# PRZM3

**Model Uses** PRZM3 is a group of models that predicts pesticide transport and transformation through the crop root and unsaturated zones of the soil.

**Major Categories** Hydrology and Water Use

**Minor Categories** Surface Water

**Model Type** Physical Model

**Subject Knowledge Level**
Intermediate

**Technical Difficulty Level**
Intermediate

**Geographic in Nature?**
No

**Abstract**
PRZM3 is the most recent version of a modeling system that links two subordinate models--PRZM and VADOFT--in order to predict pesticide transport and transformation down through the crop root and unsaturated zone.

PRZM is a one-dimensional, finite-difference model that accounts for pesticide and nitrogen fate in the crop root zone. PRZM-3 includes modeling capabilities for such phenomena as soil temperature simulation, volatilization and vapor phase transport in soils, irrigation simulation, microbial transformation, and a method of characteristics (MOC) algorithm to eliminate numerical dispersion. PRZM is capable of simulating transport and transformation of the parent compound and as many as two daughter species. VADOFT is a one-dimensional, finite-element code that solves the Richard's equation for flow in the unsaturated zone. The user may make use of constitutive relationships between pressure, water content, and hydraulic conductivity to solve the flow equations. VADOFT may also simulate the fate of two parent and two daughter products. The PRZM and VADOFT codes are linked together with the aid of a flexible execution supervisor that allows the user to build loading models that are tailored to site-specific situations. In order to perform probability-based exposure assessments, the code is also equipped with a Monte Carlo pre- and post-processor.

The PRZM3 model system with documentation is available for microcomputer (DOS) systems. Enhancements to Release 3.0 include updates to physiochemical processes, increased flexibility in representing agronomic practices, and improved post-processing and data interpretation aids. A major modification includes algorithms that enable modeling of nitrogen cycle soil kinetic processes with the ability to track nitrogen discharges from a septic tank into the soil environment and movement to groundwater.

**Future Developments**
Unknown

**Model Limitations**
Requires high level of knowledge of hydrogeology and numerical modeling concepts.

**Model Features**

- Includes modeling capabilities for simulating soil temperature and volatilization and vapor-phase transport in soils
- Irrigation simulations
- Microbial transport simulations
- Method of characteristics algorithm for eliminating numerical dispersion
- Monte-Carlo pre and post data processor
- Algorithms to model nitrogen cycle – soil kinetics

**Required Data Types**
At least data characteristics representing pressure, water content and hydraulic conductivity.

**Model Outputs**
Unknown

**Hardware Requirements**
Standard DOS requirements

**Supported Platforms**

| | | | |
|---|---|---|---|
| **DOS** | ☒ | **UNIX** | ☐ |

**Windows** ☐ **Macintosh** ☐

**Software Requirements**
None noted.

**Cost, Licensing and Availability**
DAFLOW is provided free of charge from the link below.

**Source**
US Environmental Protection Agency

**Source URL**
http://www.epa.gov/ceampubl/gwater/przm3/