Environmental Modeling: A Practical Introduction

Table of Contents

MODELS AND MODELING
Why Model?
The Modeling Process

Llyn Efymwy
Structure and Objectives of the Book
Resources on the CD-ROM

VISUALIZING ENVIRONMENTAL DATA
Introduction
Creating Two-Dimensional Plots

Plotting Time-Series Data
Plotting in Three Dimensions
Printing Plots
Exporting Graphics Files
Command-Line Scripts

PROCESSING ENVIRONMENTAL DATA
Introduction
Structure of the Llyn Efymwy Precipitation Data
Creating and Running a Simple gawk Program
Using gawk to Process Selected Fields
Storing the gawk Program in a File
Using gawk to Process Selected Records
Controlling the Format of the Output
Redirecting the Output to a File
Visualizing the Output Data
Logical or Boolean Operators in gawk

WIND SPEED AND WIND POWER
Introduction
Description of the Wind Speed Data
Calculating the Annual Mean Wind Speed
Determining the Maximum Wind Speed
Exploring Wind Speed Variability
Wind Energy and Power

SOLAR RADIATION AT EARTH’S SURFACE
Introduction
Description of the Solar Irradiance Data
Analyzing the Observations
Modeling Solar Irradiance

LIGHT INTERACTION WITH A PLANT CANOPY
Introduction
Developing a Model of Light Interaction with Plant Canopies

A Two-Layer Light Interaction Model
Accounting for Multiple Scattering
Multiple Leaf-Layer Models

ANALYTICAL AND NUMERICAL SOLUTIONS
Introduction
An Exact Analytical Solution to the Two-Layer Model
Bouguer’s Law and the Attenuation Coefficient

POPULATION DYNAMICS
Introduction
Unconstrained or Density-Independent Growth

http://www.crcpress.com/product/isbn/9780415300544

8/24/2014