"Simple LMM analysis (including time dependency auto-regression de type 1 - CH4 flux"

DELETE [REDEFINE=yes] \_remlsave

VCOMPONENTS [FIXED=CO2\_trtmt+CO2\_trtmt.(Year/Season/Month)+Av\_SoilMoisture+Av\_SoilTemp; FACTORIAL=9] RANDOM=Operator+Block+Ring/Collar+Sampling\_Date\

; INITIAL=1,1,1,1,1,1,1; CONSTRAINTS=none,none,none,none,\

none,none,none

VSTRUCTURE [TERMS=Sampling\_Date; FORMATION=direct] MODEL=AR; ORDER=1; FACTOR=Sampling\_Date

REML [PRINT=model,components,effects,waldTests; FMETHOD=automatic; MVINCLUDE=explanatory,yvariate; METHOD=AI; MAXCYCLE=20]\

TFUcorr\_Final\_CH4\_flux; SAVE=\_remlsave

VPLOT [RMETHOD=all] fittedvalues,normal,halfnormal,histogram

VKEEP [FITTEDVALUES=CH4\_fitted] TERMS=CO2\_trtmt.Year.Season.Month

FSPREADSHEET [SHEET=100001; METHOD=replace; NOUNITS=yes] CH4\_fitted

"Post-hoc analysis"

VMCOMPARISON [PRINT=letter,comparison; METHOD=BONFERRONI; DIRECTION=ascending; PROB=0.1] CO2\_trtmt.(Year/Season/Month)

VMCOMPARISON [PRINT=letter,comparison; METHOD=SIDAK; DIRECTION=ascending; PROB=0.1] CO2\_trtmt.(Year/Season/Month)

"Repeat analysis with combined factors to produce proper table of means"

VCOMPONENTS [FIXED=CO2\_trtmt+CO2\_trtmt.Year\_Season+Av\_SoilMoisture+Av\_SoilTemp; FACTORIAL=9] RANDOM=Operator+Block+Ring/Collar+Sampling\_Date\

; INITIAL=1,1,1,1,1,1,1; CONSTRAINTS=none,none,none,none,\

none,none,none

VSTRUCTURE [TERMS=Sampling\_Date; FORMATION=direct] MODEL=AR; ORDER=1; FACTOR=Sampling\_Date

REML [PRINT=means; PTERMS=CO2\_trtmt.Year\_Season; PSE=allestimates; FMETHOD=automatic; MVINCLUDE=explanatory,yvariate; METHOD=AI; MAXCYCLE=20]\

TFUcorr\_Final\_CH4\_flux; SAVE=\_remlsave

VCOMPONENTS [FIXED=CO2\_trtmt+CO2\_trtmt.Y\_S\_M+Av\_SoilMoisture+Av\_SoilTemp; FACTORIAL=9] RANDOM=Operator+Block+Ring/Collar+Sampling\_Date\

; INITIAL=1,1,1,1,1,1,1; CONSTRAINTS=none,none,none,none,\

none,none,none

VSTRUCTURE [TERMS=Sampling\_Date; FORMATION=direct] MODEL=AR; ORDER=1; FACTOR=Sampling\_Date

REML [PRINT=means; PTERMS=CO2\_trtmt.Y\_S\_M; PSE=allestimates; FMETHOD=automatic; MVINCLUDE=explanatory,yvariate; METHOD=AI; MAXCYCLE=20]\

TFUcorr\_Final\_CH4\_flux; SAVE=\_remlsave

DELETE [REDEFINE=yes] CH4\_pred\_means

VKEEP TERMS=CO2\_trtmt.Y\_S\_M; MEANS=CH4\_pred\_means

FSPREADSHEET CH4\_pred\_means

"Convert table to Vector

Next, stack data using 38 columns and select the 38 months

Then, use 'CO2\_trtmt' as 'Repeat Columns'

Rename stacked column as 'CH4\_pred\_means' and click OK to create into EXISTING book of GHG aggregates

Finally, insert three columns named 'Year', 'Season' and 'Month'

Then, fill up the names in duplicates throughout the years

Rename the sheet 'GHG\_pred\_means\_sorted' and delete the 'Temporary Book'"

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"Bootstrap Resampling - CH4 loop"

"Ambient CO2 treatment"

DELETE [PROC=yes;REDEFINE=yes] RESAMPLE

PROCEDURE [PARAMETER=pointer] 'RESAMPLE' "Mean"

OPTION 'DATA','AUXILIARY','ANCILLARY'; \

TYPE='variate','pointer',\*; SET=yes,no,no; LIST=yes

PARAMETER 'STATISTIC','EXIT'; MODE=p; TYPE='scalar'; SET=yes

CALC STATISTIC[1] = MEAN(DATA[1])

ENDPROCEDURE

FOR \_dlist = TFUcorr\_Final\_CH4\_flux\_1\_May\_2013,\

TFUcorr\_Final\_CH4\_flux\_1\_Jun\_2013,TFUcorr\_Final\_CH4\_flux\_1\_Jul\_2013,\

TFUcorr\_Final\_CH4\_flux\_1\_Aug\_2013,TFUcorr\_Final\_CH4\_flux\_1\_Sep\_2013,\

TFUcorr\_Final\_CH4\_flux\_1\_Oct\_2013,TFUcorr\_Final\_CH4\_flux\_1\_Nov\_2013,\

TFUcorr\_Final\_CH4\_flux\_1\_Dec\_2013,TFUcorr\_Final\_CH4\_flux\_1\_Jan\_2014,\

TFUcorr\_Final\_CH4\_flux\_1\_Feb\_2014,TFUcorr\_Final\_CH4\_flux\_1\_Mar\_2014,\

TFUcorr\_Final\_CH4\_flux\_1\_Apr\_2014,TFUcorr\_Final\_CH4\_flux\_1\_May\_202,\

TFUcorr\_Final\_CH4\_flux\_1\_Jun\_202,TFUcorr\_Final\_CH4\_flux\_1\_Jul\_202,\

TFUcorr\_Final\_CH4\_flux\_1\_Aug\_202,TFUcorr\_Final\_CH4\_flux\_1\_Sep\_202,\

TFUcorr\_Final\_CH4\_flux\_1\_Oct\_202,TFUcorr\_Final\_CH4\_flux\_1\_Nov\_202,\

TFUcorr\_Final\_CH4\_flux\_1\_Dec\_202,TFUcorr\_Final\_CH4\_flux\_1\_Jan\_202,\

TFUcorr\_Final\_CH4\_flux\_1\_Feb\_202,TFUcorr\_Final\_CH4\_flux\_1\_Mar\_202,\

TFUcorr\_Final\_CH4\_flux\_1\_Apr\_202,TFUcorr\_Final\_CH4\_flux\_1\_Jun\_203,\

TFUcorr\_Final\_CH4\_flux\_1\_Jul\_203,TFUcorr\_Final\_CH4\_flux\_1\_Aug\_203,\

TFUcorr\_Final\_CH4\_flux\_1\_Sep\_203,TFUcorr\_Final\_CH4\_flux\_1\_Oct\_203,\

TFUcorr\_Final\_CH4\_flux\_1\_Nov\_203,TFUcorr\_Final\_CH4\_flux\_1\_Dec\_203,\

TFUcorr\_Final\_CH4\_flux\_1\_Jan\_203,TFUcorr\_Final\_CH4\_flux\_1\_Feb\_203,\

TFUcorr\_Final\_CH4\_flux\_1\_Mar\_203,TFUcorr\_Final\_CH4\_flux\_1\_Apr\_203,\

TFUcorr\_Final\_CH4\_flux\_1\_May\_203,TFUcorr\_Final\_CH4\_flux\_1\_Jun\_204

BOOTSTRAP [PRINT=Estimates; DATA=\_dlist; NTIMES=999; SEED=0;\

PROBABILITY=0.95; METHOD=random; CIMETHOD=bca]

ENDFOR

"Elevated CO2 treatment"

DELETE [PROC=yes;REDEFINE=yes] RESAMPLE

PROCEDURE [PARAMETER=pointer] 'RESAMPLE' "Mean"

OPTION 'DATA','AUXILIARY','ANCILLARY'; \

TYPE='variate','pointer',\*; SET=yes,no,no; LIST=yes

PARAMETER 'STATISTIC','EXIT'; MODE=p; TYPE='scalar'; SET=yes

CALC STATISTIC[1] = MEAN(DATA[1])

ENDPROCEDURE

FOR \_dlist = TFUcorr\_Final\_CH4\_flux\_1\_May\_204,\

TFUcorr\_Final\_CH4\_flux\_1\_Jun\_205,TFUcorr\_Final\_CH4\_flux\_1\_Jul\_204,\

TFUcorr\_Final\_CH4\_flux\_1\_Aug\_204,TFUcorr\_Final\_CH4\_flux\_1\_Sep\_204,\

TFUcorr\_Final\_CH4\_flux\_1\_Oct\_204,TFUcorr\_Final\_CH4\_flux\_1\_Nov\_204,\

TFUcorr\_Final\_CH4\_flux\_1\_Dec\_204,TFUcorr\_Final\_CH4\_flux\_1\_Jan\_204,\

TFUcorr\_Final\_CH4\_flux\_1\_Feb\_204,TFUcorr\_Final\_CH4\_flux\_1\_Mar\_204,\

TFUcorr\_Final\_CH4\_flux\_1\_Apr\_204,TFUcorr\_Final\_CH4\_flux\_1\_May\_205,\

TFUcorr\_Final\_CH4\_flux\_1\_Jun\_206,TFUcorr\_Final\_CH4\_flux\_1\_Jul\_205,\

TFUcorr\_Final\_CH4\_flux\_1\_Aug\_205,TFUcorr\_Final\_CH4\_flux\_1\_Sep\_205,\

TFUcorr\_Final\_CH4\_flux\_1\_Oct\_205,TFUcorr\_Final\_CH4\_flux\_1\_Nov\_205,\

TFUcorr\_Final\_CH4\_flux\_1\_Dec\_205,TFUcorr\_Final\_CH4\_flux\_1\_Jan\_205,\

TFUcorr\_Final\_CH4\_flux\_1\_Feb\_205,TFUcorr\_Final\_CH4\_flux\_1\_Mar\_205,\

TFUcorr\_Final\_CH4\_flux\_1\_Apr\_205,TFUcorr\_Final\_CH4\_flux\_1\_Jun\_207,\

TFUcorr\_Final\_CH4\_flux\_1\_Jul\_206,TFUcorr\_Final\_CH4\_flux\_1\_Aug\_206,\

TFUcorr\_Final\_CH4\_flux\_1\_Sep\_206,TFUcorr\_Final\_CH4\_flux\_1\_Oct\_206,\

TFUcorr\_Final\_CH4\_flux\_1\_Nov\_206,TFUcorr\_Final\_CH4\_flux\_1\_Dec\_206,\

TFUcorr\_Final\_CH4\_flux\_1\_Jan\_206,TFUcorr\_Final\_CH4\_flux\_1\_Feb\_206,\

TFUcorr\_Final\_CH4\_flux\_1\_Mar\_206,TFUcorr\_Final\_CH4\_flux\_1\_Apr\_206,\

TFUcorr\_Final\_CH4\_flux\_1\_May\_206,TFUcorr\_Final\_CH4\_flux\_1\_Jun\_208

BOOTSTRAP [PRINT=Estimates; DATA=\_dlist; NTIMES=999; SEED=0;\

PROBABILITY=0.95; METHOD=random; CIMETHOD=bca]

ENDFOR

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"Trellis plot for GHG aggregates (with MDF limits)"

GET [ENVIRONMENT=\_tempenv]

SET [CMETHOD=rgb]

TRELLIS [FIRSTPICTURE=top; PENGROUP=CO2\_trtmt] Y=TFUcorr\_Final\_CH4\_flux,Final\_CH4\_MDF,\

Neg\_Final\_CH4\_MDF; X=Month\_Year; METHOD=Mean,Mean,Mean

SET [CMETHOD=#\_tempenv['cmethod']]

"Trellis plot for GHG predicted means (with precipitations) - Need separate axis (how?)"

GET [ENVIRONMENT=\_tempenv]

SET [CMETHOD=rgb]

TRELLIS [FIRSTPICTURE=top; PENGROUP=CO2\_trtmt\_1] Y=CH4\_pred\_means\_1,RR\_mm\_Mean\_1;\

X=Month\_Year\_1; METHOD=Line,Line

SET [CMETHOD=#\_tempenv['cmethod']]