

RZWQM2教程二：试验建立教程（单季玉米为例）

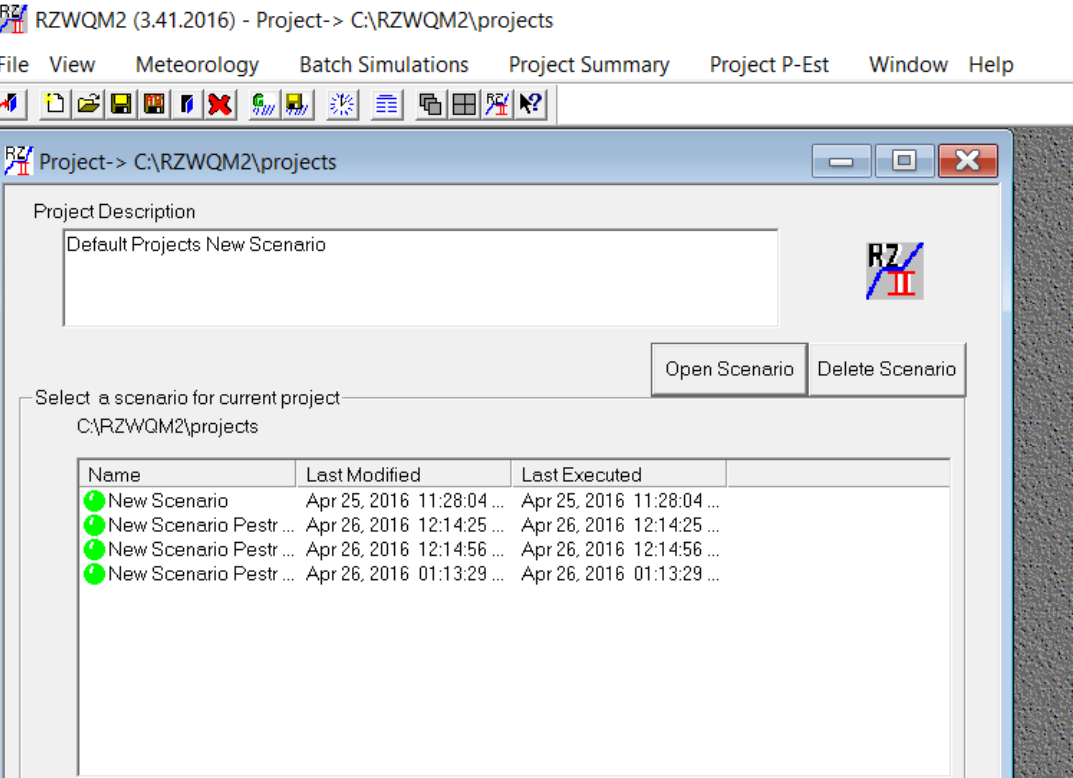
Notebook: RZWQM
Created: 12/20/2018 5:12 AM Updated: 1/27/2020 9:37 AM
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Tags: Xiaosheng.Chu@outlook.com

示例：
以中国陕西杨凌2014年夏玉米试验为例。

数据准备：

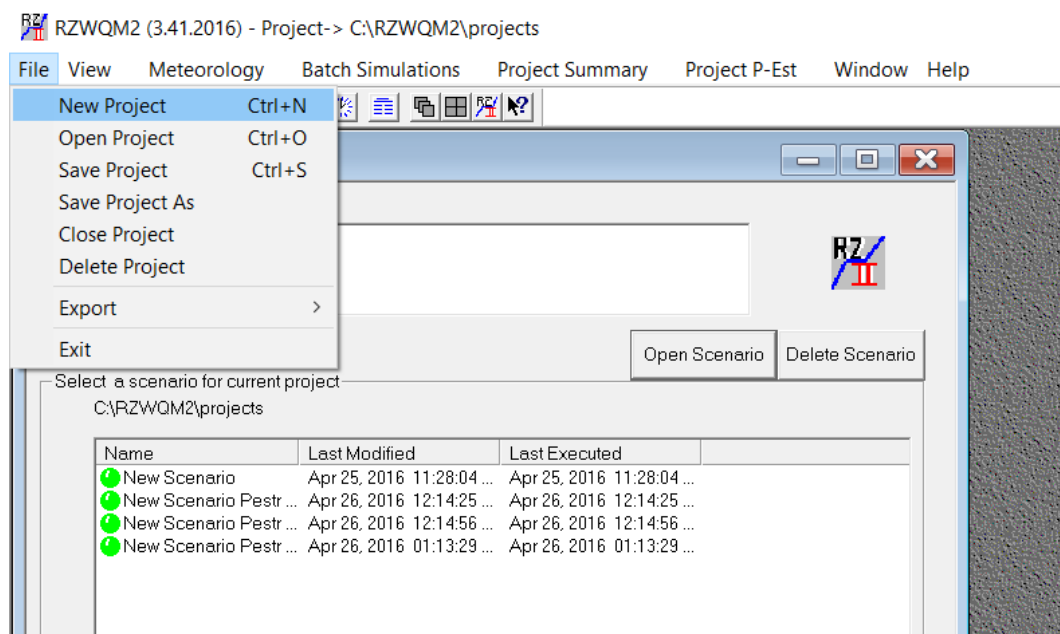


双击RZWQM桌面快捷方式，打开模型。此时界面显示的是示例projects。



1. 模型试验（Project）建立

注：Project多代表的是一个试验，如水氮耦合试验等等。一个试验中会有多个处理（也可以叫情景，scenario，后详述）。
C盘根目录下建立文件夹，命名为RZWQMWorkspace。点击File-New Project，建立新的模型试验。



Type of Project 选择“create project with example scenario”, Name 设置为RZWQM_training (可自定义), Location 处通过 Browse按钮选择C盘下的RZWQMWorkspace文件夹。点击OK，弹出的对话框中选择Yes。新建的Project会自动打开。

New Project Workspace [X]

Create a NEW Project
By default you create a project with an example scenario, or choose a blank project without an example scenario.

OK
Cancel
Help

Type of project

☒ Create project with example scenario
☐ Create blank project

Name:
RZWQM2_training

Description
Enter project description here

Location:
C:\RZWQMWorkspace

Browse

RZWQM2 [X]

C:\RZWQMWorkspace\RZWQM2_training

Does NOT Exist
Do you want to create it?

Yes No

RZWQM2 (3.41.2016) - Project-> C:\RZWQMWorkspace\RZWQM2_training

File View Meteorology Batch Simulations Project Summary Project P-Est Window Help

[Icons]

Project-> C:\RZWQMWorkspace\RZWQM2_training

Project Description
Enter project description here

Open Scenario Delete Scenario

Select a scenario for current project
C:\RZWQMWorkspace\RZWQM2_training

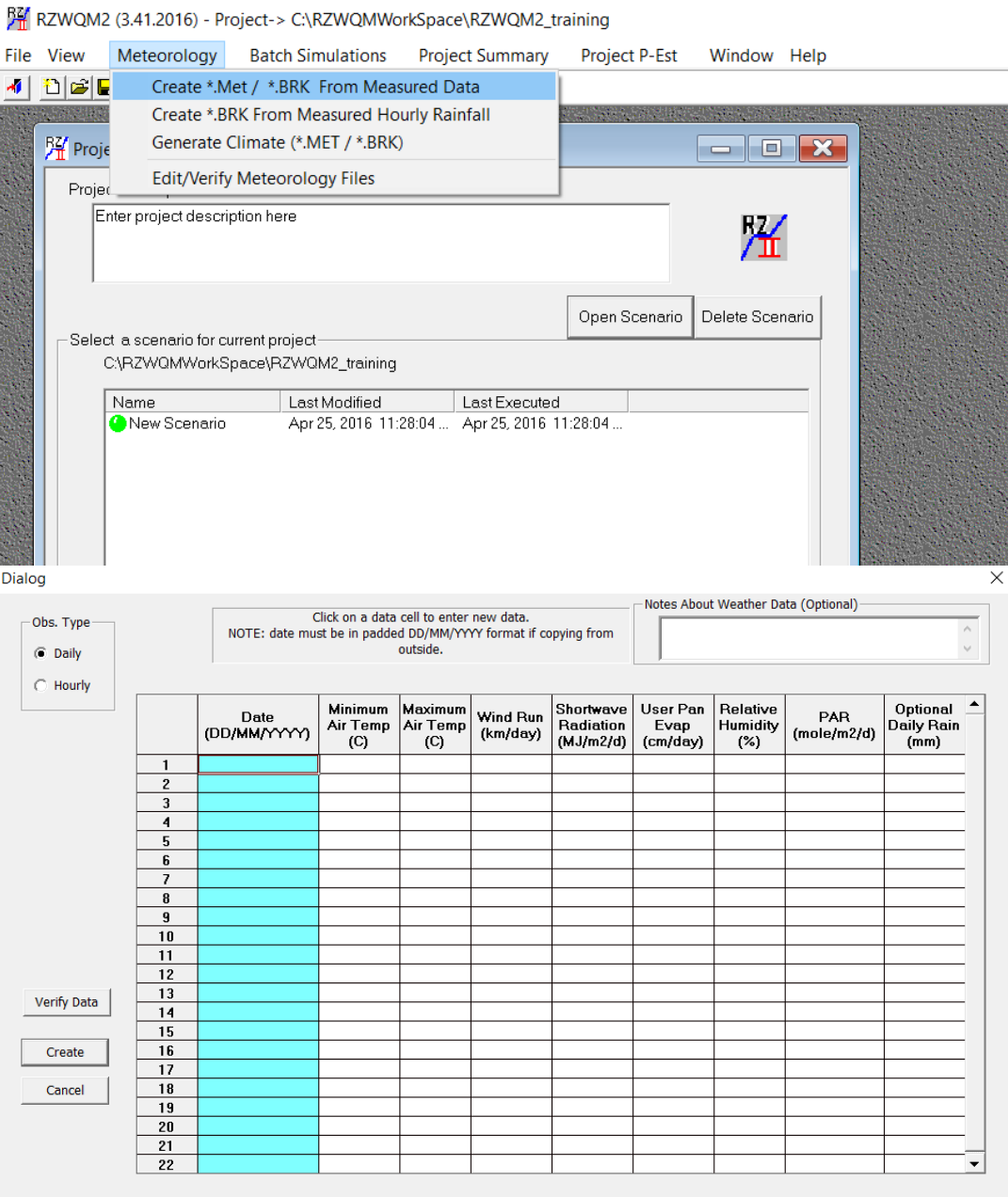
Name	Last Modified	Last Executed
● New Scenario	Apr 25, 2016 11:28:04 ...	Apr 25, 2016 11:28:04 ...

Scenario Description
As distributed with Root Zone. PEST files set up.

2. 气象数据建立

RZWQM运行所需要的气象数据包括最低温，最高温，风速，短波辐射，蒸发皿蒸发量（可选），相对湿度，光合有效辐射（可选），降雨量。生成的气象文件包括两个，主要气象数据值*.Met和断点降雨值 *.BRK。

点击Meteorology-Creat *.Met/*.BRK From Measured Data



将按图中格式整理好的气象数据从excel拷贝粘贴到空白处。注意各气象要素单位，Data需用DD/MM/YYYY格式，user pan Evap和PAR是可选参数，如果没有测量值请输入0，其他要素为必填项。注：如有逐小时降雨数据，*BRK文件可单独建立，数据框中的日降雨可不填。

Dialog

Obs. Type
☒ Daily
☐ Hourly

Click on a data cell to enter new data.
 NOTE: date must be in padded DD/MM/YYYY format if copying from outside.

Notes About Weather Data (Optional)

	Date (DD/MM/YYYY)	Minimum Air Temp (C)	Maximum Air Temp (C)	Wind Run (km/day)	Shortwave Radiation (MJ/m2/d)	User Pan Evap (cm/day)	Relative Humidity (%)	PAR (mole/m2/d)	Optional Daily Rain (mm)
1	01/01/2014	-4.50	11.70	138.24	10.26	0.00	39.00	0.00	0.00
2	02/01/2014	-2.20	11.60	190.08	7.14	0.00	37.00	0.00	0.00
3	03/01/2014	-3.40	12.60	172.80	11.28	0.00	30.00	0.00	0.00
4	04/01/2014	-5.60	11.70	146.88	11.14	0.00	39.00	0.00	0.00
5	05/01/2014	-4.60	5.50	120.96	4.29	0.00	46.00	0.00	0.00
6	06/01/2014	-3.10	6.00	95.04	4.31	0.00	49.00	0.00	0.00
7	07/01/2014	1.00	7.10	216.00	4.33	0.00	55.00	0.00	0.00
8	08/01/2014	-1.40	6.30	138.24	11.39	0.00	25.00	0.00	0.00
9	09/01/2014	-8.30	3.60	120.96	10.72	0.00	43.00	0.00	0.00
10	10/01/2014	-6.10	5.00	95.04	7.54	0.00	46.00	0.00	0.00
11	11/01/2014	-4.40	7.20	138.24	4.42	0.00	45.00	0.00	0.00
12	12/01/2014	-2.60	6.70	129.60	10.86	0.00	27.00	0.00	0.00
13	13/01/2014	-8.60	5.20	120.96	11.28	0.00	45.00	0.00	0.00
14	14/01/2014	-7.50	4.80	138.24	9.60	0.00	48.00	0.00	0.00
15	15/01/2014	-7.00	3.10	103.68	4.52	0.00	56.00	0.00	0.00
16	16/01/2014	-5.50	7.80	120.96	4.55	0.00	56.00	0.00	0.00
17	17/01/2014	-5.70	9.30	172.80	10.96	0.00	48.00	0.00	0.00
18	18/01/2014	-7.90	5.30	120.96	11.20	0.00	43.00	0.00	0.00
19	19/01/2014	-1.00	10.60	224.64	11.45	0.00	26.00	0.00	0.00
20	20/01/2014	-6.30	7.70	146.88	12.36	0.00	31.00	0.00	0.00
21	21/01/2014	-8.50	6.90	120.96	12.34	0.00	41.00	0.00	0.00
22	22/01/2014	-8.10	6.80	120.96	11.94	0.00	42.00	0.00	0.00

Verify Data

Create

Cancel

点击Verify Data 按钮检查数据填写是否有误。无误后点击Creat按钮。在弹出的对话框中为气象数据命名Yangling20140101-20151231，不要改变存储路径，点击save，此时已成功创建Yangling20140101-20151231.Met文件。

Save As

« RZQM2_training » Meteorology

Search Meteorology

Organize New folder

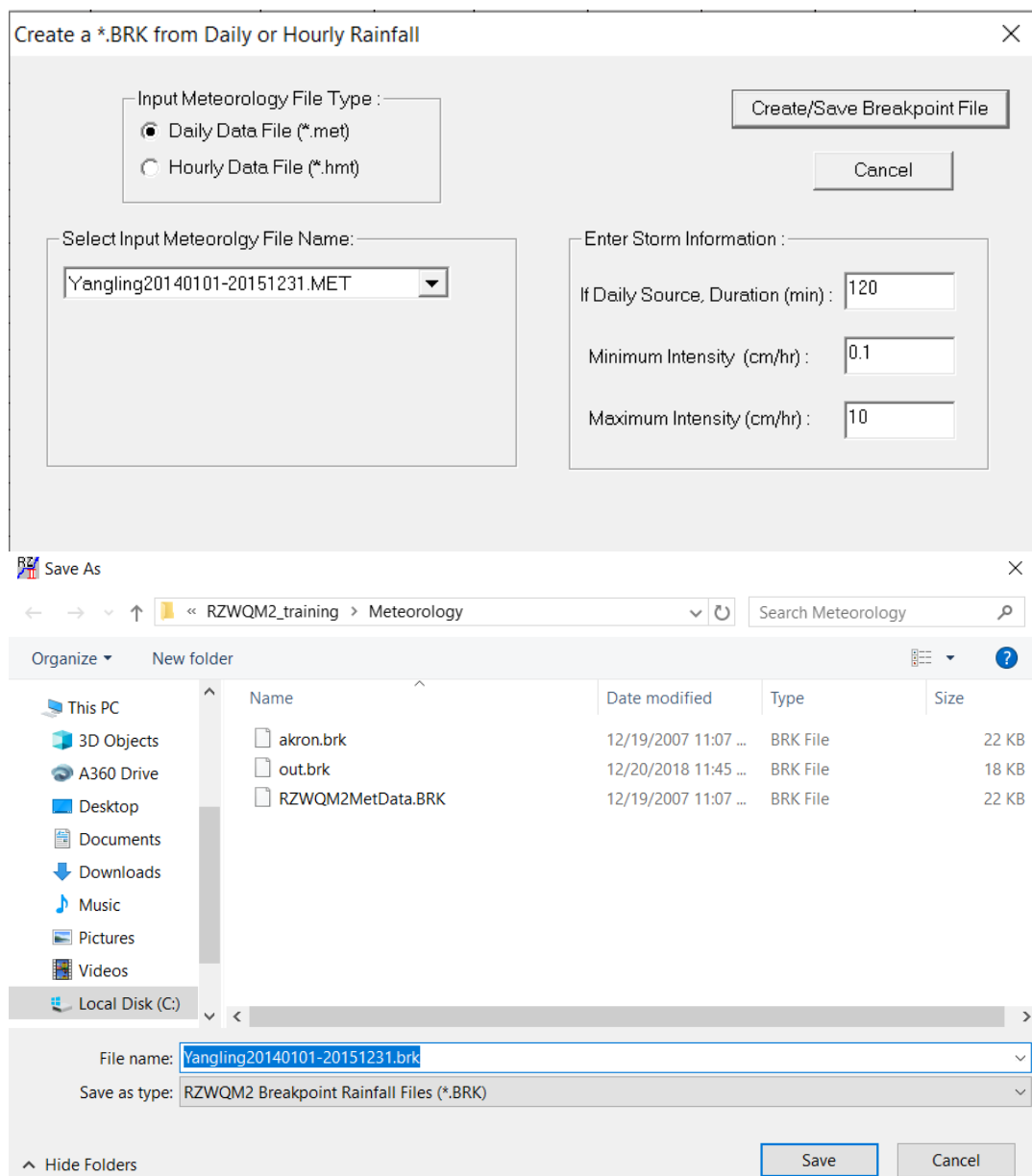
Name	Date modified	Type	Size
akron.met	12/10/2015 10:11 ...	MET File	65 KB
RZQM2MetData.MET	8/14/2014 12:47 PM	MET File	65 KB

File name: Yangling20140101-20151231

Save as type: RZQM2 Meteorology Files (*.MET)

Save Cancel

在弹出的新对话框中直接点击Creat/Save Breakpoint File, 再次弹出的对话框中直接点击Save，此时已成功创建Yangling20140101-20151231.BRK文件。



Met文件和BRK文件保存在
C:\RZWQMWorkspace\RZWQM2_training\Meteorology中。

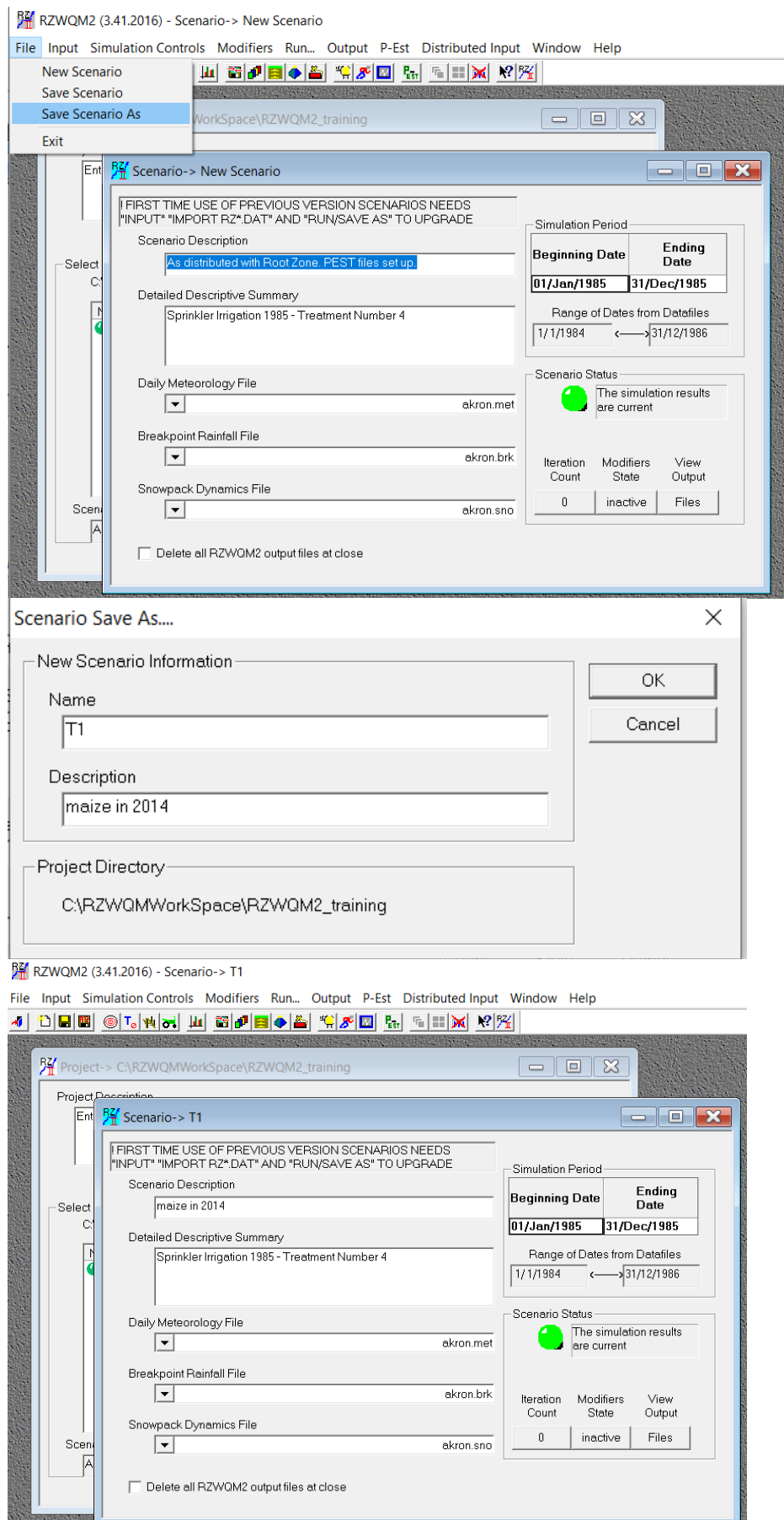
Disk (C:) > RZWQMWorkspace > RZWQM2_training > Meteorology				
Name	Date modified	Type	Size	
akron.brk	12/19/2007 11:07 ...	BRK File	22 KB	
akron.met	12/10/2015 10:11 ...	MET File	65 KB	
akron.sno	5/24/1996 4:33 PM	SNO File	4 KB	
RZWQM2MetData.BRK	12/19/2007 11:07 ...	BRK File	22 KB	
RZWQM2MetData.MET	8/14/2014 12:47 PM	MET File	65 KB	
RZWQM2MetData.SNO	5/24/1996 4:33 PM	SNO File	4 KB	
Yangling20140101-20151231.brk	12/20/2018 11:45 ...	BRK File	18 KB	
Yangling20140101-20151231.MET	12/20/2018 11:44 ...	MET File	47 KB	

3. 试验处理建立

注：试验处理一般以示例处理New scenario 为母本，进行修改。

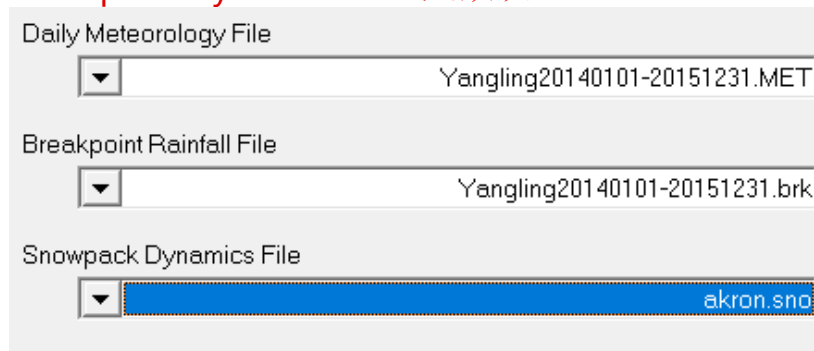
3.1 新建处理

双击New Scenario 打开示例处理，点击File-Save scenario as，在弹出的对话框中Name处为处理命名为T1（自定义），Description处输入处理描述，点击OK。此时已创建名为T1的处理，并自动打开。



3.2 气象数据选择

Daily Meteorology File 处选择Yangling20140101-20151231.MET
Breakpoint Rainfall File 处选择Yangling20140101-20151231.brk
Snowpack Dynamics File 处默认



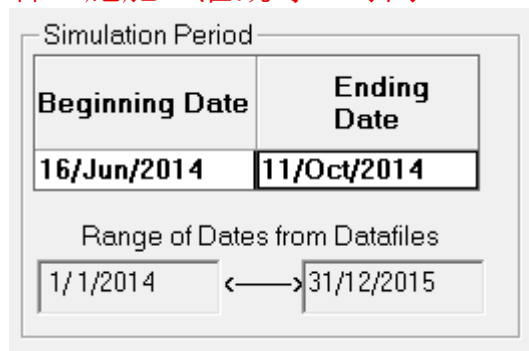
Daily Meteorology File
Yangling20140101-20151231.MET

Breakpoint Rainfall File
Yangling20140101-20151231.brk

Snowpack Dynamics File
akron.sno

3.3 模拟时间选择

模拟时间不能超出气象数据的范围，且需涵盖所有管理措施（播种、施肥、灌溉等）时间。



Simulation Period

Beginning Date	Ending Date
16/Jun/2014	11/Oct/2014

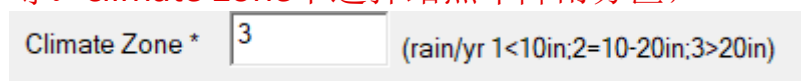
Range of Dates from Datafiles

1/1/2014 <—> 31/12/2015

3.4 试验地基础数据输入

点击  按钮，打开site Description对话框。

3.4.1 General information 下输入站点基本信息，如经纬度，坡度等。climate zone中选择站点年降雨分区，



Climate Zone * 3 (rain/yr 1<10in;2=10-20in;3>20in)

，1表示年降雨小于254mm，2表示年降雨介于254-508mm，3表示年降雨大于508mm。

Site Description

Hydraulic Control | Background Chemistry | PET | Nutrients | NH3 | Soil Erosion

General Information | Horizon Description | Soil Hydraulics | Soil Physical Properties

Location Information

Identifying Name: wheat from 201310 to 201406

County: Yangling State: Shannxi Field #: 1

Soil series name for your site: LouTu

Field Specifics

Area: 2 (ha)

Elevation: 506 (m)

Aspect: 0 (degrees) Ambient CO₂: 390 (ppm)

Latitude: 34.283 (degrees) Longitude: 108.067 (degrees)

Slope: 0 (degrees) Climate Zone: 3 (rain/yr 1<10in;2=10-20in;3>20in)

3.4.2 Horizon Description 中设置土壤分层以及机械组成等信息。Insert Horizon和Delete Horizon可以添加和删除土层。孔隙度会根据容重自动计算，土壤类型会根据机械组成自动调节。每一土层粉砂粘颗粒含量之和必须为1。

Site Description

Hydraulic Control | Background Chemistry | PET | Nutrients | NH3 | Soil Erosion

General Information | Horizon Description | Soil Hydraulics | Soil Physical Properties

Set Number of Soil Horizons

Select a row to insert before or to delete. Verify all horizon specific data after changing.

Insert Horizon Delete Horizon

Choose Soil From Database

Warning: Choosing a new soil will overwrite many soil properties

Choose New Soil Browse Nodes

VERI F Y

	Soil Type	Horizon Depth (cm)	Particle Density (g/cm ³)	Bulk Density (g/cm ³)	Porosity	Fraction Sand	Fraction Silt	Fraction Clay
1	silty loam	20	2.650	1.270	0.520755	0.073	0.750	0.177
2	silty loam	40	2.650	1.570	0.407547	0.053	0.697	0.250
3	silty clay loam	60	2.650	1.400	0.471698	0.060	0.594	0.346
4	silty clay loam	80	2.650	1.350	0.490566	0.050	0.636	0.314
5	silty loam	100	2.650	1.390	0.475472	0.077	0.772	0.151

Fraction Sand	Fraction Silt	Fraction Clay
0.073	0.750	0.177
0.053	0.697	0.250
0.060	0.594	0.346
0.050	0.636	0.314
0.077	0.772	0.151

3.4.3 Soil Hydraulics中输入土壤水分特性曲线参数（BC方程参数），提供5种计算方法，一般选择第4种，使用15bar和1/3bar土壤含水率估算。

Site Description

Hydraulic Control | Background Chemistry | PET | Nutrients | NH3 | Soil Erosion

General Information | Horizon Description | Soil Hydraulics | Soil Physical Properties

Method To Estimate Brooks-Corey Parameters (Select Only One Method)

☐ Minimum Input (1/3 or 1/10 bar WC along with reference BC-curves)
☐ Full BC Parameters (User Input or Estimated, Constrained)
☐ Full BC Parameters (User Input or Estimated, Not Constrained)
☒ Estimate BC Parameters Using 15 And 1/3 bar Water Content
☐ Estimate BC Parameters Using Their Correlations With 1/3 bar Water Content

Advanced Richard Equation Parameters

	Ksat		Saturation Water Content	1/3 bar Water Content	15 bar Water Content	Residual Water Content
1	2.200000		0.501000	0.317000	0.199000	0.015000
2	1.100000		0.501000	0.325000	0.195000	0.015000
3	1.300000		0.471000	0.348000	0.220000	0.015000
4	1.300000		0.471000	0.335000	0.150000	0.015000
5	1.200000		0.501000	0.307000	0.141000	0.015000

3.4.4 Soil Physical Properties 中输入土壤物理参数，如微孔隙度、土壤热容等。如无实测，可默认。

Site Description

Hydraulic Control | Background Chemistry | PET | Nutrients | NH3 | Soil Erosion

General Information | Horizon Description | Soil Hydraulics | Soil Physical Properties

Micro-Macropore Control

☐ Enter known microporosity fraction
☐ Macropores present in the soil

	(Heat Model) Texture Class Index	Dry Vol. Heat Capacity (J/mm ³ /C)	Fraction Microporosity of Total Porosity	Total Macroporosity (cc/cc)	Fraction Dead-End Macropores	Average Radius of Cylindrical Pores (cm)	Width of Cracks (cm)	Length of Cracks (cm)
1	2 - Medium	0.00111	0.401	0.00050	0.001	0.100	0.000	0.000
2	2 - Medium	0.00111	0.393	0.01000	0.500	0.000	0.050	10.00
3	3 - Fine	0.00111	0.472	0.01000	0.500	0.000	0.050	10.00
4	3 - Fine	0.00111	0.322	0.01000	0.500	0.000	0.050	10.00
5	2 - Medium	0.00111	0.284	0.01000	0.500	0.000	0.050	10.00

3.4.5 Hydraulic Control中输入水力学控制条件，如表层结皮、排水、地下水位、下边界条件等，如无实测，可默认。

Site Description

General Information	Horizon Description	Soil Hydraulics	Soil Physical Properties
Hydraulic Control	Background Chemistry	PET	Nutrients
		NH3	Soil Erosion
Surface Crust Crusting Surface? <input type="radio"/> Yes <input checked="" type="radio"/> No Crust Conductivity (cm/hr) <input type="text" value="0.4285"/>		Bottom Boundary During Redistribution <input type="radio"/> Constant Head <input checked="" type="radio"/> Unit Gradient Flow <input type="radio"/> Constant Flux	
Drain Information Drains Present? <input type="radio"/> Yes <input checked="" type="radio"/> No Depth from Surface to Drain (cm) <input type="text" value="10"/> Drain Spacing (cm) <input type="text" value="1000"/> Radius of Drain (cm) <input type="text" value="20"/>		General Controls Field Saturation Fraction <input type="text" value="0.99"/> Unit Gradient Flow During Infiltration? <input type="radio"/> Yes <input checked="" type="radio"/> No	
Water Table High Water Table Present? <input type="radio"/> Yes <input checked="" type="radio"/> No Water Table Leakage Rate (cm/hr) <input type="text" value="1e-009"/>		Uniform Surface Mixing Equation Mixing Parameter (1/cm) <input type="text" value="4.4"/>	
		Management Soil Moisture Threshold 1st Horizon Moisture Depletion <input type="text" value="0.99"/>	

OK Cancel Apply Help

3.4.6 Background Chemistry中输入土壤化学数据，如pH、各离子浓度等。如无实测，可默认。

Site Description

General Information	Horizon Description	Soil Hydraulics	Soil Physical Properties
Hydraulic Control	Background Chemistry	PET	Nutrients
		NH3	Soil Erosion
<p>When water is applied to the system either through rainfall or irrigation applications, there are background chemicals present in that water source. Provide estimates for the major cation/ions in (mg/L), and pH in standard scale 3-14.</p>			
	pH	Ca	Na
	Mg	Cl	HCO3
	SO4	Al	
Rain Water Chemistry	6.40	0.00	0.00
Irrigation Water	6.80	0.00	0.00

3.4.7 PET中输入潜在蒸散发控制参数，包括土壤反射率、水分胁迫计算方法、是否使用蒸发皿蒸发量等。注意此处要设置风速测量高度。

Site Description

General Information

Horizon Description

Soil Hydraulics

Soil Physical Properties

Hydraulic Control

Background Chemistry

PET

Nutrients

NH3

Soil Erosion

Albedo Information

Albedo of dry soil

0.3

Albedo of wet soil

0.2

Albedo of crop at maturity

0.43

Albedo of fresh residue

0.4

Meteorology Parameters

Wind measurement height (m)

10.2

Average daily sunshine fraction

0.8

Resistance Parameters

Surface Soil Resistance for the S-W PET (s/m)

37

Plant Water Stress Calculation Methods

Potential Water Uptake/ Potential T

Pan Coefficient

This is the average daily pan coefficient for the crop. Only used when pan data is provided.

1

Surface Energy Balance Options

Hourly ET Timestep?

☐ Yes
☒ No

Use SHAW Module?

☐ Yes
☒ No

OK

Cancel

Apply

Help

3.4.8 Nutrients中输入养分模拟控制参数。包括各养分库、微生物库等。如无实测，可默认。

Site Description

General Information

Horizon Description

Soil Hydraulics

Soil Physical Properties

Hydraulic Control

Background Chemistry

PET

Nutrients

NH3

Soil Erosion

Nutrient parameters determine the behavior of the nutrient model transformations and other components of the nitrogen cycle.

Nutrient System C:N ratios

	C:N Ratio
Slow Residue Pool 1 Partition Coefficient	8.00
Fast Residue Pool 2 Partition Coefficient	80.00
Fast Soil Humus Pool	8.00
Intermediate Soil Humus Pool	10.00
Slow Soil Humus Pool	11.00
Carbon Sink Pool	0.00
Aerobic Heterotrophs Pool	8.00
Autotrophs Pool	8.00
Anaerobic Heterotrophs Pool	8.00

Reset C:N Ratios to Default Values

Detailed Nutrient Parameters

These parameters are to be used by advanced users ONLY.

Edit Detailed Parameters

Reset Detailed Parameters to Default Values

3.4.9 NH3中输入氨控制信息，如施加硝化抑制剂等。如无实测可默认。

Site Description

General Information

Horizon Description

Soil Hydraulics

Soil Physical Properties

Hydraulic Control

Background Chemistry

PET

Nutrients

NH3

Soil Erosion

When anhydrous ammonia is applied to the field there is a localized sterilization of the soil immediately surrounding the nozzle. This effect slows the nitrification process for a period of time.

Without Nitrification Inhibitor

Lag time until the system starts to recover (days)

14

Time from start of recovery to full recovery (days)

14

With Nitrification Inhibitor

Additional Lag time until the system starts to recover (days)

18

Time from start of recovery to full recovery (days)

14

3.4.10 Soil Erosion 中输入土壤侵蚀控制参数，如无实测可默认。

Site Description

General Information

Horizon Description

Soil Hydraulics

Soil Physical Properties

Hydraulic Control

Background Chemistry

PET

Nutrients

NH3

Soil Erosion

Field Properties

Total field area (ha)

2

Field Drainage Area (ha)

0.0

Specific surface area for clay particles (m²/g)

20.0

Use Enrichment

☒

Slope of overland flow profile (deg)

0

Length of Slope (m)

1.0

Soil erodibility for the slope ((tons / ac) / English EI)


0.005

Annual Variation of Erodibility

	CDATE 1	CDATE 2	CDATE 3	CDATE 4	CDATE 5	CDATE 6	CDATE 7
Day of Year	1	-1	-1	-1	-1	-1	-1

	CDATE 1	CDATE 2	CDATE 3	CDATE 4	CDATE 5	CDATE 6	CDATE 7
CFACT	0.01						
PFACT	0.01						
NFACT	0.01						

3.5 模拟初始值输入

 按钮，打开模拟初始值输入对话框。模拟初始值为模拟开始当天的值，需对应处理设置的模拟开始时间。包括土壤水分、温度、土壤化学、杀虫剂等。

Initial System State

Water and Temperature | Soil Chemistry State | Pesticide State

Input Mode for Hydraulic State

☐ Tensiometric Potential
☒ Volumetric Water Content

Reset Soil to "Initial Conditions Input" on Planting Day or Starting Day of Each Year?

☐ Yes, on Planting (Day of Year)
☐ Yes, on Start (Day of Year)
☒ No, Run Continuously [Default]

Enter the initial state of the water profile and temperature profile.

	Volumetric Water Content	Temperature (C)
1	0.2047	27.1000
2	0.2342	25.0000
3	0.2463	23.5000
4	0.2449	23.9000
5	0.2343	21.8000

3.6 残茬参数输入

点击按钮，打开残茬状态对话框。包括初始残茬库/无机氮参数以及地表残茬覆盖设置。

此处输入初始土壤养分（硝态氮/铵态氮）数据。

Residue Condition

Initial Residue/Inorganic N Profile | Surface Residue Properties

Initialization Wizard

Set the initial state for the residue pool system.

Equilibrate Nutrient Pools

	Aerobic Heterotrophs (#orgs/g)	Autotrophs (#orgs/g)	Anaerobic Heterotrophs (#orgs/g)	Urea-N Conc (ug-N/g)	NO3-N Conc (ug-N/g)	NH4-N Conc (ug-N/g)
1	477086.91	7484.50	67000.00	0.000	5.653	0.602
2	116475.70	1466.30	13000.00	0.000	1.600	0.236
3	99000.00	1247.30	11000.00	0.000	0.930	0.231
4	144.60	27.70	14.50	0.000	0.920	0.043
5	270.80	24.00	27.10	0.000	0.680	0.272

地表残茬覆盖中设置残茬类型、覆盖量、残茬碳氮比等。如无残茬覆盖，覆盖量设置为0。

Initial Residue/Inorganic N Profile Surface Residue Properties

Initial Dry Mass of Surface Flat Residue

Mass of flat residue (metric Tons/ha)

Residue Cover Factor Type

☐ Corn = 2.0

☐ Soybeans=2.5

☐ Wheat =4.0

Residue Properties

Age of residue at start of the simulation (days)

Average height of flat residue layer (cm)

C:N ratio of dominant residue material

Surface residue decomposition constant *

Residue Stem Area Index (SAI)

Average height of standing residue (cm)

Mass of standing residue (metric Tons/ha)

OK Cancel Apply Help

3.7 管理措施输入

点击  按钮，打开管理措施窗口。包括作物设置、播种、有机肥、灌溉、无机肥、杀虫剂、耕作。

3.7.1 作物选择

点击Edit DSSAT CSM Parameter，打开作物设置窗口。

Management Options

Crop Selection Crop Planting Manure Irrigation Fertilization Pesticides Tillage

Add and/or Parameterize Annual Crops

Add Custom Generic Crop Parameters

GenericCrop

Edit DSSAT CSM Parameters

DSSAT-CSM

maize IB0033 PIO 3780

Edit Qckplant Parameters

QckPlant

9082 Sugar beet

Add and/or Parameterize Perennials (Turf or Tree)

Add Qckturf Parameters

QckPerennial

<Select Perennial Crop>

Edit QckTree Parameters

Crop ID's: <2000 - Generic
7000-7999 - DSSAT CSM
8000-8999 - QckTurf
9000-9499 - QckPlant
9500-9999 - QckTree
Note: many annuals or one perennial are allowed in the simulation at one time

Crops Available for Simulation

7000 maize IB0033 PIO 3780

Select

Deselect

Reset

Move up

Move down

Additional Plant Parameters

OK Cancel Apply Help

DSSAT Species/Cultivar Input

Choose Species from Database
maize
DSSAT PARAMETERS
Select plants from the database, use the provided values or enter your own.

Choose Cultivar from Species Database
PC0001 2500-2600 GDD
PC0002 2600-2650 GDD
PC0003 2650-2700 GDD
PC0004 2700-2750 GDD
PC0005 2750-2800 GDD
Add Cultivar
Remove Cultivar
Ecotype code for this cultivar IB0001

OK
Cancel
Set Simulation Control by Species

IB0033 PIO 3780

P1 Thermal time from seedling emergence to the end of the juvenile phase (days above 5°C base temperature)	300.0000
P2 Delay in development (days/hr) for each hour that daylength is above 12.5 hours (0-1)	0.8000
P5 Thermal time from silking to physiological maturity (days above 5°C base temperature)	615.0000
G2 Maximum possible number of kernels per plant	710.0000
G3 Kernel filling rate during the linear grain filling stage and under optimum conditions (mg/day)	9.6000
PHINT Phytochron interval; the interval in thermal time (days) between successive leaf tip appearances	38.9000
Maximum plant height at maturity (cm)	244.6000
Plant biomass at HALF of maximum height (g)	43.0700

选择一个玉米品种：Choose Species from Database 选择maize，Choose Cultivar from Species Database 选择PC0001 2500-2600 GDD（任意），点击Add Cultivar 按钮添加。

DSSAT Species/Cultivar Input

Choose Species from Database
maize
DSSAT PARAMETERS
Select plants from the database, use the provided values or enter your own.

Choose Cultivar from Species Database
PC0001 2500-2600 GDD
PC0002 2600-2650 GDD
PC0003 2650-2700 GDD
PC0004 2700-2750 GDD
PC0005 2750-2800 GDD
Add Cultivar
Remove Cultivar
Ecotype code for this cultivar IB0001

OK
Cancel
Set Simulation Control by Species

IB0033 PIO 3780 PC0001 2500-2600 GDD

P1 Thermal time from seedling emergence to the end of the juvenile phase (days above 5°C base temperature)	160.0000
P2 Delay in development (days/hr) for each hour that daylength is above 12.5 hours (0-1)	0.7500
P5 Thermal time from silking to physiological maturity (days above 5°C base temperature)	780.0000
G2 Maximum possible number of kernels per plant	750.0000
G3 Kernel filling rate during the linear grain filling stage and under optimum conditions (mg/day)	8.5000
PHINT Phytochron interval; the interval in thermal time (days) between successive leaf tip appearances	49.0000
Maximum plant height at maturity (cm)	0.0000
Plant biomass at HALF of maximum height (g)	0.0000

Set Simulation Control by Species 中选择maize，进入DSSAT模拟控制窗口。该窗口控制作物模拟，包括根系、水氮胁迫等。此处将输出频率设置为1。设置完成后OK保存。

Cancel

Set Simulation Control by Species

maize
soybean
wheat
sorghum
potato
millet-prl
barley
drybean

DSSAT Simulation Control

Factors and Efficiencies

Soil Fertility Factor (0..1) 1

Soil Nitrification Factor (0..1) 1

Inoculation Efficiency (0..1) 1

N Fixation Efficiency (0..1) 1

Simulation Control

Water Stress Routines Yes No

Nitrogen Stress Routines Yes No

Symbiosis Routines Yes No

Phosphorous Routines Yes No

Potassium Routines Yes No

Disease and Pest Routines Yes No

Enter Measured PAR Yes No

Photosynthesis Option?

Daily (C) ☒ Hourly (L) ☐

Output Control

Files named with Experiment code Yes No

Create Overview File Yes No

Create Summary File Yes No

Create Growth File Yes No

Create Carbon File Yes No

Create Water File Yes No

Create Nitrogen File Yes No

Create Mineral Nutrients File Yes No

Create Diseases/Pests File Yes No

Create Long Output File Yes No

Detailed Output Frequency (days) 1

DSSAT Treatment Number 4

MAIZE

	Depth (cm)	Soil Root Growth Factor (SRGF)
1	5	1.00
2	15	1.00
3	30	0.96
4	45	0.84
5	60	0.84
6	90	0.71
7	100	0.22

User Entry Of SRGF?

Yes ☒ No, Calculate ☐

Calculate SRGF

Max Root Depth (cm) 200

Geotropical Exponent 3

CALCULATE

OK

Cancel

在DSSAT-CSM中选择PC0001 2500-2600 GDD，并点击右箭头添加到右侧框中。Apply保存。

Management Options

Crop Selection | Crop Planting | Manure | Irrigation | Fertilization | Pesticides | Tillage

Add and/or Parameterize Annual Crops

GenericCrop

Add Custom Generic Crop Parameters

Edit DSSAT CSM Parameters

maize IB0033 PIO 3780

maize PC0001 2500-2600 GDD

QckPlant

9082 Sugar beet

Edit Qckplant Parameters

Add and/or Parameterize Perennials (Turf or Tree)

Add Qckturf Parameters

Edit Qckturf Parameters

QckPerennial

<Select Perennial Crop>

Crop ID's: <2000 - Generic
7000-7999 - DSSAT CSM
8000-8999 - QckTurf
9000-9499 - QckPlant
9500-9999 - QckTree

Note: many annuals or one perennial are allowed in the simulation at one time

Crops Available for Simulation

7000 maize PC0001 2500-2600 GDD

Select

Deselect

Reset

Move up

Move down

Additional Plant Parameters

OK

Cancel

Apply

Help

3.7.2 播种设置crop planting

包括播种作物、播种时间、密度、行距、深度、播种方式、收获时间、留茬高度、收获系数、收获类型等。

	Reference Crop	Date of Planting (dd/MON/yyyy)	Planting Density (#seeds/ha)	Row Spacing (cm)	Planting Depth (cm)	Method of Planting	Emergence (#days after planting)
1	7000 maize PC0001 2500-260	19/Jun/2014	52000	60	5.0	Seed	-99
Emergence (#days after planting)	Init Plant Material @ Transplanting (kg/ha)	Sprout Length @ Transplanting (cm)	Plant Age @ Tranplanting (days)	Harvest Dependency			
-99	-99.0	-99.0	-99	Harvest Date			
Growth Stage Dependency (0..1)	Growth Class Dependency (1-7)	Threshold % (0..100)	Date of Harvest (dd/MON/yyyy)	Stubble Height (cm)	Harvest Efficiency (0..1)		
			11/Oct/2014	0.0	1.00		
Harvest Type		Soil Water @Planting (cm/100cm soil)	Plant Window (#days after date)				
Single/Above Ground		0	0				

3.7.3 有机肥 Manure

无有机肥施加时保持空白

Management Options

Crop Selection | Crop Planting | Manure | Irrigation | Fertilization | Pesticides | Tillage

Enter data appropriate for describing each manure application. Date Offset for Timing will accept either a number of days value or date depending on the Timing of Application cell selection.

NOTE: Scroll to right for more input data cells.

	Reference Crop	Source of Manure	Timing of Application	Date Offset for Timing	Method of Application
1					
2					
3					
4					

3.7.4 灌溉

包含了特定日期灌溉或自动灌溉设置。

点击Add/Edit Irrigation Events，打开灌溉管理窗口。

Management Options

Crop Selection | Crop Planting | Manure | Irrigation | Fertilization | Pesticides | Tillage

Schedule Irrigation Events

Add/Edit Irrigation Events

Overall Summary of Irrigation Events

Earliest Event: 29/JUN/1985
Latest Event: 18/SEP/1985
Number of Irrigation Events: 12
Maximum Total Seasonal Application: 18.9000 cm

Use?

☒ Specific Dates

☐ Fixed Interval

☐ Root Zone Dep

☐ ET Deficit

Specific Dates

Number of Events: 12
Earliest Event: 29/JUN/1985
Latest Event: 18/SEP/1985
Accumulated Specific Amounts: 18.9000 cm

Fixed Intervals

Number of Events:
Earliest Event:
Latest Event:
Accumulated Interval Amounts: cm

Root Zone Depletion

Number of Rules:
Earliest Event:
Latest Event:
Accumulated Maximum Applications: cm

ET Deficit

Number of Rules:
Earliest Event:
Latest Event:
Accumulated Maximum Applications: cm

OK Cancel Apply Help

在Specific Dates中，设置灌溉作物、灌溉类型、灌溉时间、灌溉量等信息。ok保存。

	Plant Identification	Type	Application Rate (cm/hr)	Maximum Total Seasonal Application (cm)	Date	Amount (cm)
1	7000 maize PC0001 2500-2600 GDC	Drip		6.00	18/Jul/2014	3.00

	Plant Identification	Maximum Total Seasonal Application (cm)	Date	Amount (cm)	Date	Amount (cm)
1	7000 maize PC0001 2500-2600 GDC	6.00	18/Jul/2014	3.00	01/Aug/2014	3.00

此时窗口会显示设置的灌溉信息。必须勾选Specific Dates选项，否则灌溉信息不会被读取。

Management Options

Crop Selection | Crop Planting | Manure | Irrigation | Fertilization | Pesticides | Tillage

Schedule Irrigation Events

Add/Edit Irrigation Events

Overall Summary of Irrigation Events

Number of Irrigation Events: 2

Earliest Event: 18/JUL/2014

Latest Event: 01/AUG/2014

Maximum Total Seasonal Application: 6.00000 cm

Use?

☒ Specific Dates

☐ Fixed Interval

☐ Root Zone Dep

☐ ET Deficit

Specific Dates

Number of Events: 2

Earliest Event: 18/JUL/2014

Latest Event: 01/AUG/2014

Accumulated Specific Amounts: 6.00000 cm

Fixed Intervals

Number of Events:

Earliest Event:

Latest Event:

Accumulated Interval Amounts:

cm

Root Zone Depletion

Number of Rules:

Earliest Event:

Latest Event:

Accumulated Maximum Applications:

cm

ET Deficit

Number of Rules:

Earliest Event:

Latest Event:

Accumulated Maximum Applications:

cm

OK

Cancel

Apply

Help

3.7.5 施无机肥 Fertilizer

包括施肥作物、施肥时间、施肥方式以及施肥量等信息。

	Reference Crop	Timing of Application	Date Offset for Application	Method of Application	NO3-N (kg/ha)	NH4-N (kg/ha)
1	7000 maize PC0001 2500-2600 GDC	Specific Date	17/Jun/2014	Surface Broadcast		

	Urea-N (kg/ha)	Minimum Days Between Split Applications	Proportion for Starter (0...1)	Maximum Amount N for Each Split (kg/ha)	Chemical Application Option for BMPs	BMP Application
1	225.00					

3.7.6 杀虫剂 pesticides

无使用保持为空

Management Options

Crop Selection | Crop Planting | Manure | Irrigation | Fertilization | Pesticides | Tillage

NOTE: Select desired pesticides and modify input data only if values are known with certainty.


	Reference Crop	Pesticide Name	Modify Parameters	Timing of Pesticide Application	Date Off Applic
1			Parameters		
2					
3					
4					

3.7.7 耕作 Tillage

包括耕作作物、时间、耕作方式等

	Reference Crop	Timing of Tillage Operation	Offset Date for Operation	Tillage Implement	Average Effective Depth (cm)	Tillage Intensity
1	7000 maize PC0001 25	Specific Date	18/Jun/2014	Field cultivator	10	0.250
Tillage Intensity		Tillage Operation Performed				
0.250		1-Primary Tillage				

4. 实测数据输入

点击打开实测数据输入窗口，按照格式填写实测数据。输入的实测数据包括产量、生物量、叶面积指数、株高等。如果没有实测数据，保持各项为空。

注意，Horizon.out Depths中设置的是Horizon.out文件输出数据的土层分布，一般会自动设置为与土壤物理界面相同的土层定义，也可以自定义输出土层，但不得超出最大土层。

Experimental Data

Soil Organic C | Soil Pressure Head | Yield | Biomass | Plant N Uptake | Grain N Uptake | Tile Flow | Water Table | Runoff | Plant Height | ET

LAI | Soil N2O | Soil NxO | Soil CH4 | Phenology

Horizon.out Depths | Soil Water | Organic Carbon Pools | Soil NO3-N | Soil NH4-N | Pesticides | Soil Temp

Horizon.out reports simulated soil layer variables through time.

The defaults are the initial soil profile horizon depths.

The depths for this output file do not have to match experimental depths, and may have more depths provided than the experimental or horizon description depths.

Each depth must be greater than the previous and all depths must be less than the maximum depth specified in the initial soil profile description

Horizon Depths

1	20
2	40
3	60
4	80
5	100
6	
7	
8	
9	
10	

Soil Layer Variables Present

Soil Temp.
Soil Wat. Content

OK

Cancel

Apply

Help

5. 模型运行

点击运行模型，Normal Operation表示运行正常。运行结束后，点击Files查看模拟结果。

Scenario: T1


PLEASE WAIT
Running RZWQM Simulation

Cancel

Day: 98 of 118
Date: 21/9/2014

Status
Normal Operation

Scenario Status



The simulation results are current

Iteration Count	Modifiers State	View Output
0	inactive	Files

RUN NO. 1 C:\RZWQMWORKSPACE\RZWQM2_TRAINING\T1\

	CROP	GROWTH	BIOMASS		LEAF	CROP N	STRESS		
DATE	AGE	STAGE	kg/ha	LAI	NUM	kg/ha	%	H2O	N
19 JUN	0	Sowing	0	0.00	0.0	0	0.0	0.00	0.00
20 JUN	1	Germinate	0	0.00	0.0	0	0.0	0.00	0.00
24 JUN	5	Emergence	21	0.00	2.0	1	4.4	0.00	0.00
3 JUL	14	End Juveni	48	0.11	6.1	2	3.2	0.05	0.00
10 JUL	21	Floral Ini	182	0.35	9.0	7	3.6	0.19	0.00
8 AUG	50	75% Silkin	3110	1.49	18.5	69	2.2	0.32	0.02
19 AUG	61	Beg Gr Fil	4690	1.45	18.5	69	1.5	0.00	0.02
3 OCT	106	End Gr Fil	9997	0.79	18.5	128	1.3	0.02	0.00
6 OCT	109	Maturity	9997	0.79	18.5	128	1.3	0.00	0.00
11 OCT	114	Harvest	9997	0.79	18.5	128	1.3	0.00	0.00