

# P2P Education

Version 1.50

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## 1. Overview of the P2P-Education Software

P2P-Education is an interactive teaching-learning system. Both web- and Windows-based versions of P2P-Education have been developed. The software introduces the P2P modeling system and integrates computer-guided hydrologic learning processes in a user-friendly interface. P2P-Education is specially designed for three major user levels: elementary level (Level 1: K-12 and outreach education), medium level (Level 2: undergraduate education), and advanced level (Level 3: graduate education). Depending on the levels, users are guided to different educational systems. Each system consists of a series of mini “libraries” featured with movies, pictures, and documentation related to fundamental hydrologic theories, overland flow experiments, and demonstrations of the P2P software, including P2P modeling and a series of hydrotopographic analysis tools. The three-level structure of the P2P-Education software is schematically shown in Fig. 1.

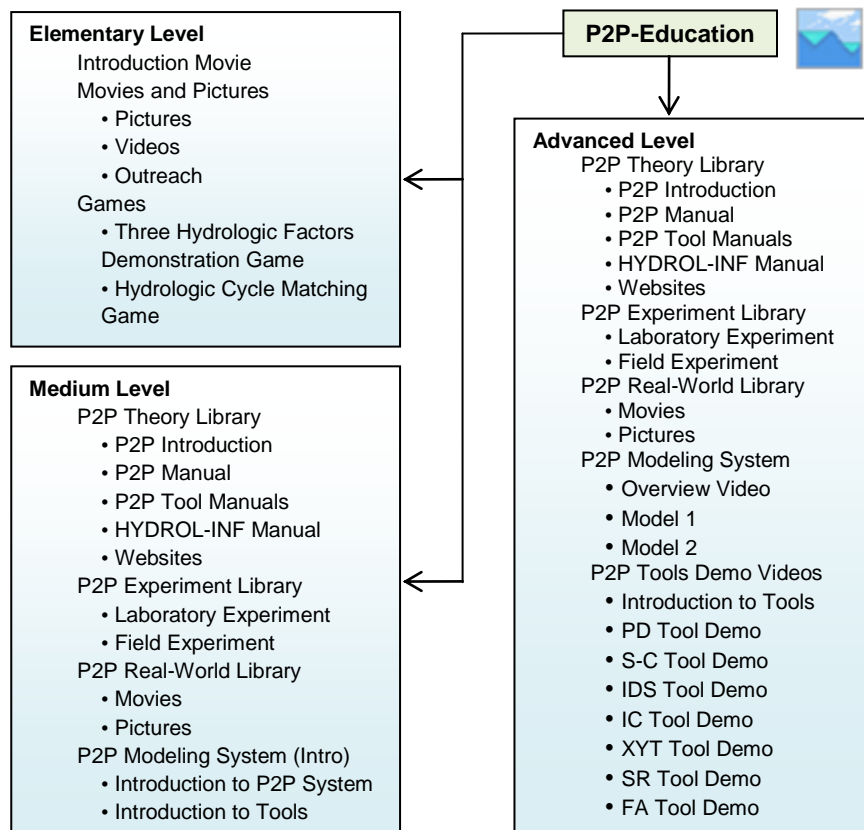


Fig. 1 Three-level structure of the P2P-Education software

## 2. Main Interface of the P2P-Education Software

The main interface of the P2P-Education system (Fig. 2) consists of six buttons, which are organized into two groups: selection of user levels (elementary, medium, and advanced levels) and general information on the P2P-Education software, such as introduction, overview video of this educational software, as well as the software version and contact information.

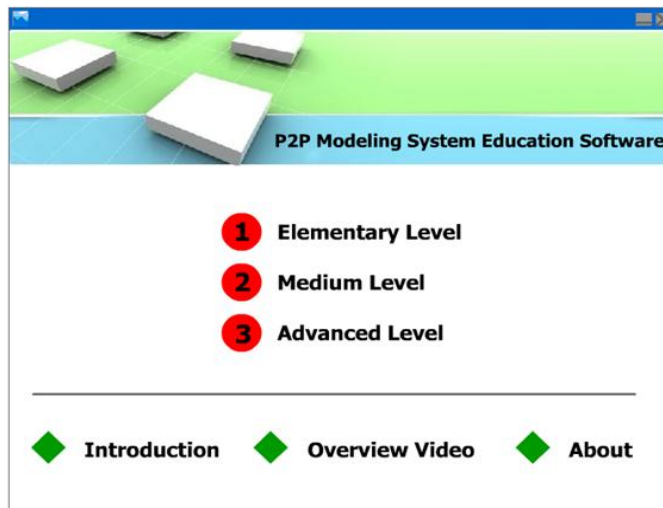


Fig. 2 P2P-Education software – Main interface

## 3. Advanced Level (Level 3)

Level 3, designed for advanced users (graduate students), provides educational details regarding the P2P overland flow theory, experiments, and modeling. The materials at this level are organized into five mini-libraries: P2P Theory Library, P2P Experiment Library, P2P Real-world Library, P2P Modeling System, and P2P Tools Demonstration Videos (Fig. 3).

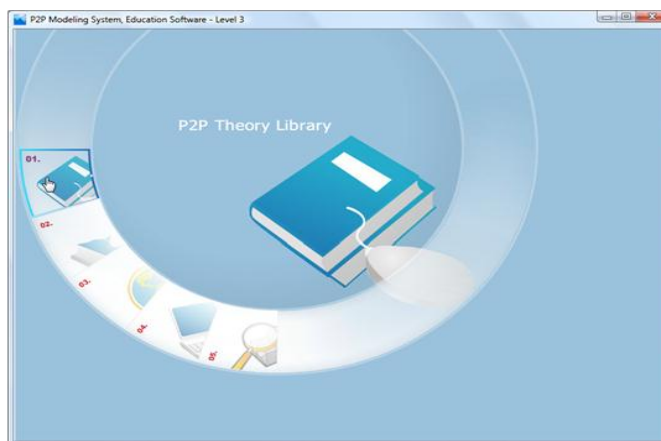


Fig. 3 P2P-Education software – Level 3 home window

## P2P Theory Library

This library contains P2P Introduction, P2P Manual, P2P Tool Manuals, HYDROL-INF Manual, and the link to the P2P website (Fig. 4). The P2P user's manual details the P2P modeling system and use of the software. The P2P tool manuals consist of puddle delineation technical and user's manuals (PD), scanned data combination tool manual (S-C), image-based depression storage computation tool manual (IDS), image correction tool manual (IC), coordinate transformation tool manual (XYT), surface slope removal tool manual (SR), and fractal analysis manual (FA). The HYDROL-INF manual provides details on the HYDROL-INF modeling system.

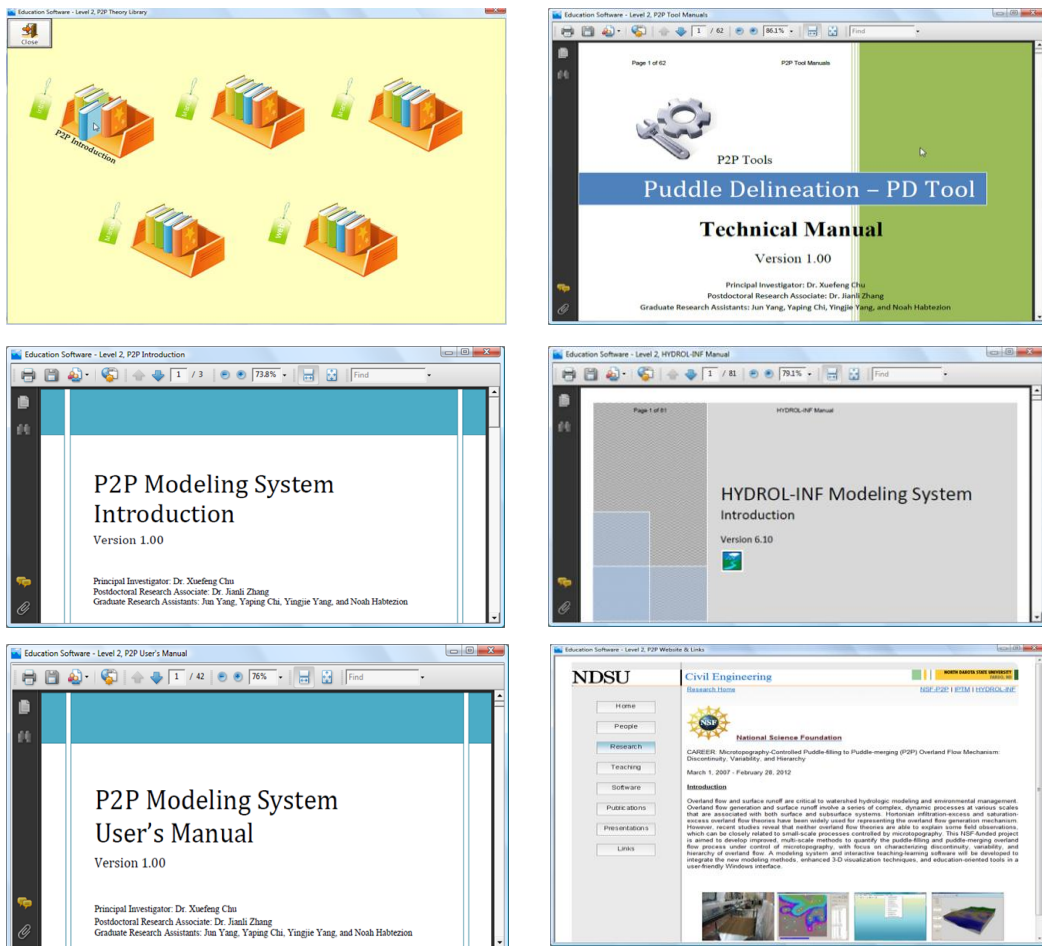


Fig. 4 Level 3 - P2P theory library

### *P2P Experiment Library*

This library has two major categories (Fig. 5), which are used to display different movies and pictures. The first one consists of laboratory experiment movies and pictures, while the second one contains field experiment movies and pictures. The pictures and movies show the equipment utilized for lab/field experiments, setup of lab/field experiments, and the P2P overlaid flow process in the laboratory and field conditions.

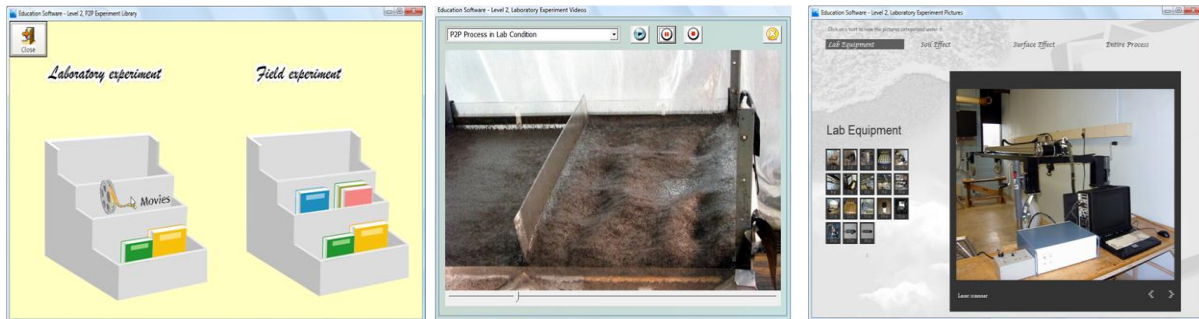


Fig. 5 Level 3 - P2P experiment library

### *P2P Real-World Library*

Some pictures and movies have been selected to show the dynamic P2P overlaid flow process in various real-world settings (Fig. 6). Users can access those pictures and movies from this library.

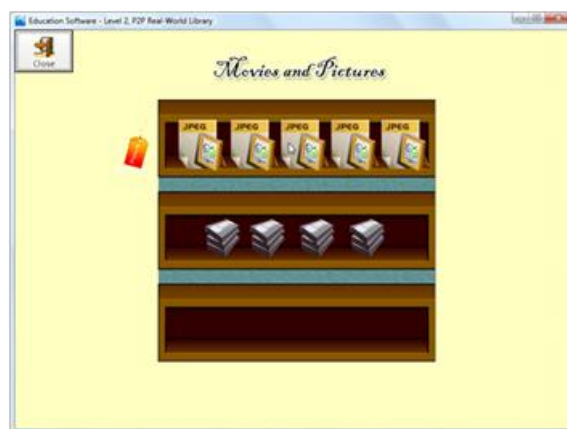


Fig. 6 Level 3 - P2P real world library

## P2P Modeling System

Three demonstration videos, including Overview Video, Model 1, and Model 2 (Fig. 7) provide detailed information on the P2P modeling system. The intention of the first overview demo video is to familiarize users with the P2P Modeling System graphical user interface. It goes through all menus and functions of the software. The demo video of Model 1 shows how to use P2P Model-1 through the wizard. The third Model 2 video displays all steps to manually run P2P Model-2.

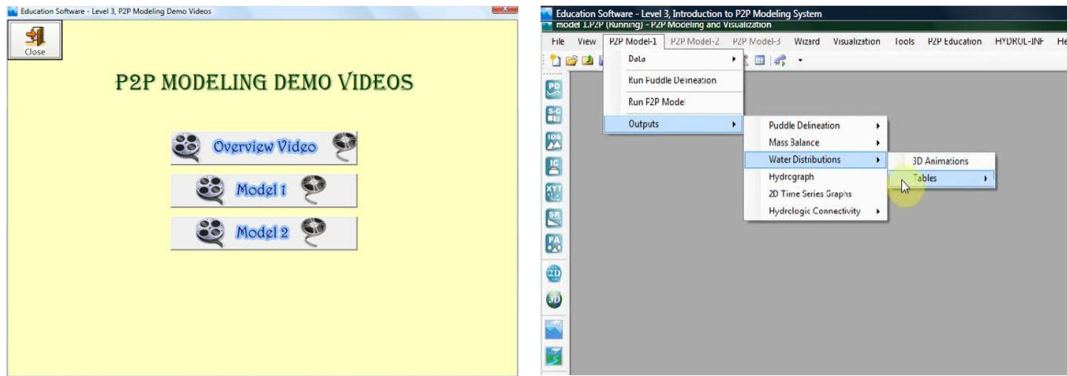


Fig. 7 Level 3 - P2P model system

## P2P Tools Demo Videos

From this library, users can access an introduction video of the P2P tools and demo videos for the seven individual P2P tools: PD Tool, S-C Tool, IDS Tool, IC Tool, XYT Tool, SR Tool, and FA Tool (Fig. 8).

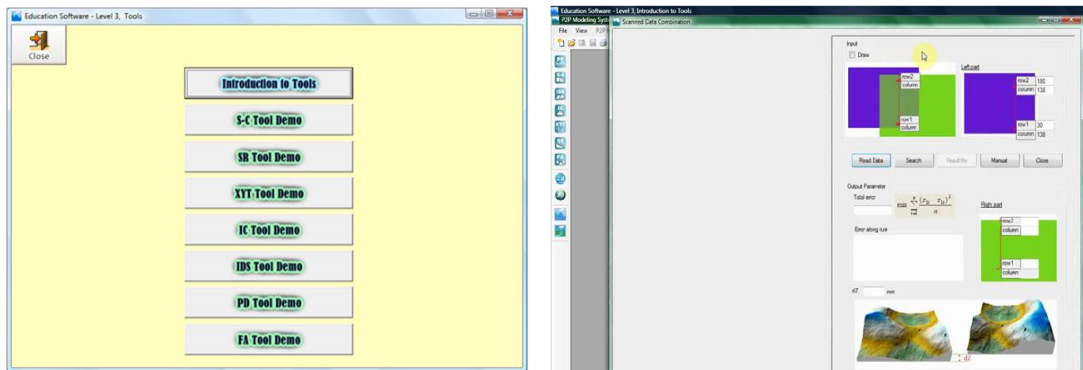


Fig. 8 Level 3 - P2P tools demo videos

#### 4. Medium Level (Level 2)

This level intends to provide educational information regarding the P2P overland flow process for undergraduate students. Similar to Level 3, the materials (documentation, pictures, and movies) are organized in four mini-libraries: P2P Theory Library, P2P Experiment Library, Real-World Library, and Introduction to the P2P Modeling System (Fig. 9). Two introductory demo videos are: introduction to the P2P system and introduction to the P2P tools.

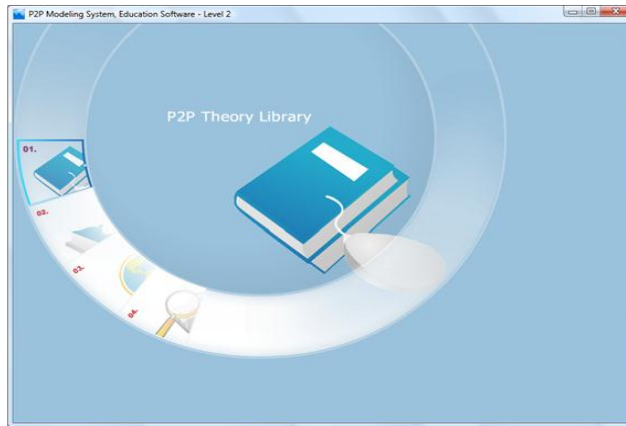


Fig. 9 P2P-Education Software – Level 2 home window

#### 5. Elementary Level (Level 1)

This level is intended to provide educational information regarding basic hydrology and the P2P overland flow process for K-12 students and outreach education. The information is presented in a simple way so that the students can easily understand. From the Windows interface (Fig. 10), users can access Introduction Movie, Movies and Pictures, and Games.



Fig. 10 P2P-Education Software – Level 1 home window



### *Introduction Movie*

This animation video (created by NASA) vividly shows the hydrologic cycle, involving major hydrologic processes and terms (Fig. 11).



Fig. 11 Level 1 – Introduction movie

### *Movies and Pictures*

The Windows interface (Fig. 12) has three categories, which are used to display various pictures and movies related to overland flow generation, the P2P filling-merging-spilling process. The outreach component contains a series of photos, showing the relevant K12 educational activities in the P2P laboratory.

### *Games*

Two games are included in this educational software specially designed for K12 students (Fig. 13). The first game demonstrates how three fundamental factors (surface microtopography, soil type, and rainfall intensity) affect overland flow generation, infiltration, and surface runoff. Based on the P2P modeling for a set of scenarios (combination of the three control factors), their effects can be visualized and compared. The second game involves learning the terms related to the hydrologic cycle.

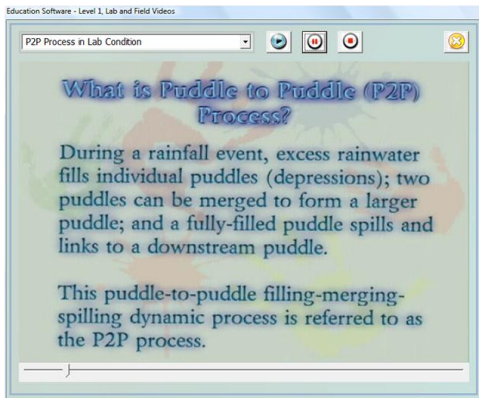


Fig. 12 Level 1 – Movies and pictures

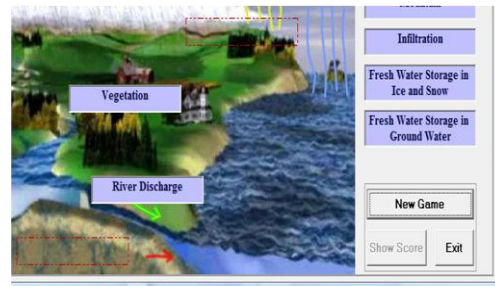
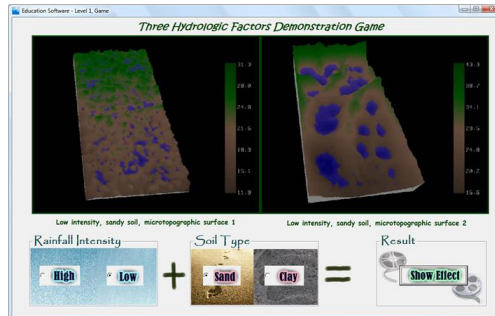


Fig. 13 Level 1 – Games