Global Soil Organic Carbon Sequestration Potential Map

GSOCseq

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Technical Workshops. 2020

Soil Organic Carbon Sequestration Maps

Día 3. Corriendo modelo Roth C en 3 etapas

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Talleres - MÓDULOS

Módulo I

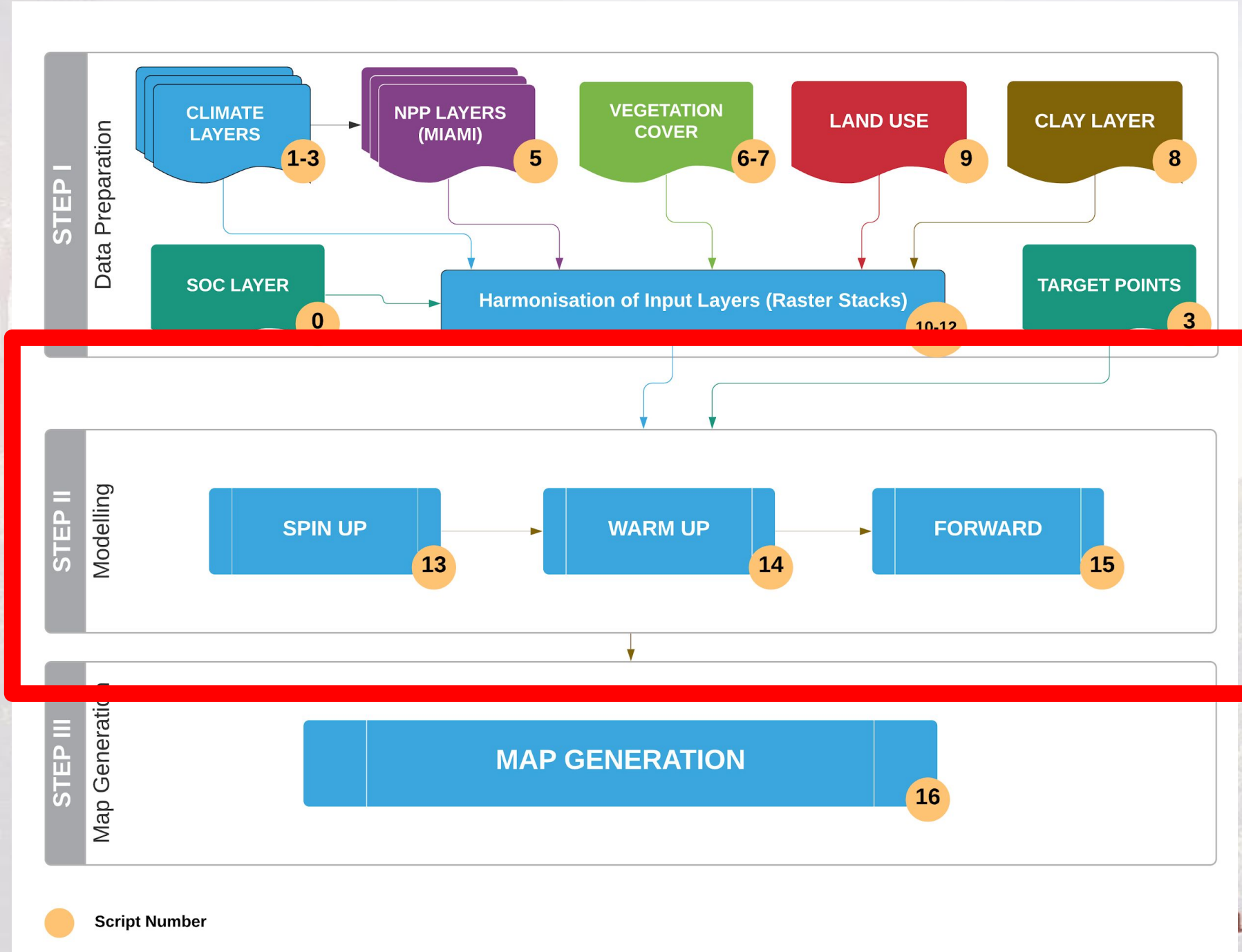
- **Día 1: INTRODUCCIÓN** Teórico. Marco conceptual; Modelo Roth C; Aproximación general; Datos de Entrada; Software necesario; Revisión del Procedimiento de inicio a fin y Scripts a utilizar

- **Día 2: PREPARACIÓN DE DATOS.** Teórico – Práctico. Armonización de Datos de entrada y sus scripts. Generación de "target points" donde se correrá el modelo (Caso de ejemplo provisto por GSP).

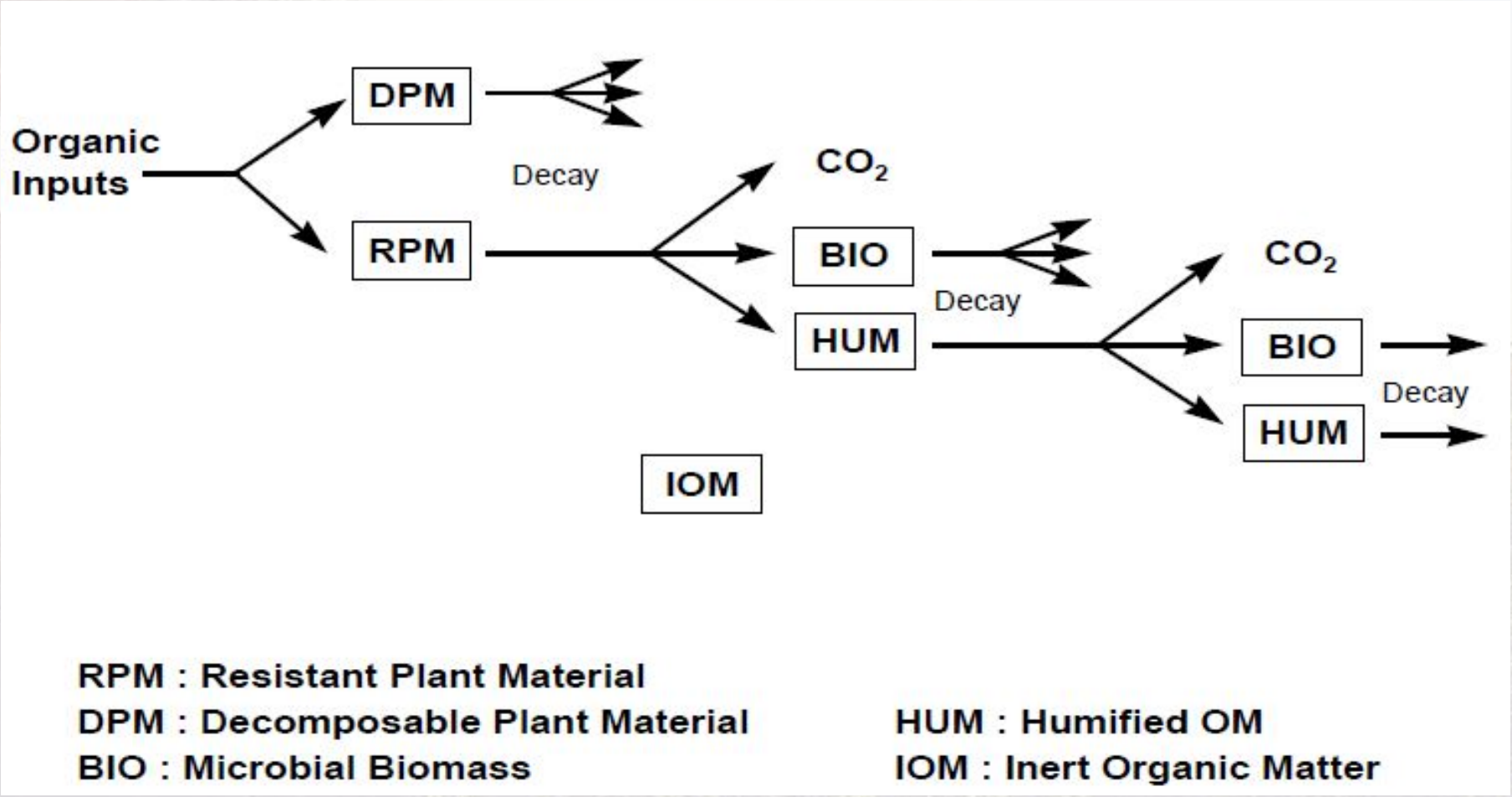
- **Día 3: CORRIDAS DEL MODELO** Práctico. (Caso de ejemplo provisto por GSP).

- **Día 4: MAPA Y PRODUCTOS** Generación de mapas a partir de salidas del modelo (Caso de ejemplo provisto por GSP).

- **Día 5: CIERRE MÓDULO I** Errores comunes. Consultas pendientes. Preparación para próximas sesiones. Reporte Técnico.


STEP I
Data Preparation
CLIMATE LAYERS
1-3
NPP LAYERS (MIAMI)
5
VEGETATION COVER
6-7
LAND USE
9
CLAY LAYER
8
SOC LAYER
0
Harmonisation of Input Layers (Raster Stacks)
10-12
TARGET POINTS
3
STEP II
Modelling
SPIN UP
13
WARM UP
14
FORWARD
15
STEP III
Map Generation
MAP GENERATION
16
Script Number

Estructura del modelo



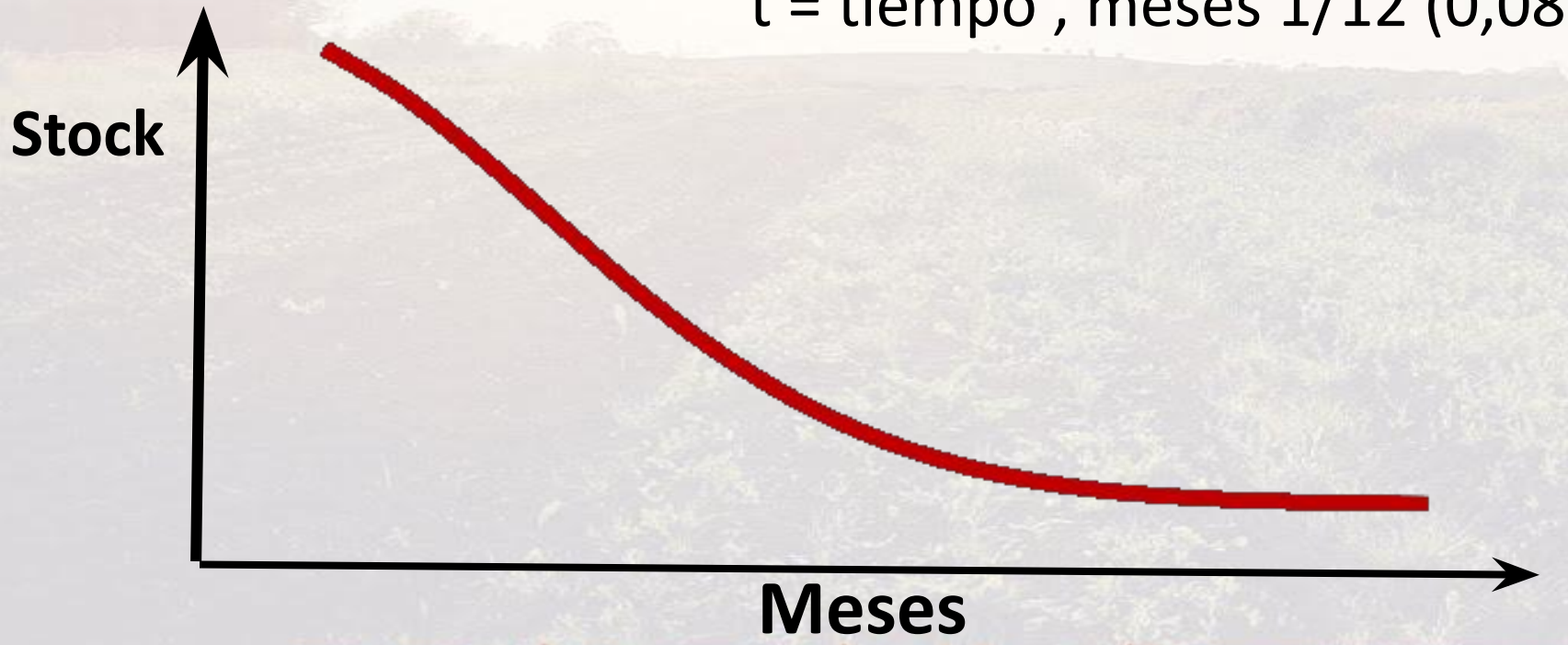
Dinámica de C en RothC

La cantidad de C de cada pool (Y) se descompone siguiendo una función de decaimiento exponencial:

$$Y \cdot e^{-kt}$$

…Donde **k** = cte de descomposición anual

t = tiempo , meses 1/12 (0,083)



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Tasas de descomposición

- **Constantes (*k*),** *en años $^{-1}$, que dependen de cada compartimento*

- DPM (decomposable plant mat): **10.0** .... 0.1 años
- RPM (resistant plant material): **0.3** .....3.3 años
- BIO (microbial biomass): **0.66** ..... 1.5 años
- HUM (Humified organic C) : **0.02** ..... 50 años
- IOM (Inerte) .....0.000000 ..... α

Dinámica de C en RothC

…A Su vez… esa tasa **k** es afectada por distintos factores (que hacen que sea mayor o menor)

$$Y \cdot e^{-kt} \Rightarrow Y \cdot e^{-k.\,a.b.c.\,t}$$

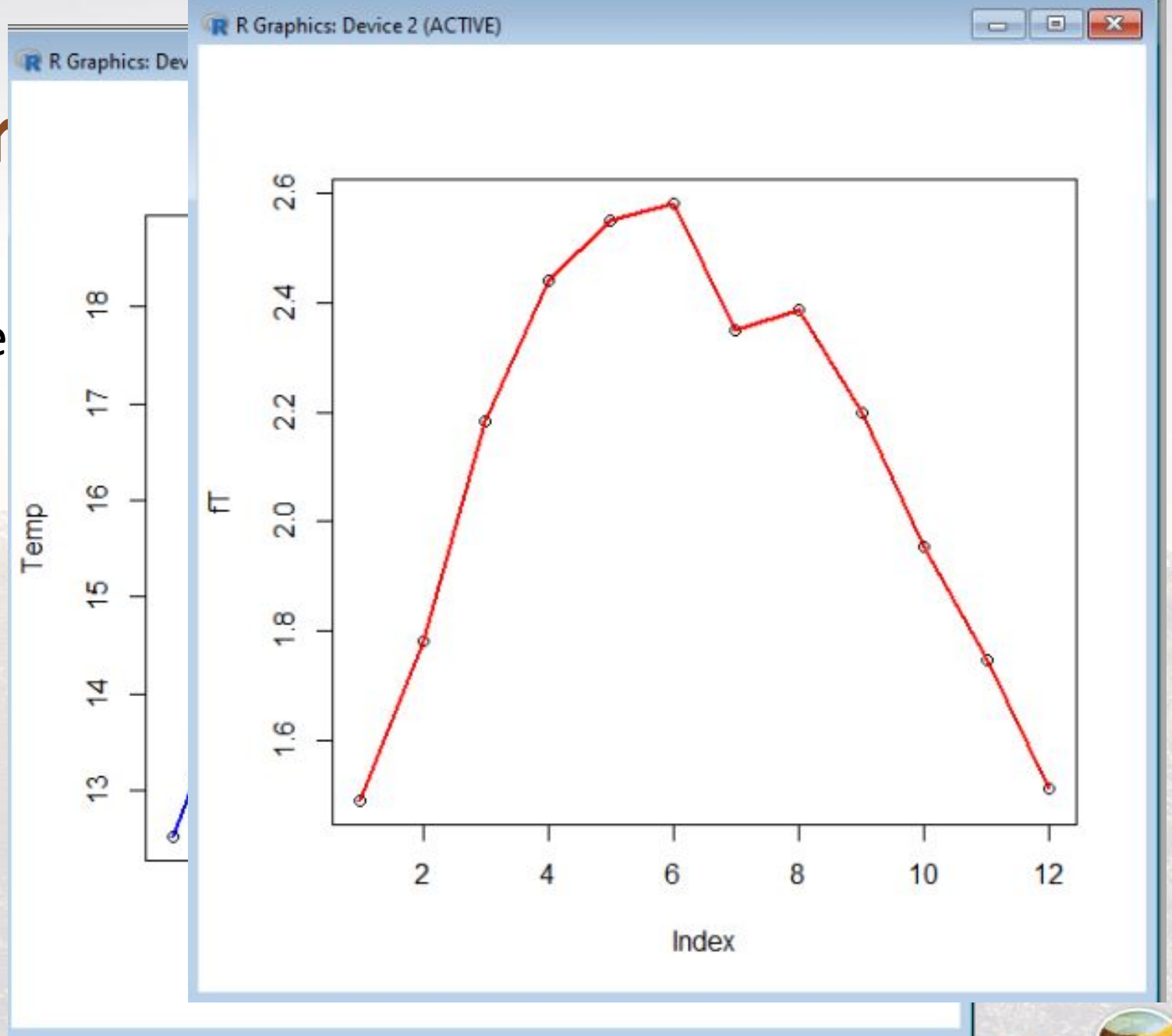
a= factor de temperatura

b= factor de humedad del suelo

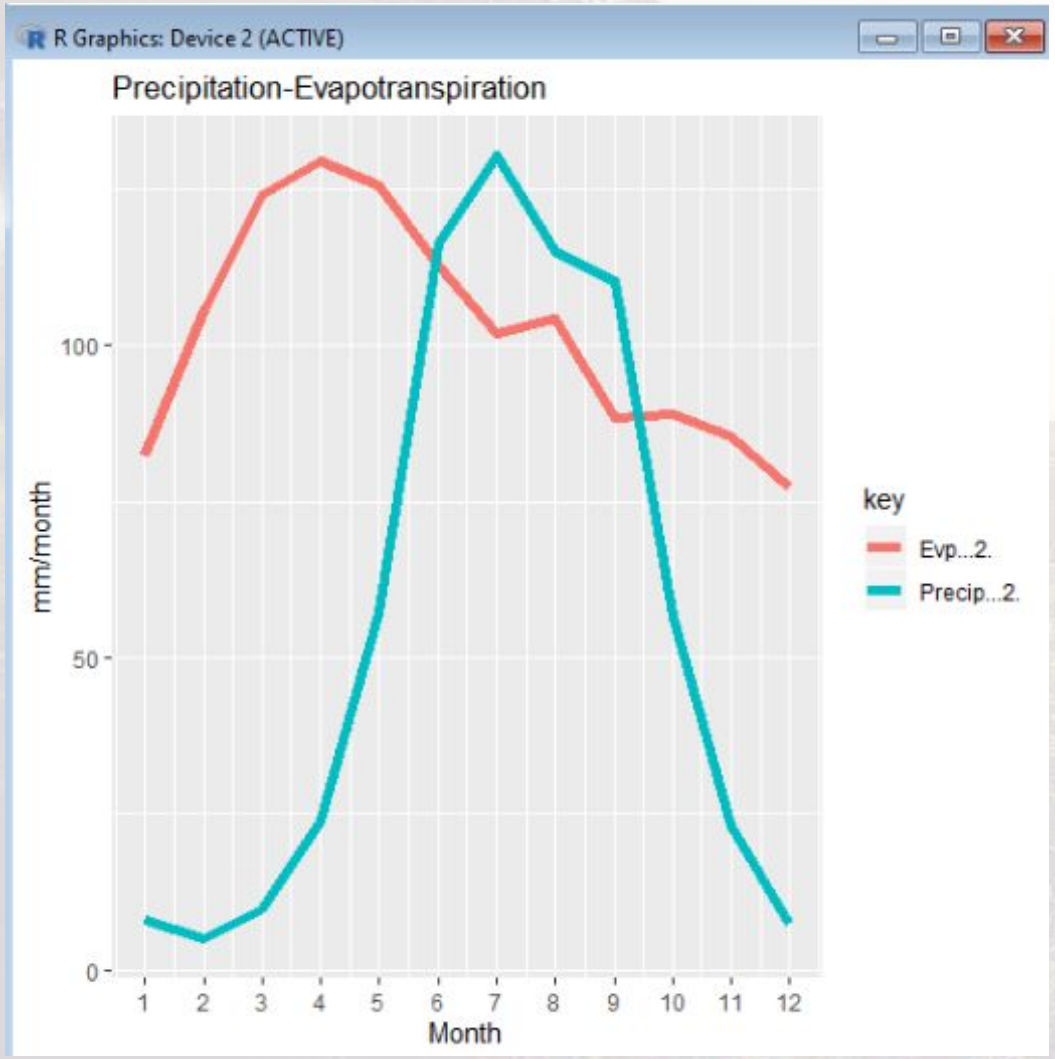
c= factor de cobertura del suelo

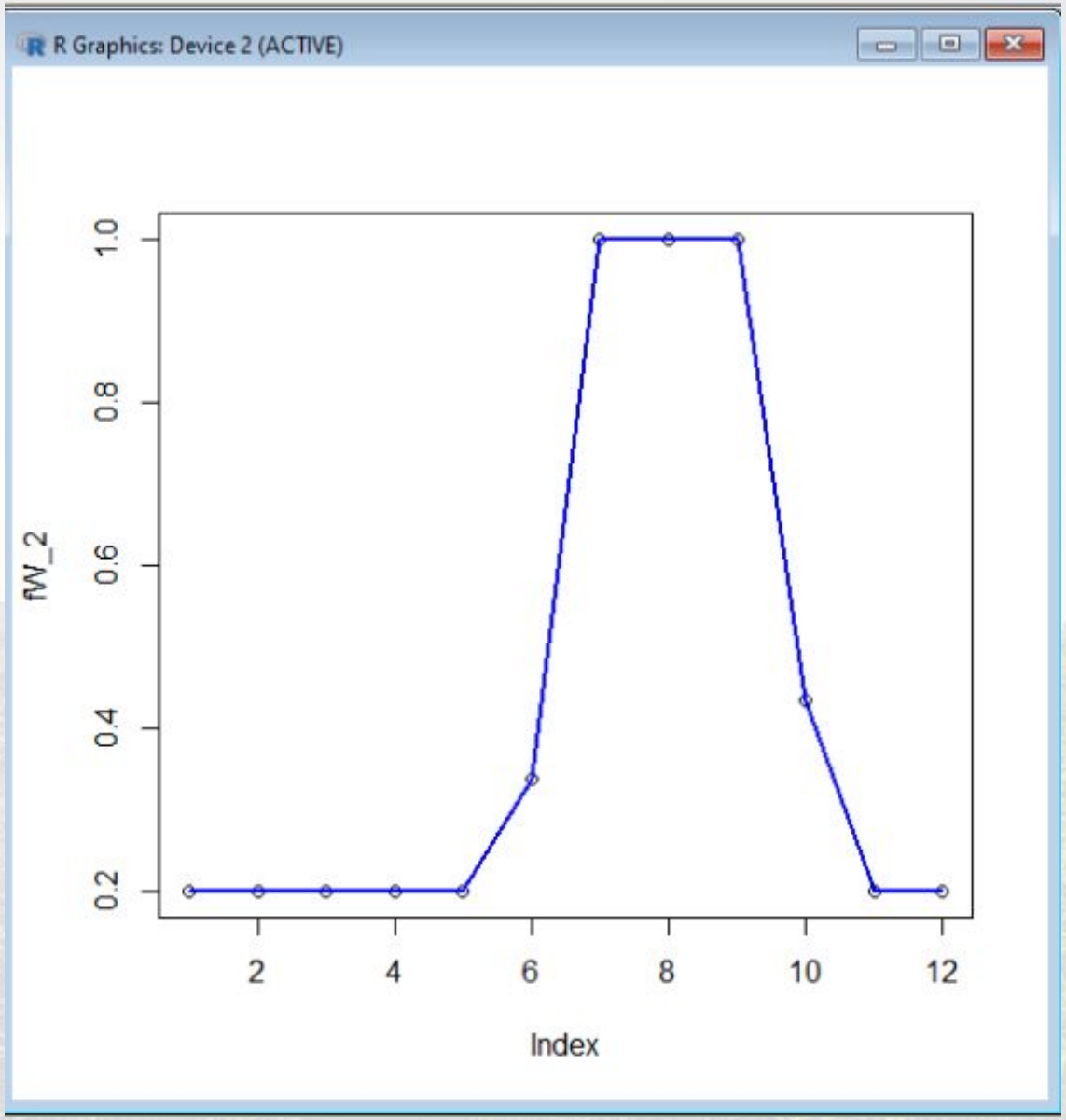
Factor de Temper

- #Temperature effects pe
- fT=fT.RothC(Temp[,2])



Factor de Humedad





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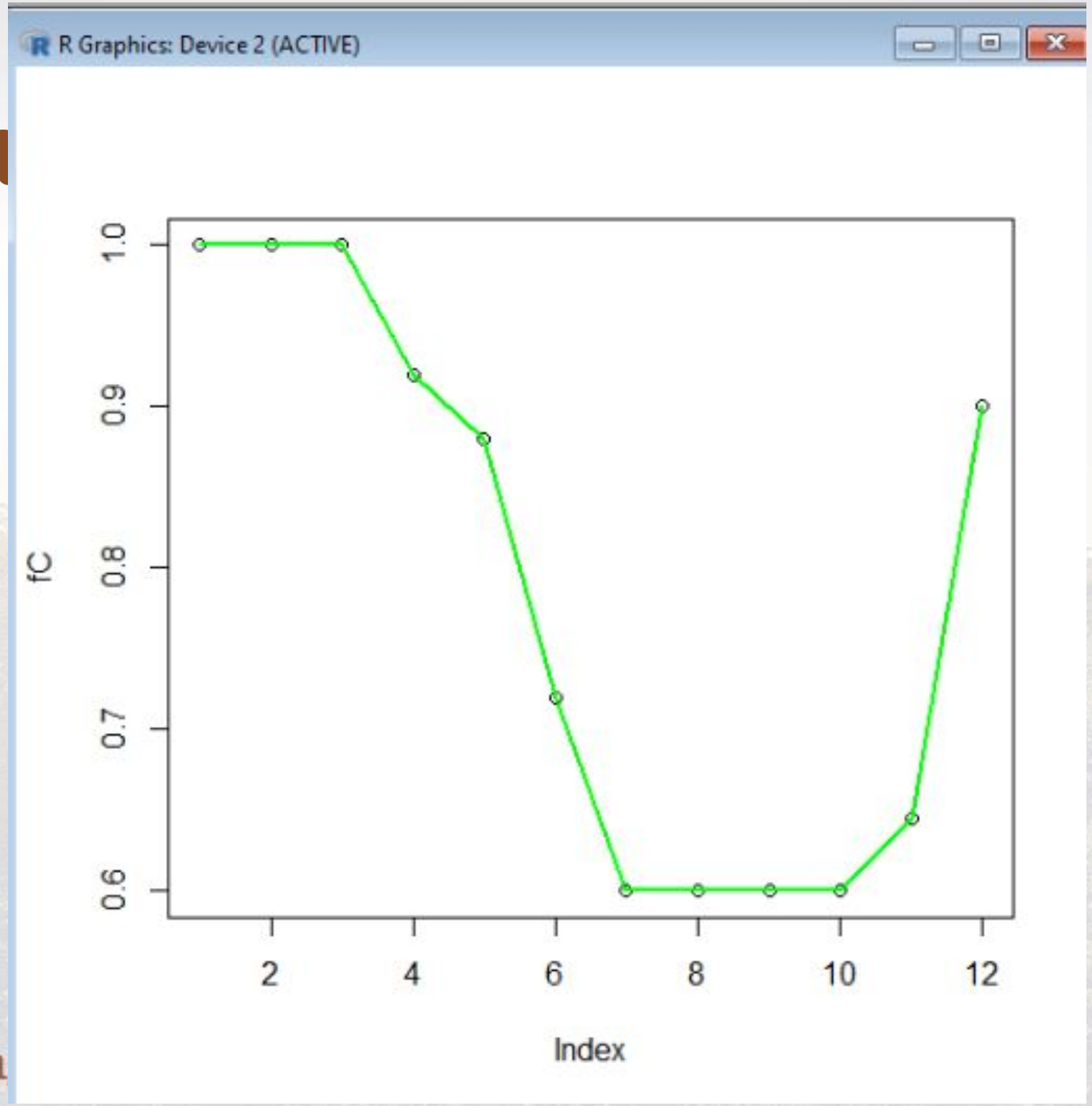
Factor de Cobert



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SCRIPT NUMBER 13. ROTH C SPIN UP

Inputs:

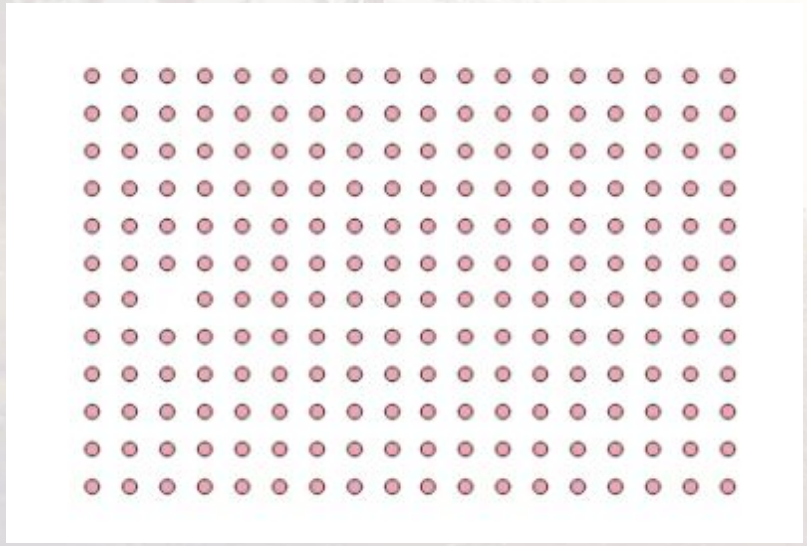
Point vector with the locations to run the model. (empty vector, should come from the SOC MAP FAO, one point per pixel) (from QGIS PROCEDURE number 1)

STACK LAYER (from script number 10) :
Stack_Set_SPIN_UP_[country_code].tif

Outputs :

C_INPUT_EQ.shp (contains the output of the model and the pedotransfer functions)

SPIN UP OUTPUTS:



1.2	2	Cnpt_EQ
1.2	3	SOC_pdt
1.2	4	DPM_pdt
1.2	5	RPM_pdt
1.2	6	BIO_pdt
1.2	7	HUM_pdt
1.2	8	IOM_pdt

1.2	9	Clnq_mn
1.2	10	Clnq_mx
1.2	11	SOC_min
1.2	12	DPM_min
1.2	13	RPM_min
1.2	14	BIO_min
1.2	15	HUM_min
1.2	16	IOM_min
1.2	17	SOC_max
1.2	18	DPM_max
1.2	19	RPM_max
1.2	20	BIO_max
1.2	21	HUM_max
1.2	22	IOM_max

SCRIPT NUMBER 14. ROTH C WARM UP

Inputs:

Point vector with the locations to run the model. (empty vector, should come from the SOC MAP FAO, one point per pixel) (from QGIS PROCEDURE number 1)

C_INPUT_EQ.shp (from script number 13)

STACK LAYER (from script number 11) :
Stack_Set_WARM_UP_[country_code].tif

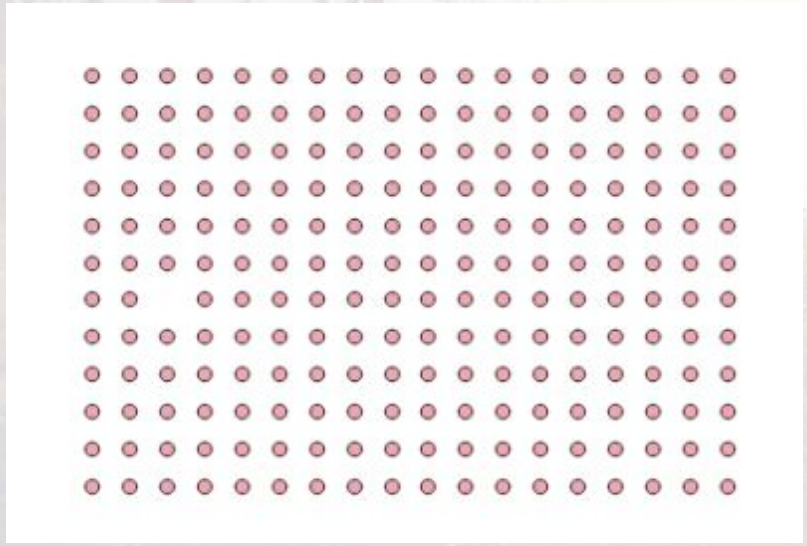
NPP LAYER(from script number 5):
NPP_MIAMI_MEAN_81-00_[country_code].tif

CRU LAYERS (from script number 2):
Prec_Stack_216_01-18_CRU.tif
Prec_Stack_216_01-18_CRU.tif
Prec_Stack_216_01-18_CRU.tif

Outputs :

WARM_UP.shp (contains the output of the model from 2000 to 2018)

WARM UP OUTPU



1.2	3	SOC_T0
1.2	4	DPM_w_up
1.2	5	RPM_w_up
1.2	6	BIO_w_up
1.2	7	HUM_w_up
1.2	8	IOM_w_up
1.2	9	Cin_mean

1.2	10	SOC_18min
1.2	11	DPM_w_min
1.2	12	RPM_w_min
1.2	13	BIO_w_min
1.2	14	HUM_w_min
1.2	15	IOM_w_min
1.2	16	SOC_18max
1.2	17	DPM_w_max
1.2	18	RPM_w_max
1.2	19	BIO_w_max
1.2	20	HUM_w_max
1.2	21	IOM_w_max
1.2	22	Cin_min
1.2	23	Cin_max

SCRIPT NUMBER 15. ROTH C FOWARD

Inputs:

Point vector with the locations to run the model. (empty vector, should come from the SOC MAP FAO, one point per pixel) (from QGIS PROCEDURE number 1)

WARM_UP.shp (from script number 14)

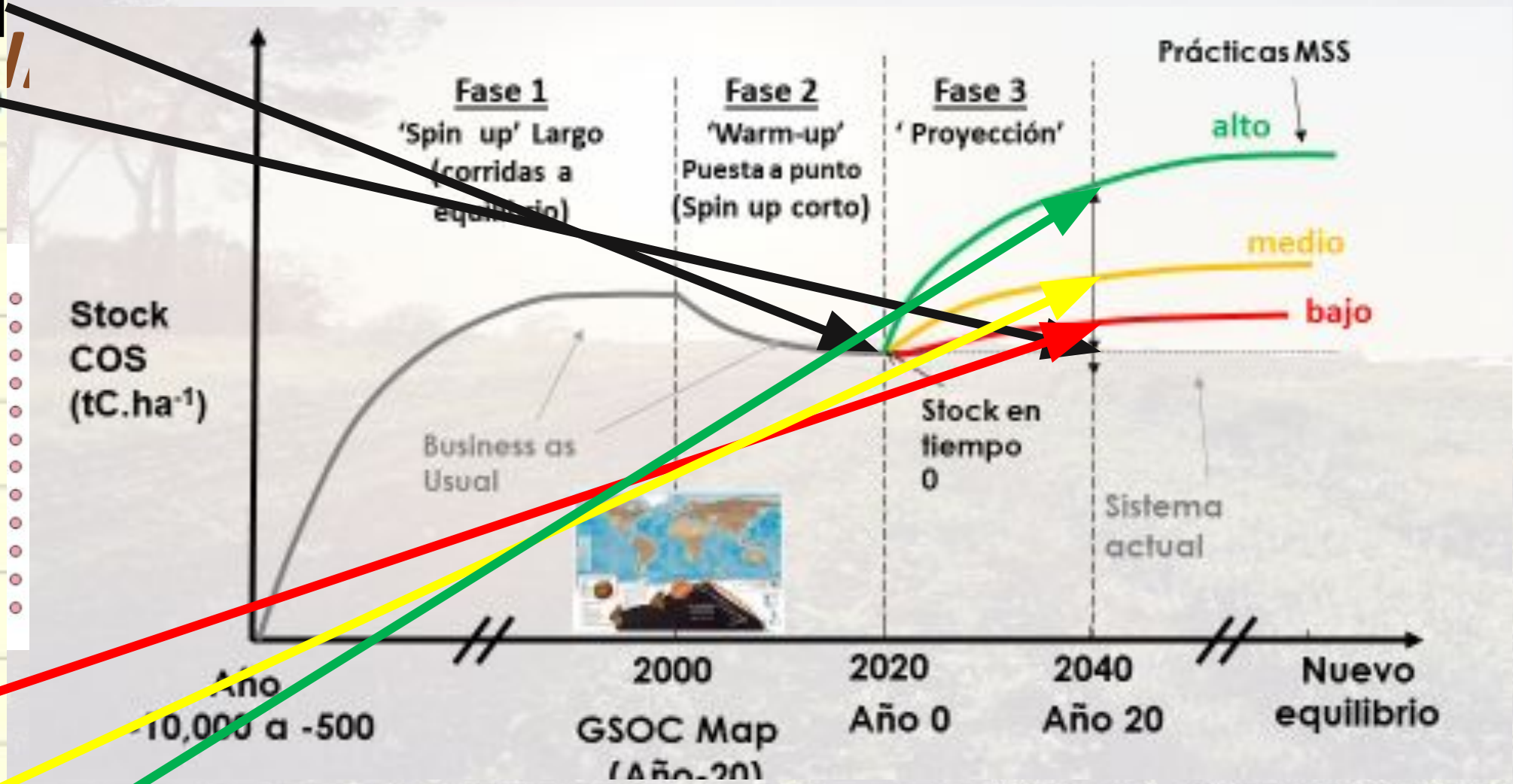
STACK LAYER (from script number 12) :
Stack_Set_FOWARD_[country_code].tif

Outputs :

FOWARD_BAU_3E_20YEARS_[code country].shp
(contains the output of the model for Bussines as usual, and three future scenarios based on a carbon input improvement)

1.2	1	SOC_
1.2	2	SOC_BAU_20
1.2	3	DPM_B
1.2	4	RPM_B
1.2	5	BIO_B
1.2	6	HUM_B
1.2	7	IOM_B
1.2	8	LndUs
1.2	9	Lw_Sc
1.2	10	Md_Sc
1.2	11	Hgh_S

T 0



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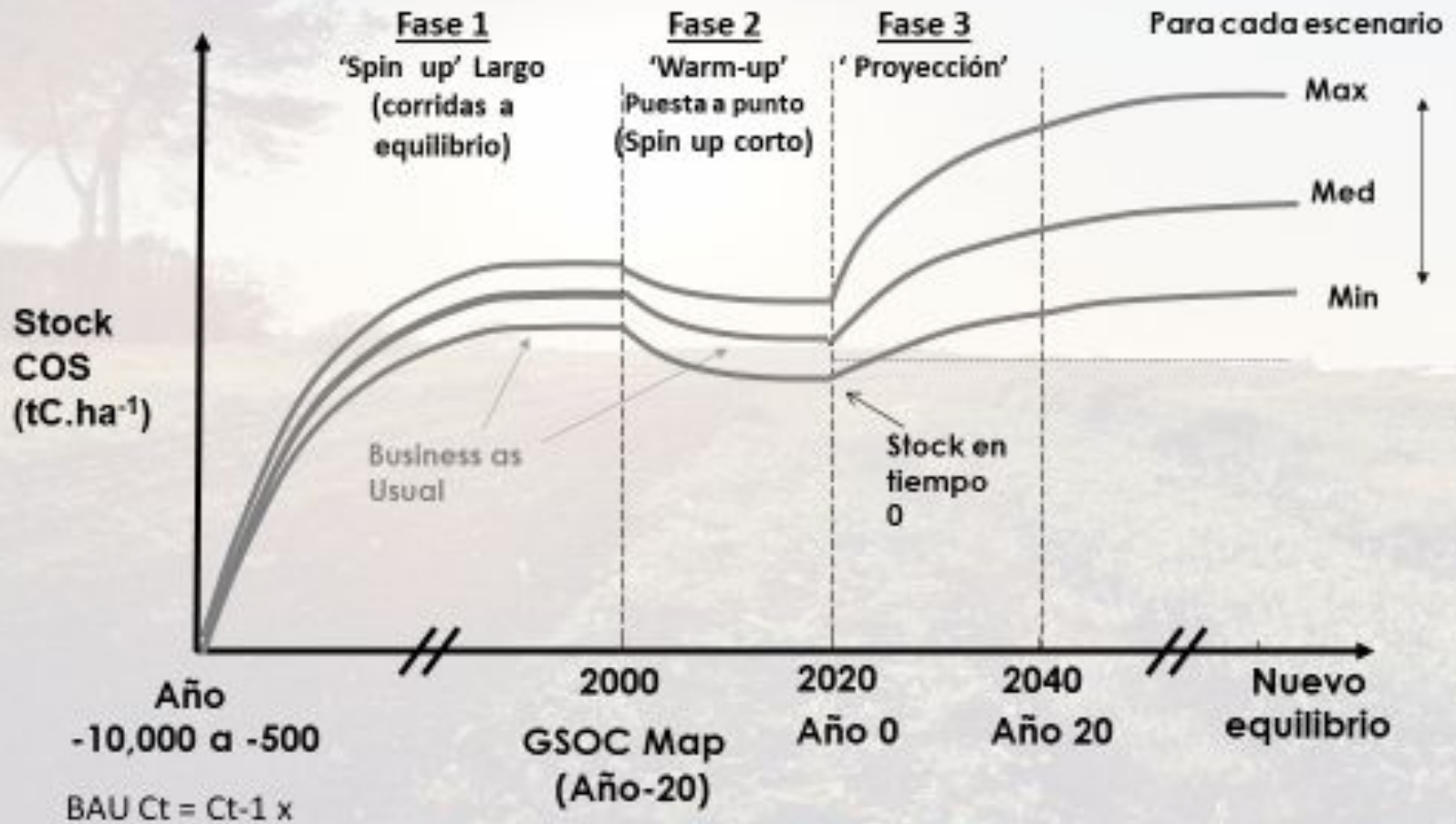
1.2	12	SOC_BAU_ MIN
1.2	13	SOC_BAU_ MAX
1.2	14	Md_Scn_ MIN
1.2	15	Md_Scn_ MAX
1.2	16	SOC_2018_ MIN
1.2	17	SOC_2018_ MAX
1.2	18	UNC_B
1.2	19	UNC_2
1.2	20	UNC_S

Incertidumbres



BAU Ct = Ct-1 x (NPP t-1)$^{-1}$ x NPPt

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