# S10 Text. SAS code estimation Vcmax

The aim of this supplementary text is to show the script that we used to estimate *V*cmax based on a non-spatial version of the FvCB model. SAS 9.4 (SAS Institute Inc., Cary, NC, USA) was used to determine this parameter. The SAS code can be found in Script A.

**Script A: Estimation of *V*cmax**

TITLE 'Variable and NON-apparent GM MODEL';

**DATA** A;

INPUT O2 A CI Phi2 IINC;

CARDS;

210 -1.730867869 57.29709798 0.157615105 1501.023193

210 2.48673195 85.07692803 0.186694296 1501.308228

210 11.91396762 135.9996364 0.226902522 1501.817627

210 -1.647895302 54.20496623 0.140388119 1499.106567

210 2.886119778 83.42940262 0.165921291 1499.507568

210 10.10901107 142.5623306 0.197250298 1499.946167

210 -1.28253547 53.30851971 0.181425208 1498.806396

210 3.671348059 83.05302419 0.214313471 1498.740234

210 13.14922683 143.8820261 0.259420286 1498.021118

210 -2.039129209 62.93784097 0.156681355 1499.478149

210 1.095401158 88.23946581 0.174437161 1499.23645

210 7.149731338 130.8860382 0.19317922 1499.494019

;

**PROC** **NLIN** DATA=A METHOD=GAUSS ITERATIONS=**1000**;

PARMS VCMAX=**150** R=**4**;

\*;

RD = **3.4**;

\* Assumed kinetic properties RuBiSco;

KMC=**267**;

KMO=**164**;

SCO=**2.6**;

omega=**1**; \* The fraction of rchl/rw is assumed to be 1;

GM0=**0**;

W=omega;

GAMMA = **0.5**\*O2/SCO;

X1C = VCMAX;

X2C = KMC\*(**1**+O2/KMO);

WXXC = -W\*(RD\*X2C+GAMMA\*X1C);

GXXC = GM0\*(X2C+GAMMA)+R\*(X1C-RD);

XRDC = X1C\*(CI-GAMMA)-RD\*(CI+X2C);

AAC = X2C+GAMMA\*(**1**-W)+R\*(CI+X2C);

BBC = -((X2C+GAMMA\*(**1**-W))\*(X1C-RD) +WXXC +(CI+X2C)\*GXXC +R\*XRDC);

CCC = WXXC\*(X1C-RD) +GXXC\*XRDC;

AC = (-BBC - (BBC\*\***2**-**4**\*AAC\*CCC)\*\***0.5**)/(**2**\*AAC);

MODEL A = AC;

output out = b predicted = yp residual = res ;

**proc** **corr**;

var A yp;

**proc** **print**;

**RUN**;