

## PRMS

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|-------------------------|---|---|
| <b>Model Uses</b>       | PRMS is a distributed-parameter modeling system used for evaluating the impacts of precipitation, climate and land use on stream flow, sedimentation and general hydrology. |   |
| <b>Major Categories</b> | Hydrology and Water Use; Climate  | <u>Subject Knowledge Level</u><br>Intermediate    |
| <b>Minor Categories</b> | Precipitation; Runoff   | <u>Technical Difficulty Level</u><br>Intermediate |
| <b>Model Type</b>       | Physical Model  | <u>Geographic in Nature?</u><br>No                |

### **Abstract**

PRMS is a modular-design, deterministic, distributed-parameter modeling system developed to evaluate the impacts of various combinations of precipitation, climate, and land use on streamflow, sediment yields, and general basin hydrology. Basin response to normal and extreme rainfall and snowmelt can be simulated to evaluate changes in water-balance relationships, flow regimes, flood peaks and volumes, soil-water relationships, sediment yields, and ground-water recharge. Parameter-optimization and sensitivity analysis capabilities are provided to fit selected model parameters and evaluate their individual and joint effects on model output. The modular design provides a flexible framework for continued model-system enhancement and hydrologic-modeling research and development.

### **Future Developments**

Unknown

### **Model Limitations**

Unknown

### **Model Features**

- Deterministic, distributed-parameter model
- Assess response to extreme rainfall or snowmelt including water balance, flow regimes, flood peaks, soil-water relationships, sediment yield and ground-water recharge

### **Required Data Types**

For daily stream flow computations, a minimum of daily precipitation and daily maximum and minimum air temperature are required.

For snowmelt computations, daily short-wave solar radiation data are recommended. For areas without snowmelt, daily pan evaporation data can be substituted for temperature data.

For storm hydrograph and sediment computations, short time-interval precipitation, streamflow, and sediment data are needed. Physical descriptive data on the topography, soils, and vegetation are input for each watershed subunit. The spatial and temporal variation of precipitation, temperature and solar radiation are also needed.

The input time-series data are read from a WDM file.

### **Model Outputs**

The observed (if available) and predicted mean daily discharge for the basin is output in tabular form. Annual and monthly summaries of precipitation, interception, potential and actual evapotranspiration, and inflows and outflows of the ground water and subsurface reservoirs are available. The time series available at a monthly time step may also be output at a daily time step along with the available soil moisture, percent snow cover, pack water equivalent, and snowmelt. Most of the computed daily time series can also be written to the WDM file. This information is also available for the individual HRU's. A summary table of observed and predicted peak flows and runoff volumes for each storm period is output in tabular form. The inflow and outflow for user selected overland flow plans and channel segments can be output in tabular form, as "printer" plots, or to the WDM file.

**Hardware Requirements**

None noted

|     |                                     |                     |      |                                     |
|-----|-------------------------------------|---------------------|------|-------------------------------------|
| DOS | <input checked="" type="checkbox"/> | Supported Platforms | UNIX | <input checked="" type="checkbox"/> |
|-----|-------------------------------------|---------------------|------|-------------------------------------|

**Software Requirements**

None noted

|         |                          |           |                          |
|---------|--------------------------|-----------|--------------------------|
| Windows | <input type="checkbox"/> | Macintosh | <input type="checkbox"/> |
|---------|--------------------------|-----------|--------------------------|

**Cost, Licensing and Availability**

Free - available from link below.

**Source**

US Geological Survey

**Source URL**

<http://water.usgs.gov/software/prms.html>