# Soil

## Soil Chemistry

### Soil EC

model = lmer(EC ~ Day\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=Soil\_data,REML= TRUE)

Shapiro-Wilk normality test

W = 0.9766, p-value < 2.2e-16

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: EC

Chisq Df Pr(>Chisq)

Day 1826.1130 1 <2e-16 \*\*\*

Basalt\_bin 0.1962 1 0.6578

Bacillus\_bin 0.4528 1 0.5010

Day:Basalt\_bin 101.9628 1 <2e-16 \*\*\*

Day:Bacillus\_bin 6.5472 1 0.0105 \*

Basalt\_bin:Bacillus\_bin 1.5306 1 0.2160

Day:Basalt\_bin:Bacillus\_bin 1.5894 1 0.2074

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Fixed effects:

Estimate Std. Error t value

(Intercept) 0.5311794 0.0358511 14.816

Day -0.0027996 0.0001142 -24.506

Basalt\_bin -0.0449739 0.0507012 -0.887

Bacillus\_bin 0.0980685 0.0507012 1.934

Day:Basalt\_bin 0.0010096 0.0001616 6.249

Day:Bacillus\_bin -0.0004364 0.0001616 -2.701

Basalt\_bin:Bacillus\_bin -0.1070807 0.0717023 -1.493

Day:Basalt\_bin:Bacillus\_bin 0.0002881 0.0002285 1.261

### Soil SWC

SWC above 0.11 (Mean±3\*Stdev = 0.112) was removed.

model = lmer(SWC ~ Day\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=Soil\_data,REML= TRUE)

Shapiro-Wilk normality test

W = 0.95965, p-value < 2.2e-16

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: SWC

Chisq Df Pr(>Chisq)

Day 223.8669 1 < 2.2e-16 \*\*\*

Basalt\_bin 0.4081 1 0.522925

Bacillus\_bin 1.8137 1 0.178068

Day:Basalt\_bin 6.8401 1 0.008913 \*\*

Day:Bacillus\_bin 4.3701 1 0.036575 \*

Basalt\_bin:Bacillus\_bin 2.0055 1 0.156731

Day:Basalt\_bin:Bacillus\_bin 0.4544 1 0.500265

Fixed effects:

Estimate Std. Error t value

(Intercept) 2.227e-01 1.546e-02 14.401

Day 3.452e-04 3.428e-05 10.070

Basalt\_bin 3.937e-02 2.187e-02 1.800

Bacillus\_bin 4.890e-02 2.187e-02 2.236

Day:Basalt\_bin -1.115e-04 4.808e-05 -2.320

Day:Bacillus\_bin -9.377e-05 4.808e-05 -1.951

Basalt\_bin:Bacillus\_bin -4.651e-02 3.092e-02 -1.504

Day:Basalt\_bin:Bacillus\_bin 4.563e-05 6.770e-05 0.674

# Leachate

## Leachate Chemistry

### pH

model = lmer(pH ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo) ,data=IC\_data)

### Shapiro-Wilk normality test

### W = 0.99212, p-value = 0.4356

### Response: pH

### Chisq Df Pr(>Chisq)

### Days 48.7513 1 2.906e-12 \*\*\*

### Basalt\_bin 34.0796 1 5.290e-09 \*\*\*

### Bacillus\_bin 1.8763 1 0.170755

### Days:Basalt\_bin 7.2523 1 0.007081 \*\*

### Days:Bacillus\_bin 4.0222 1 0.044906 \*

### Basalt\_bin:Bacillus\_bin 5.3044 1 0.021271 \*

### Days:Basalt\_bin:Bacillus\_bin 5.4389 1 0.019693 \*

Fixed effects:

Estimate Std. Error t value

(Intercept) 7.7549646 0.0537077 144.392

Days 0.0047121 0.0006725 7.006

Basalt\_bin 0.4462799 0.0759542 5.876

Bacillus\_bin 0.2989747 0.0759542 3.936

Days:Basalt\_bin -0.0033796 0.0009511 -3.553

Days:Bacillus\_bin -0.0029172 0.0009511 -3.067

Basalt\_bin:Bacillus\_bin -0.3383749 0.1074154 -3.150

Days:Basalt\_bin:Bacillus\_bin 0.0031369 0.0013451 2.332

### EC

model = lmer(EC ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo) ,data=IC\_data)

Shapiro-Wilk normality test

W = 0.99209, p-value = 0.4324

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: EC

Chisq Df Pr(>Chisq)

Days 131.3815 1 < 2.2e-16 \*\*\*

Basalt\_bin 0.1237 1 0.725079

Bacillus\_bin 3.6190 1 0.057123 .

Days:Basalt\_bin 0.0980 1 0.754259

Days:Bacillus\_bin 0.6043 1 0.436945

Basalt\_bin:Bacillus\_bin 8.1247 1 0.004367 \*\*

Days:Basalt\_bin:Bacillus\_bin 2.8290 1 0.092574 .

---

Fixed effects:

Estimate Std. Error t value

(Intercept) 2.652474 0.334158 7.938

Days -0.014199 0.003268 -4.345

Basalt\_bin 1.235970 0.472571 2.615

Bacillus\_bin 1.719555 0.472571 3.639

Days:Basalt\_bin -0.006519 0.004621 -1.411

Days:Bacillus\_bin -0.008037 0.004621 -1.739

Basalt\_bin:Bacillus\_bin -2.157414 0.668316 -3.228

Days:Basalt\_bin:Bacillus\_bin 0.010993 0.006536 1.682

## Cations & Nitrogen

### Ca

model = lmer(Tot\_Ca\_mmol ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Cations,REML= TRUE)

Shapiro-Wilk normality test

W = 0.97846, p-value = 0.378

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: Tot\_Ca\_mmol

Chisq Df Pr(>Chisq)

Days 116.9761 1 < 2e-16 \*\*\*

Basalt\_bin 1.6991 1 0.19240

Bacillus\_bin 2.4319 1 0.11889

Days:Basalt\_bin 4.0605 1 0.04390 \*

Days:Bacillus\_bin 0.2956 1 0.58665

Basalt\_bin:Bacillus\_bin 6.2441 1 0.01246 \*

Days:Basalt\_bin:Bacillus\_bin 2.1802 1 0.13980

Fixed effects:

Estimate Std. Error t value

(Intercept) 3.128418 0.460186 6.798

Days -0.021973 0.006274 -3.502

Basalt\_bin 2.295965 0.650801 3.528

Bacillus\_bin 1.798982 0.650801 2.764

Days:Basalt\_bin -0.021957 0.008872 -2.475

Days:Bacillus\_bin -0.012579 0.008872 -1.418

Basalt\_bin:Bacillus\_bin -2.419177 0.922823 -2.621

Days:Basalt\_bin:Bacillus\_bin 0.018833 0.012755 1.477

### K

model = lmer(Tot\_K\_mmol ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Cations,REML= TRUE)

Shapiro-Wilk normality test

W = 0.98213, p-value = 0.5366

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: Tot\_K\_mmol

Chisq Df Pr(>Chisq)

Days 247.4611 1 < 2.2e-16 \*\*\*

Basalt\_bin 0.1375 1 0.710737

Bacillus\_bin 6.6082 1 0.010151 \*

Days:Basalt\_bin 0.4618 1 0.496805

Days:Bacillus\_bin 1.4149 1 0.234238

Basalt\_bin:Bacillus\_bin 8.6700 1 0.003235 \*\*

Days:Basalt\_bin:Bacillus\_bin 4.7845 1 0.028717 \*

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Fixed effects:

Estimate Std. Error t value

(Intercept) 5.58768 0.58701 9.519

Days -0.04038 0.00671 -6.018

Basalt\_bin 2.23202 0.83016 2.689

Bacillus\_bin 3.68424 0.83016 4.438

Days:Basalt\_bin -0.01903 0.00949 -2.006

Days:Bacillus\_bin -0.02252 0.00949 -2.373

Basalt\_bin:Bacillus\_bin -4.27986 1.17672 -3.637

Days:Basalt\_bin:Bacillus\_bin 0.02995 0.01369 2.187

### Mg

model = lmer(Tot\_Mg\_mmol ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Cations,REML= TRUE)

Shapiro-Wilk normality test

W = 0.9659, p-value = 0.09685

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: Tot\_Mg\_mmol

Chisq Df Pr(>Chisq)

Days 71.9090 1 < 2.2e-16 \*\*\*

Basalt\_bin 0.7778 1 0.377809

Bacillus\_bin 7.2666 1 0.007025 \*\*

Days:Basalt\_bin 2.3310 1 0.126821

Days:Bacillus\_bin 0.4116 1 0.521174

Basalt\_bin:Bacillus\_bin 6.7403 1 0.009426 \*\*

Days:Basalt\_bin:Bacillus\_bin 1.5579 1 0.211976

Fixed effects:

Estimate Std. Error t value

(Intercept) 6.04790 1.27529 4.742

Days -0.04255 0.01617 -2.631

Basalt\_bin 5.51697 1.80353 3.059

Bacillus\_bin 6.12053 1.80353 3.394

Days:Basalt\_bin -0.04494 0.02287 -1.965

Days:Bacillus\_bin -0.03037 0.02287 -1.328

Basalt\_bin:Bacillus\_bin -6.68888 2.55716 -2.616

Days:Basalt\_bin:Bacillus\_bin 0.04111 0.03294 1.248

### Na

model = lmer(Tot\_Na\_mmol ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Cations,REML= TRUE)

Shapiro-Wilk normality test

W = 0.98197, p-value = 0.529

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: Tot\_Na\_mmol

Chisq Df Pr(>Chisq)

Days 197.8936 1 < 2.2e-16 \*\*\*

Basalt\_bin 2.0272 1 0.154508

Bacillus\_bin 5.0244 1 0.024993 \*

Days:Basalt\_bin 3.7834 1 0.051763 .

Days:Bacillus\_bin 0.9201 1 0.337437

Basalt\_bin:Bacillus\_bin 9.8613 1 0.001688 \*\*

Days:Basalt\_bin:Bacillus\_bin 5.0736 1 0.024293 \*

Fixed effects:

Estimate Std. Error t value

(Intercept) 11.36073 1.48117 7.670

Days -0.08498 0.01839 -4.620

Basalt\_bin 9.06527 2.09469 4.328

Bacillus\_bin 8.75508 2.09469 4.180

Days:Basalt\_bin -0.07709 0.02601 -2.964

Days:Bacillus\_bin -0.05863 0.02601 -2.254

Basalt\_bin:Bacillus\_bin -11.16505 2.96985 -3.759

Days:Basalt\_bin:Bacillus\_bin 0.08443 0.03748 2.252

### Fe

model= lmer(log(Tot\_Fe\_mmol) ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Cations,REML= TRUE)

Shapiro-Wilk normality test

W = 0.98399, p-value = 0.6286

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: log(Tot\_Fe\_mmol)

Chisq Df Pr(>Chisq)

Days 176.2846 1 < 2.2e-16 \*\*\*

Basalt\_bin 0.4089 1 0.522530

Bacillus\_bin 6.8727 1 0.008752 \*\*

Days:Basalt\_bin 0.2054 1 0.650363

Days:Bacillus\_bin 1.4976 1 0.221039

Basalt\_bin:Bacillus\_bin 0.8744 1 0.349731

Days:Basalt\_bin:Bacillus\_bin 0.0067 1 0.934536

Fixed effects:

Estimate Std. Error t value

(Intercept) -1.1249923 0.5324520 -2.113

Days -0.0418529 0.0058959 -7.099

Basalt\_bin 0.3053765 0.7530009 0.406

Bacillus\_bin 0.9883499 0.7530009 1.313

Days:Basalt\_bin -0.0031998 0.0083380 -0.384

Days:Bacillus\_bin 0.0068838 0.0083380 0.826

Basalt\_bin:Bacillus\_bin -0.7966689 1.0672476 -0.746

Days:Basalt\_bin:Bacillus\_bin 0.0009886 0.0120353 0.082

### Al

model = lmer(log(Tot\_Al\_mmol) ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Cations,REML= TRUE)

Shapiro-Wilk normality test

W = 0.96289, p-value = 0.0734

Response: log(Tot\_Al\_mmol)

Chisq Df Pr(>Chisq)

Days 487.9152 1 < 2e-16 \*\*\*

Basalt\_bin 2.2019 1 0.13784

Bacillus\_bin 0.0049 1 0.94409

Days:Basalt\_bin 0.7674 1 0.38101

Days:Bacillus\_bin 3.0666 1 0.07991 .

Basalt\_bin:Bacillus\_bin 0.6666 1 0.41425

Days:Basalt\_bin:Bacillus\_bin 4.0488 1 0.04420 \*

Fixed effects:

Estimate Std. Error t value

(Intercept) -2.7249653 0.2588083 -10.529

Days -0.0312553 0.0026117 -11.967

Basalt\_bin -0.9220203 0.3660102 -2.519

Bacillus\_bin -0.1686936 0.3660102 -0.461

Days:Basalt\_bin 0.0074152 0.0036935 2.008

Days:Bacillus\_bin 0.0002781 0.0036935 0.075

Basalt\_bin:Bacillus\_bin 1.0026666 0.5277711 1.900

Days:Basalt\_bin:Bacillus\_bin -0.0109693 0.0054515 -2.012

### Mn

model = lmer(log(Tot\_Mn\_mmol+1e-06) ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Cations,REML= TRUE)

Shapiro-Wilk normality test

W = 0.9653, p-value = 0.09057

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: log(Tot\_Mn\_mmol + 1e-06)

Chisq Df Pr(>Chisq)

Days 0.1961 1 0.657883

Basalt\_bin 2.6697 1 0.102277

Bacillus\_bin 8.1716 1 0.004255 \*\*

Days:Basalt\_bin 0.0924 1 0.761200

Days:Bacillus\_bin 0.8215 1 0.364733

Basalt\_bin:Bacillus\_bin 2.5180 1 0.112555

Days:Basalt\_bin:Bacillus\_bin 0.0173 1 0.895215

Fixed effects:

Estimate Std. Error t value

(Intercept) -8.285516 1.445442 -5.732

Days -0.014920 0.019730 -0.756

Basalt\_bin -0.271083 2.044163 -0.133

Bacillus\_bin 2.633403 2.044163 1.288

Days:Basalt\_bin 0.003535 0.027903 0.127

Days:Bacillus\_bin 0.015612 0.027903 0.560

Basalt\_bin:Bacillus\_bin -2.882051 2.898582 -0.994

Days:Basalt\_bin:Bacillus\_bin 0.005283 0.040111 0.132

### Si

model = lmer(Tot\_Si\_mmol ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Cations,REML= TRUE)

Shapiro-Wilk normality test

W = 0.95968, p-value = 0.04841

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: Tot\_Si\_mmol

Chisq Df Pr(>Chisq)

Days 96.0562 1 < 2.2e-16 \*\*\*

Basalt\_bin 12.3950 1 0.0004305 \*\*\*

Bacillus\_bin 0.0024 1 0.9606223

Days:Basalt\_bin 8.1570 1 0.0042894 \*\*

Days:Bacillus\_bin 0.5749 1 0.4483149

Basalt\_bin:Bacillus\_bin 0.2833 1 0.5945544

Days:Basalt\_bin:Bacillus\_bin 0.1364 1 0.7118492

Fixed effects:

Estimate Std. Error t value

(Intercept) 0.1958624 0.0285147 6.869

Days -0.0013137 0.0003892 -3.375

Basalt\_bin 0.1236113 0.0403259 3.065

Bacillus\_bin 0.0184873 0.0403259 0.458

Days:Basalt\_bin -0.0009880 0.0005504 -1.795

Days:Bacillus\_bin -0.0001584 0.0005504 -0.288

Basalt\_bin:Bacillus\_bin 0.0005579 0.0571812 0.010

Days:Basalt\_bin:Bacillus\_bin -0.0002923 0.0007913 -0.369

### Ni

model = lmer(Tot\_Ni\_mmol ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Cations,REML= TRUE)

Shapiro-Wilk normality test

W = 0.97173, p-value = 0.1851

Response: Tot\_Ni\_mmol

Chisq Df Pr(>Chisq)

Days 97.2594 1 < 2.2e-16 \*\*\*

Basalt\_bin 37.0236 1 1.167e-09 \*\*\*

Bacillus\_bin 2.1505 1 0.1425

Days:Basalt\_bin 22.8920 1 1.714e-06 \*\*\*

Days:Bacillus\_bin 0.2726 1 0.6016

Basalt\_bin:Bacillus\_bin 1.4288 1 0.2320

Days:Basalt\_bin:Bacillus\_bin 0.5491 1 0.4587

Fixed effects:

Estimate Std. Error t value

(Intercept) 6.372e-04 1.883e-04 3.383

Days -5.087e-06 2.504e-06 -2.032

Basalt\_bin 1.649e-03 2.664e-04 6.190

Bacillus\_bin 4.846e-04 2.664e-04 1.819

Days:Basalt\_bin -1.400e-05 3.541e-06 -3.955

Days:Bacillus\_bin -3.153e-06 3.541e-06 -0.890

Basalt\_bin:Bacillus\_bin -4.920e-04 3.777e-04 -1.303

Days:Basalt\_bin:Bacillus\_bin 3.775e-06 5.094e-06 0.741

### P

model= lmer(log(Tot\_P\_mmol) ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Cations,REML= TRUE)

Shapiro-Wilk normality test

W = 0.97016, p-value = 0.1557

Response: log(Tot\_P\_mmol)

Chisq Df Pr(>Chisq)

Days 142.5301 1 <2e-16 \*\*\*

Basalt\_bin 0.0667 1 0.7963

Bacillus\_bin 0.1047 1 0.7463

Days:Basalt\_bin 0.1129 1 0.7368

Days:Bacillus\_bin 1.4614 1 0.2267

Basalt\_bin:Bacillus\_bin 3.5822 1 0.0584 .

Days:Basalt\_bin:Bacillus\_bin 0.2800 1 0.5967

Fixed effects:

Estimate Std. Error t value

(Intercept) -2.161666 0.306428 -7.054

Days -0.023759 0.004031 -5.895

Basalt\_bin 0.180627 0.433354 0.417

Bacillus\_bin 0.572443 0.433354 1.321

Days:Basalt\_bin 0.003473 0.005700 0.609

Days:Bacillus\_bin -0.002860 0.005700 -0.502

Basalt\_bin:Bacillus\_bin -0.437999 0.614476 -0.713

Days:Basalt\_bin:Bacillus\_bin -0.004340 0.008203 -0.529

### Cr

model= lmer(log(Tot\_Cr\_mmol) ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=Cr\_cation,REML= TRUE)

Shapiro-Wilk normality test

W = 0.87748, p-value = 0.0006257

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: log(Tot\_Cr\_mmol)

Chisq Df Pr(>Chisq)

Days 38.3590 1 5.886e-10 \*\*\*

Basalt\_bin 0.2312 1 0.6306

Bacillus\_bin 1.2260 1 0.2682

Days:Basalt\_bin 0.4192 1 0.5173

Days:Bacillus\_bin 0.6394 1 0.4239

Basalt\_bin:Bacillus\_bin 0.0023 1 0.9617

Days:Basalt\_bin:Bacillus\_bin 0.5999 1 0.4386

Fixed effects:

Estimate Std. Error t value

(Intercept) -10.095593 0.303459 -33.268

Days -0.011276 0.002648 -4.258

Basalt\_bin -0.351601 0.429156 -0.819

Bacillus\_bin 0.034864 0.429156 0.081

Days:Basalt\_bin 0.003754 0.003745 1.002

Days:Bacillus\_bin 0.004169 0.003745 1.113

Basalt\_bin:Bacillus\_bin 0.243469 0.625597 0.389

Days:Basalt\_bin:Bacillus\_bin -0.004228 0.005459 -0.774

## NITROGEN

### NH4

model = lmer(Tot\_NH4\_mmol ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Nitro,REML= TRUE)

Shapiro-Wilk normality test

W = 0.97095, p-value = 0.1624

Response: Tot\_NH4\_mmol

Chisq Df Pr(>Chisq)

Days 66.5872 1 3.348e-16 \*\*\*

Basalt\_bin 11.7059 1 0.0006230 \*\*\*

Bacillus\_bin 3.8014 1 0.0512113 .

Days:Basalt\_bin 11.3895 1 0.0007386 \*\*\*

Days:Bacillus\_bin 2.3378 1 0.1262644

Basalt\_bin:Bacillus\_bin 6.5477 1 0.0105023 \*

Days:Basalt\_bin:Bacillus\_bin 5.9174 1 0.0149925 \*

Fixed effects:

Estimate Std. Error t value

(Intercept) 1.239112 0.243545 5.088

Days -0.012588 0.003324 -3.787

Basalt\_bin -0.307420 0.344425 -0.893

Bacillus\_bin 1.411446 0.344425 4.098

Days:Basalt\_bin 0.003133 0.004701 0.666

Days:Bacillus\_bin -0.013170 0.004701 -2.801

Basalt\_bin:Bacillus\_bin -1.676834 0.487091 -3.443

Days:Basalt\_bin:Bacillus\_bin 0.016174 0.006649 2.433

### NO2

model = lmer(log(Tot\_NO2\_mmol) ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Nitro,REML= TRUE)

Shapiro-Wilk normality test

W = 0.8565, p-value = 4.764e-06

Response: log(Tot\_NO2\_mmol)

Chisq Df Pr(>Chisq)

Days 20.5186 1 5.905e-06 \*\*\*

Basalt\_bin 0.2351 1 0.6278

Bacillus\_bin 0.1443 1 0.7040

Days:Basalt\_bin 0.1257 1 0.7230

Days:Bacillus\_bin 1.8117 1 0.1783

Basalt\_bin:Bacillus\_bin 1.4775 1 0.2242

Days:Basalt\_bin:Bacillus\_bin 0.0514 1 0.8206

Fixed effects:

Estimate Std. Error t value

(Intercept) -7.459001 1.057789 -7.052

Days -0.041498 0.014439 -2.874

Basalt\_bin 1.108544 1.495939 0.741

Bacillus\_bin -0.450702 1.495939 -0.301

Days:Basalt\_bin -0.001844 0.020420 -0.090

Days:Bacillus\_bin 0.022710 0.020420 1.112

Basalt\_bin:Bacillus\_bin -1.024558 2.115578 -0.484

Days:Basalt\_bin:Bacillus\_bin -0.006550 0.028878 -0.227

### NO3

model = lmer(log(Tot\_NO3\_mmol) ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo),data=ICPData\_Nitro,REML= TRUE)

Shapiro-Wilk normality test

W = 0.98906, p-value = 0.8685

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: log(Tot\_NO3\_mmol)

Chisq Df Pr(>Chisq)

Days 78.2250 1 < 2e-16 \*\*\*

Basalt\_bin 3.7034 1 0.05430 .

Bacillus\_bin 3.0236 1 0.08206 .

Days:Basalt\_bin 0.0205 1 0.88615

Days:Bacillus\_bin 4.1995 1 0.04044 \*

Basalt\_bin:Bacillus\_bin 0.4451 1 0.50469

Days:Basalt\_bin:Bacillus\_bin 0.3275 1 0.56715

Fixed effects:

Estimate Std. Error t value

(Intercept) -6.925247 0.865560 -8.001

Days 0.037608 0.011815 3.183

Basalt\_bin 0.293445 1.224087 0.240

Bacillus\_bin -3.042644 1.224087 -2.486

Days:Basalt\_bin 0.005069 0.016709 0.303

Days:Bacillus\_bin 0.030973 0.016709 1.854

Basalt\_bin:Bacillus\_bin 1.464412 1.731120 0.846

Days:Basalt\_bin:Bacillus\_bin -0.013522 0.023630 -0.572

## DIC, DOC & Alkalinity

### DIC

model = lmer(Total\_DIC\_mg ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo) ,data=IC\_data)

Shapiro-Wilk normality test

W = 0.97018, p-value = 0.0007305

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: Total\_DIC\_mg

Chisq Df Pr(>Chisq)

Days 61.1011 1 5.422e-15 \*\*\*

Basalt\_bin 2.0450 1 0.15271

Bacillus\_bin 5.3292 1 0.02097 \*

Days:Basalt\_bin 1.3259 1 0.24954

Days:Bacillus\_bin 0.1063 1 0.74436

Basalt\_bin:Bacillus\_bin 5.8857 1 0.01526 \*

Days:Basalt\_bin:Bacillus\_bin 1.3484 1 0.24556

### DOC

model = lmer(Total\_DOC\_mg ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo) ,data=IC\_data)

Shapiro-Wilk normality test

W = 0.98894, p-value = 0.1804

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: Total\_DOC\_mg

Chisq Df Pr(>Chisq)

Days 115.0927 1 < 2.2e-16 \*\*\*

Basalt\_bin 0.2734 1 0.601063

Bacillus\_bin 6.7506 1 0.009372 \*\*

Days:Basalt\_bin 1.2718 1 0.259432

Days:Bacillus\_bin 1.5551 1 0.212378

Basalt\_bin:Bacillus\_bin 4.8287 1 0.027989 \*

Days:Basalt\_bin:Bacillus\_bin 0.4589 1 0.498161

### Alkalinity

model= lmer(TA\_mEQ ~ Days\*Basalt\_bin\*Bacillus\_bin + (1|potNo) ,data=Alkalinity\_data)

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: TA\_mEQ

Chisq Df Pr(>Chisq)

Days 49.5589 1 1.925e-12 \*\*\*

Basalt\_bin 0.5908 1 0.442095

Bacillus\_bin 6.9541 1 0.008363 \*\*

Days:Basalt\_bin 0.2082 1 0.648212

Days:Bacillus\_bin 0.3423 1 0.558516

Basalt\_bin:Bacillus\_bin 8.9034 1 0.002846 \*\*

Days:Basalt\_bin:Bacillus\_bin 1.3328 1 0.248314

# Gas Emissions

## CO2

model= lmer(CO2\_Flux ~ Temp+SWC+SWCquadr + (1|PotNo),data=GHGDataCO2)

REML criterion at convergence: 1016.6

Scaled residuals:

Min 1Q Median 3Q Max

-2.39121 -0.75879 -0.05814 0.69556 2.49968

Random effects:

Groups Name Variance Std.Dev.

PotNo (Intercept) 0.569 0.7543

Residual 2.783 1.6684

Number of obs: 260, groups: PotNo, 20

Fixed effects:

Estimate Std. Error t value

(Intercept) 6.9924 2.9816 2.345

Temp -0.4176 0.1401 -2.981

SWC 48.6064 14.7247 3.301

SWCquadr -137.6061 33.7525 -4.077

Correlation of Fixed Effects:

(Intr) Temp SWC

Temp -0.844

SWC -0.600 0.111

SWCquadr 0.577 -0.132 -0.980

Shapiro-Wilk normality test

W = 0.99343, p-value = 0.2717

Residual analysis:

model2 = lmer(residualsCO2 ~ Day\*Basalt\_bin\*Bacillus\_bin + (1|PotNo),data=GHGDataCO2)

REML criterion at convergence: 1018.3

Scaled residuals:

Min 1Q Median 3Q Max

-2.4038 -0.7164 -0.0285 0.7494 2.5613

Random effects:

Groups Name Variance Std.Dev.

PotNo (Intercept) 0.00 0.000

Residual 2.61 1.616

Number of obs: 260, groups: PotNo, 20

Fixed effects:

Estimate Std. Error t value

(Intercept) -0.369686 0.453301 -0.816

Day 0.005344 0.005522 0.968

Basalt\_bin 0.396338 0.630155 0.629

Bacillus\_bin -0.497731 0.621137 -0.801

Day:Basalt\_bin -0.006405 0.007662 -0.836

Day:Bacillus\_bin 0.006171 0.007668 0.805

Basalt\_bin:Bacillus\_bin 0.869878 0.870261 1.000

Day:Basalt\_bin:Bacillus\_bin -0.009572 0.010692 -0.895

Correlation of Fixed Effects:

(Intr) Day Bslt\_b Bclls\_ Dy:Bs\_ Dy:Bc\_ Bs\_:B\_

Day -0.923

Basalt\_bin -0.720 0.664

Bacillus\_bn -0.735 0.678 0.529

Day:Bslt\_bn 0.665 -0.721 -0.922 -0.489

Dy:Bclls\_bn 0.668 -0.724 -0.481 -0.920 0.522

Bslt\_bn:Bc\_ 0.525 -0.484 -0.729 -0.714 0.672 0.657

Dy:Bslt\_:B\_ -0.479 0.520 0.664 0.660 -0.720 -0.717 -0.920

optimizer (nloptwrap) convergence code: 0 (OK)

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: residualsSCECO2

Chisq Df Pr(>Chisq)

Day 1.0363 1 0.30867

Basalt\_bin 0.0135 1 0.90753

Bacillus\_bin 0.0416 1 0.83836

Day:Basalt\_bin 4.4875 1 0.03414 \*

Day:Bacillus\_bin 0.0546 1 0.81532

Basalt\_bin:Bacillus\_bin 0.1976 1 0.65663

Day:Basalt\_bin:Bacillus\_bin 0.8015 1 0.37065

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

## CO2eq

model = lmer(CO2eq\_Flux ~ Temp+SWC+SWCquadr + (1|PotNo),data=GHGDataCO2)

REML criterion at convergence: 1022.9

Scaled residuals:

Min 1Q Median 3Q Max

-2.40485 -0.71212 -0.05107 0.66320 2.55079

Random effects:

Groups Name Variance Std.Dev.

PotNo (Intercept) 0.5557 0.7454

Residual 2.8604 1.6913

Number of obs: 260, groups: PotNo, 20

Fixed effects:

Estimate Std. Error t value

(Intercept) 6.7763 3.0190 2.245

Temp -0.4075 0.1420 -2.870

SWC 50.5976 14.8881 3.399

SWCquadr -141.8680 34.1521 -4.154

Correlation of Fixed Effects:

(Intr) Temp SWC

Temp -0.845

SWC -0.599 0.111

SWCquadr 0.576 -0.132 -0.980

> shapiro.test(residuals(modelSCEL9))

Shapiro-Wilk normality test

W = 0.99468, p-value = 0.4556

Residual analysis:

model2 = lmer(residualsCO2eq ~ Day\*Basalt\_bin\*Bacillus\_bin + (1|PotNo),data=GHGDataCO2)

REML criterion at convergence: 1025.1

Scaled residuals:

Min 1Q Median 3Q Max

-2.4210 -0.6959 -0.0285 0.7174 2.5578

Random effects:

Groups Name Variance Std.Dev.

PotNo (Intercept) 0.000 0.000

Residual 2.681 1.637

Number of obs: 260, groups: PotNo, 20

Fixed effects:

Estimate Std. Error t value

(Intercept) -0.364686 0.459391 -0.794

Day 0.005267 0.005596 0.941

Basalt\_bin 0.355289 0.638621 0.556

Bacillus\_bin -0.539394 0.629481 -0.857

Day:Basalt\_bin -0.005981 0.007765 -0.770

Day:Bacillus\_bin 0.006918 0.007771 0.890

Basalt\_bin:Bacillus\_bin 0.998449 0.881953 1.132

Day:Basalt\_bin:Bacillus\_bin -0.011375 0.010836 -1.050

Correlation of Fixed Effects:

(Intr) Day Bslt\_b Bclls\_ Dy:Bs\_ Dy:Bc\_ Bs\_:B\_

Day -0.923

Basalt\_bin -0.720 0.664

Bacillus\_bn -0.735 0.678 0.529

Day:Bslt\_bn 0.665 -0.721 -0.922 -0.489

Dy:Bclls\_bn 0.668 -0.724 -0.481 -0.920 0.522

Bslt\_bn:Bc\_ 0.525 -0.484 -0.729 -0.714 0.672 0.657

Dy:Bslt\_:B\_ -0.479 0.520 0.664 0.660 -0.720 -0.717 -0.920

optimizer (nloptwrap) convergence code: 0 (OK)

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: residualsSCECO2eq

Chisq Df Pr(>Chisq)

Day 1.0490 1 0.30573

Basalt\_bin 0.0034 1 0.95362

Bacillus\_bin 0.0660 1 0.79718

Day:Basalt\_bin 4.7649 1 0.02905 \*

Day:Bacillus\_bin 0.0389 1 0.84367

Basalt\_bin:Bacillus\_bin 0.1854 1 0.66680

Day:Basalt\_bin:Bacillus\_bin 1.1021 1 0.29381

## CH4

model = lmer(CH4\_Flux ~ Temp+SWC+SWCquadr + (1|PotNo),data=GHGDataCH4)

REML criterion at convergence: -1643.9

Scaled residuals:

Min 1Q Median 3Q Max

-2.0707 -0.6661 -0.3916 0.9553 2.0860

Random effects:

Groups Name Variance Std.Dev.

PotNo (Intercept) 0.0000154 0.003924

Residual 0.0001055 0.010273

Number of obs: 268, groups: PotNo, 20

Fixed effects:

Estimate Std. Error t value

(Intercept) -0.0202494 0.0178468 -1.135

Temp 0.0010132 0.0008423 1.203

SWC 0.1900916 0.0884998 2.148

SWCquadr -0.4171173 0.2031201 -2.054

Correlation of Fixed Effects:

(Intr) Temp SWC

Temp -0.845

SWC -0.595 0.104

SWCquadr 0.574 -0.124 -0.982

Shapiro-Wilk normality test

W = 0.87853, p-value = 2.402e-14

Residual analysis:

model= lmer(residualsCH4 ~ Day\*Bacillus\_bin\*Basalt\_bin + (1|PotNo),data=GHGDataCH4)

REML criterion at convergence: -1602.7

Scaled residuals:

Min 1Q Median 3Q Max

-2.3993 -0.6733 -0.2913 0.8693 2.1408

Random effects:

Groups Name Variance Std.Dev.

PotNo (Intercept) 0.000e+00 0.000000

Residual 9.717e-05 0.009858

Number of obs: 268, groups: PotNo, 20

Fixed effects:

Estimate Std. Error t value

(Intercept) -1.761e-04 2.726e-03 -0.065

Day -8.542e-07 3.335e-05 -0.026

Bacillus\_bin -2.432e-03 3.786e-03 -0.642

Basalt\_bin -3.024e-03 3.848e-03 -0.786

Day:Bacillus\_bin 6.245e-05 4.688e-05 1.332

Day:Basalt\_bin 3.018e-05 4.688e-05 0.644

Bacillus\_bin:Basalt\_bin 9.922e-03 5.339e-03 1.858

Day:Bacillus\_bin:Basalt\_bin -1.594e-04 6.581e-05 -2.422

Correlation of Fixed Effects:

(Intr) Day Bclls\_ Bslt\_b Dy:Bc\_ Dy:Bs\_ Bc\_:B\_

Day -0.921

Bacillus\_bn -0.725 0.668

Basalt\_bin -0.709 0.653 0.514

Dy:Bclls\_bn 0.659 -0.715 -0.920 -0.467

Day:Bslt\_bn 0.655 -0.711 -0.475 -0.921 0.509

Bclls\_bn:B\_ 0.514 -0.474 -0.709 -0.726 0.653 0.668

Dy:Bcll\_:B\_ -0.469 0.510 0.655 0.660 -0.713 -0.716 -0.920

optimizer (nloptwrap) convergence code: 0 (OK)

Analysis of Deviance Table (Type II Wald chisquare tests)

Response: residualsSCECH4

Chisq Df Pr(>Chisq)

Day 0.0918 1 0.76193

Bacillus\_bin 1.1307 1 0.28763

Basalt\_bin 1.9947 1 0.15786

Day:Bacillus\_bin 0.3142 1 0.57512

Day:Basalt\_bin 2.3755 1 0.12325

Bacillus\_bin:Basalt\_bin 0.5527 1 0.45722

Day:Bacillus\_bin:Basalt\_bin 5.8673 1 0.01542 \*