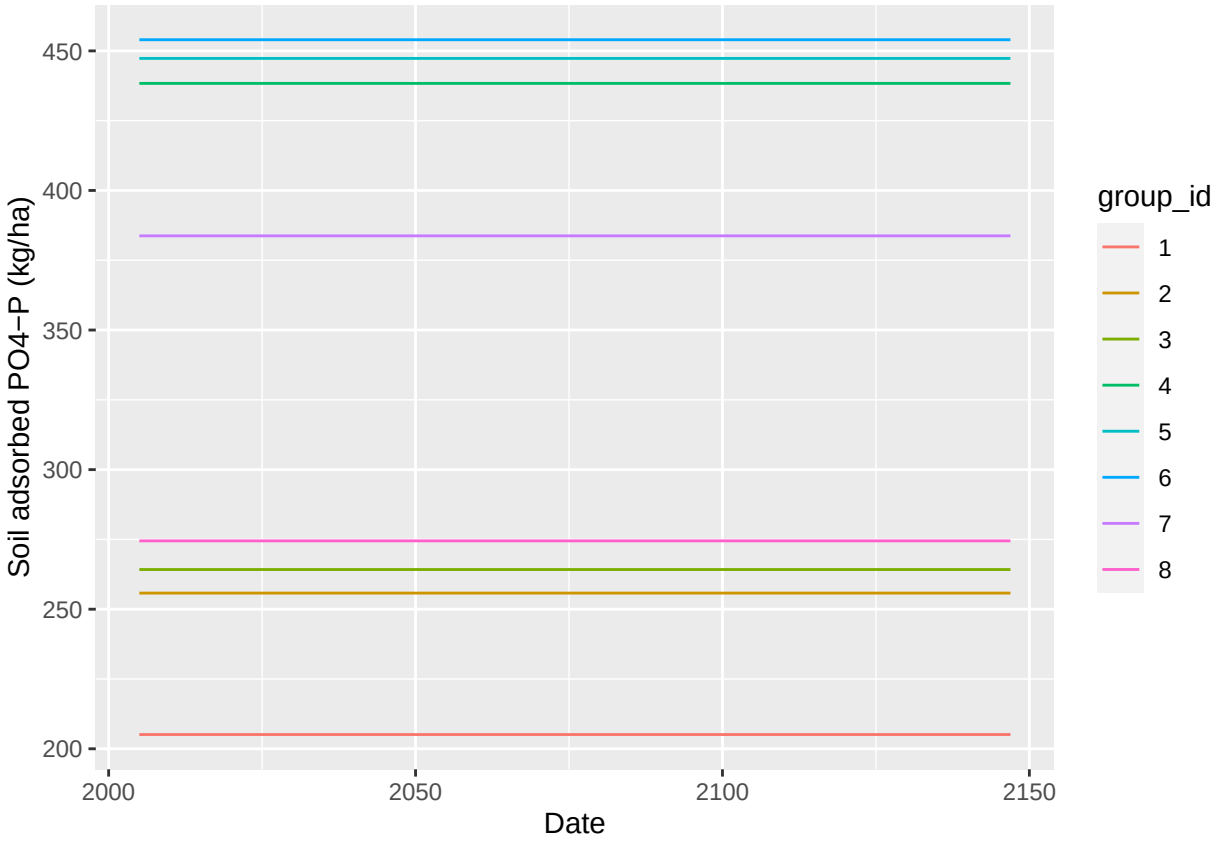
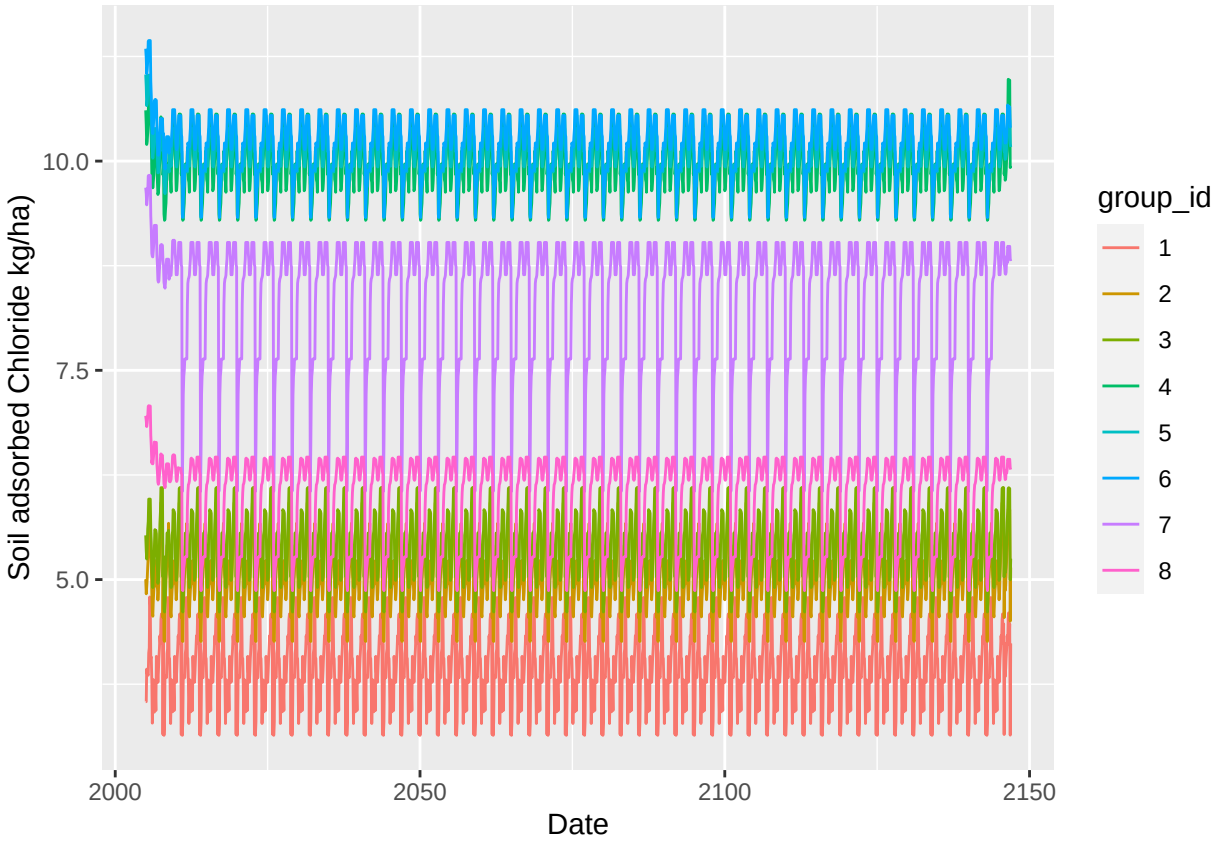


Figure 37: Ammonium and Aluminum on exchangerover time

Anion Exchange Capacity






Soil adsorbed Chloride kg/ha)
10.0
7.5
5.0
2000
2050
2100
2150
Date
group_id
1
2
3
4
5
6
7
8

Other

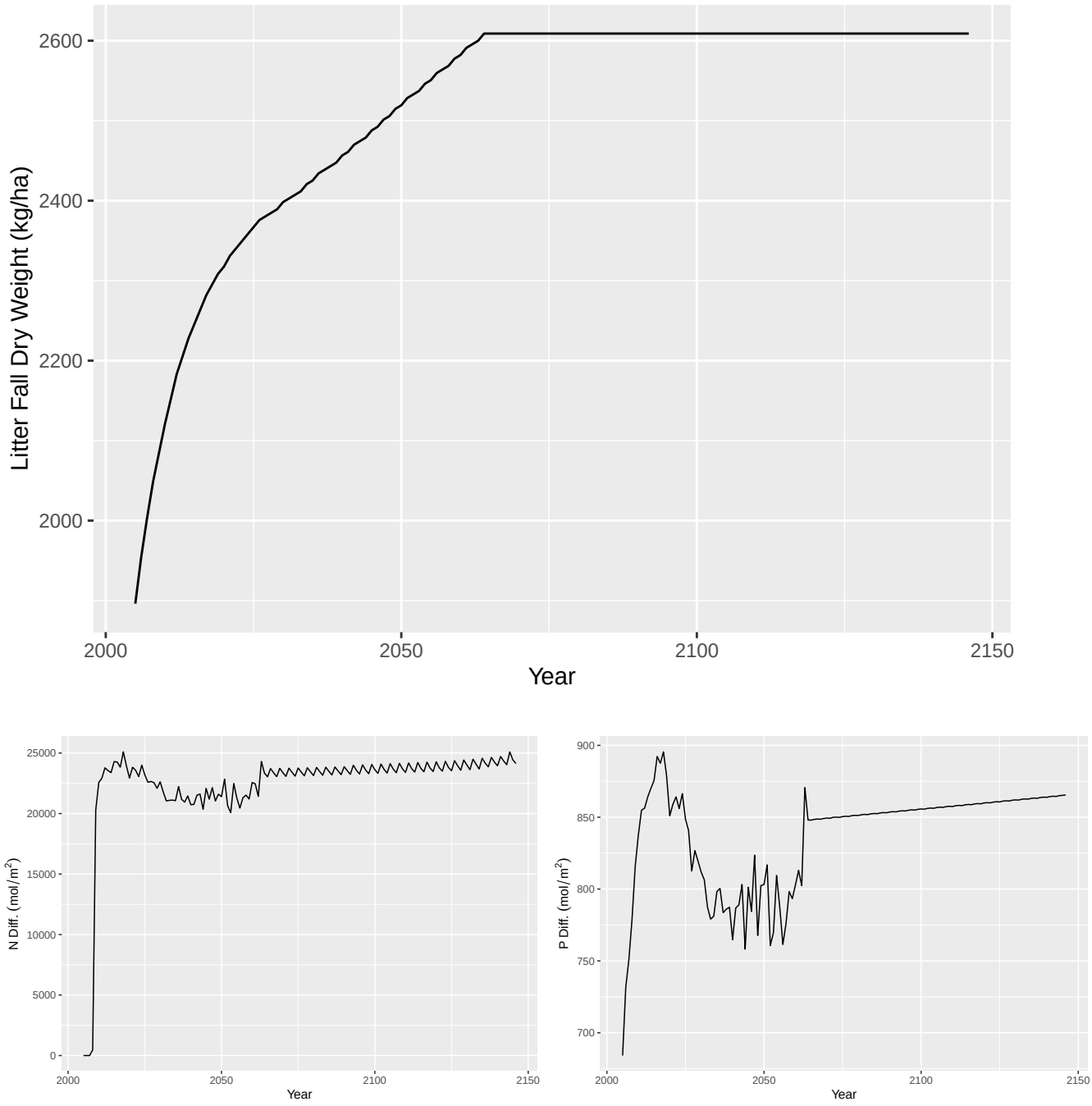


Figure 38: N and P Potential Uptake to Actual Uptake Difference

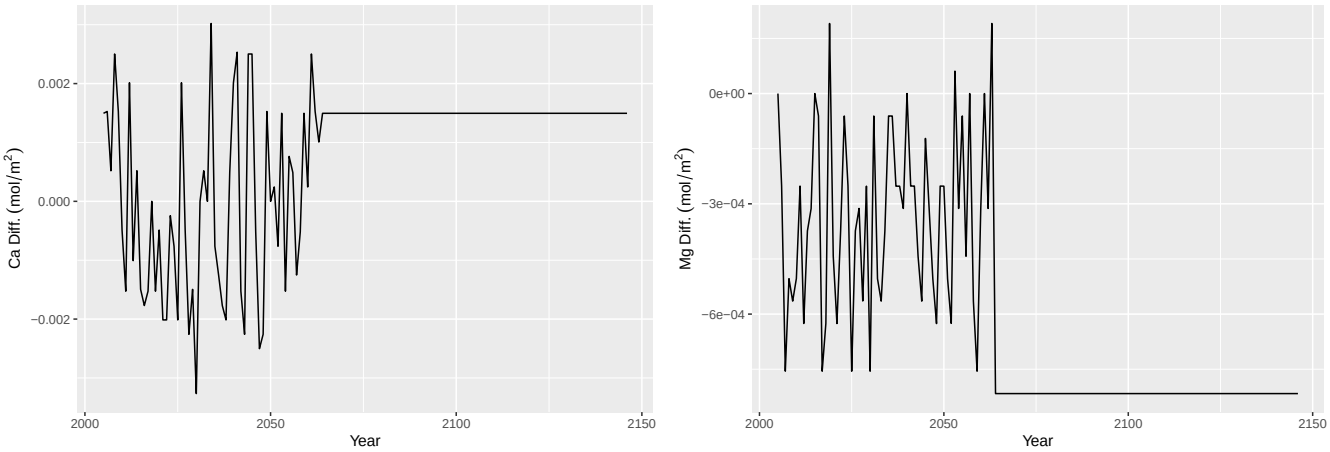


Figure 39: Ca and Mg Potential Uptake to Actual Uptake Difference

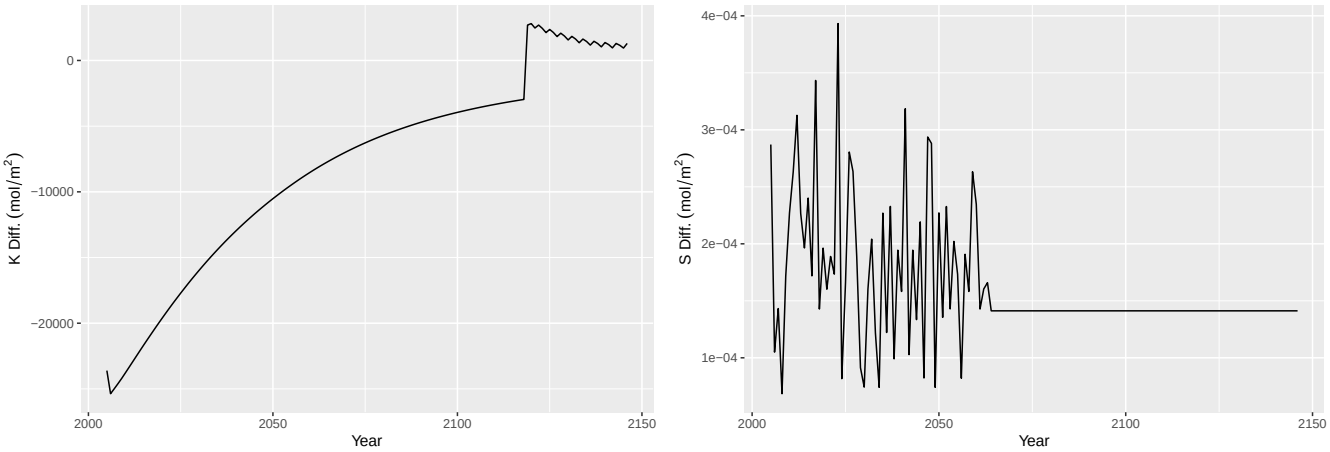


Figure 40: K and S Potential Uptake to Actual Uptake Difference