Model selection of fixed effects for the soil CH4 linear mixed effect model

The symbol \* indicates that interactions between environmental variables are being tested, as well as the environmental variables being tested individually.

1) Original model.

Soil CH4 model 1<-lme(sqrt(CH4+2.71)~

Plantation\*Microform\*Soil moisture (30 – 40cm)\*WTD

+Plantation\*Microform\*Soil temperature

+Plantation\*Microform\*Air temperature

+Plantation\*Microform\*Soil moisture (0 – 10cm)

+Soil moisture (30 – 40cm)\*Soil moisture (0 – 10cm)

+Air temperature\*Soil moisture (0 – 10cm),

random=~1|Plantation/Plot/Subplot,

weights= varIdent(form=~1|Plantation\*Microform))

2) The interaction between plantation, microform and soil temperature was dropped. There was false convergence here and so the interaction between plantation, microform and air temperature was also dropped.

Soil CH4 model 2<-lme(sqrt(CH4+2.71)~

Plantation\*Microform\*Soil moisture (30 – 40cm)\*WTD

+Plantation\*Soil temperature

+Microform\*Soil temperature

+Plantation\*Air temperature

+Microform\*Air temperature

+Plantation\*Microform\*Soil moisture (0 – 10cm)

+Soil moisture (30 – 40cm)\*Soil moisture (0 – 10cm)

+Air temperature\*Soil moisture (0 – 10cm),

random=~1|Plantation/Plot/Subplot,

weights= varIdent(form=~1|Plantation\*Microform))

3) The interaction between air temperature and soil moisture (0 – 10 cm) was dropped.

Soil CH4 model 3<-lme(sqrt(CH4+2.71)~

Plantation\*Microform\*Soil moisture (30 – 40cm)\*WTD

+Plantation\*Soil temperature

+Microform\*Soil temperature

+Plantation\*Air temperature

+Microform\*Air temperature

+Plantation\*Microform\*Soil moisture (0 – 10cm)

+Soil moisture (30 – 40cm)\*Soil moisture (0 – 10cm),

random=~1|Plantation/Plot/Subplot,

weights= varIdent(form=~1|Plantation\*Microform))

4) The interaction between microform and soil temperature was dropped.

Soil CH4 model 4<-lme(sqrt(CH4+2.71)~

Plantation\*Microform\*Soil moisture (30 – 40cm)\*WTD

+Plantation\*Soil temperature

+Plantation\*Air temperature

+Microform\*Air temperature

+Plantation\*Microform\*Soil moisture (0 – 10cm)

+Soil moisture (30 – 40cm)\*Soil moisture (0 – 10cm),

random=~1|Plantation/Plot/Subplot,

weights= varIdent(form=~1|Plantation\*Microform))

5) The interaction between plantation, microform and soil moisture (0 – 10 cm) was dropped.

Soil CH4 model 5<-lme(sqrt(CH4+2.71)~

Plantation\*Microform\*Soil moisture (30 – 40cm)\*WTD

+Plantation\*Soil temperature

+Plantation\*Air temperature

+Microform\*Air temperature

+Plantation\*Soil moisture (0 – 10cm)

+Microform\*Soil moisture (0 – 10cm)

+Soil moisture (30 – 40cm)\*Soil moisture (0 – 10cm),

random=~1|Plantation/Plot/Subplot,

weights= varIdent(form=~1|Plantation\*Microform))

6) The interaction between microform and soil moisture (0 – 10 cm) was dropped.

Soil CH4 model 6<-lme(sqrt(CH4+2.71)~

Plantation\*Microform\*Soil moisture (30 – 40cm)\*WTD

+Plantation\*Soil temperature

+Plantation\*Air temperature

+Microform\*Air temperature

+Plantation\*Soil moisture (0 – 10cm)

+Soil moisture (30 – 40cm)\*Soil moisture (0 – 10cm),

random=~1|Plantation/Plot/Subplot,

weights= varIdent(form=~1|Plantation\*Microform))

7) The interaction between plantation and air temperature was dropped.

Soil CH4 model 7<-lme(sqrt(CH4+2.71)~

Plantation\*Microform\*Soil moisture (30 – 40cm)\*WTD

+Plantation\*Soil temperature

+Microform\*Air temperature

+Plantation\*Soil moisture (0 – 10cm)

+Soil moisture (30 – 40cm)\*Soil moisture (0 – 10cm),

random=~1|Plantation/Plot/Subplot,

weights= varIdent(form=~1|Plantation\*Microform))

8) The interaction between microform and air temperature was dropped.

Soil CH4 model 8<-lme(sqrt(CH4+2.71)~

Plantation\*Microform\*Soil moisture (30 – 40cm)\*WTD

+Plantation\*Soil temperature

+Air temperature

+Plantation\*Soil moisture (0 – 10cm)

+Soil moisture (30 – 40cm)\*Soil moisture (0 – 10cm),

random=~1|Plantation/Plot/Subplot,

weights= varIdent(form=~1|Plantation\*Microform))

9) The interaction between soil moisture at 0 – 10 cm and soil moisture at 30 – 40 cm was dropped.

Soil CH4 model 9<-lme(sqrt(CH4+2.71)~

Plantation\*Microform\*Soil moisture (30 – 40cm)\*WTD

+Plantation\*Soil temperature

+Air temperature

+Plantation\*Soil moisture (0 – 10cm),

random=~1|Plantation/Plot/Subplot,

weights= varIdent(form=~1|Plantation\*Microform))

10) Air temperature was dropped.

Soil CH4 model 10<-lme(sqrt(CH4+2.71)~

Plantation\*Microform\*Soil moisture (30 – 40cm)\*WTD

+Plantation\*Soil temperature

+Plantation\*Soil moisture (0 – 10cm),

random=~1|Plantation/Plot/Subplot,

weights= varIdent(form=~1|Plantation\*Microform))

11) The interaction between plantation and soil moisture (0 – 10 cm) was dropped. This is the final model.

Soil CH4 model 11<-lme(sqrt(CH4+2.71)~

Plantation\*Microform\*Soil moisture (30 – 40cm)\*WTD

+Plantation\*Soil temperature

+Soil moisture (0 – 10cm),

random=~1|Plantation/Plot/Subplot,

weights= varIdent(form=~1|Plantation\*Microform))