# DamData.txt

This file contains dam properties for **outlet lakes** that operate as reservoirs (i.e. dams) and which do not use general parameters (so the term olake below refers to those olakes that are reservoirs/dams). Properties defined here override the properties and generic parameters given in GeoData.txt and par.txt. Lake depth from GeoData.txt may also be kept by using -9999 for the value in *DamData.txt*. Dams defined in *DamData.txt* can not be included in LakeData.txt (with the exception of a LakeData.txt with only nutrient model parameters). Dam properties include physical characteristics, e.g. depth, and regulation routine parameters. In *DamData.txt*, four different dam types with different purposes may be used. These are irrigation dam, water supply dam, flood control dam and hydropower dam. Each typ has its own rules for regulation. Hydropower dams are regulated similar to the routines in LakeData.txt, but not totally.

*DamData.txt* can only be used for standard olakes (ldtype 1, see `ldtype` definition in LakeData.txt), no lakebasins are allowed.

*DamData.txt* is a tab-separated file located in the modeldir folder. Lakes are listed row-wise. The first row contains a column header with variable names. Variable names are not case-sensitive (max. 10 characters, no spaces). Columns with headings unknown to HYPE are skipped while reading the file. Columns containing character strings, e.g. descriptive meta-data, must not exceed a length of 100 characters. The columns may be in any order. A value must exist for every column and row, i.e. empty cells are not allowed, with the exception of column `lake_depth`, see first paragraph. Maximum 50 columns allowed.

Example snippet of a *DamData.txt* file structure:

```
PURPOSE SUBID LAKE_DEPTH REGVOL RATE EXP  W0REF SNOWFRAC QINFJAN QINFFEB
QINFMAR ...
4       25    16.7       189    100  1.5  104   0.27     18.8    16.3
16.5    ...
4       34    55.7       85     75   1.5  0     0.61     5.3     5.1     4.1
...
...     ...   ...        ...    ...  ...  ...   ...      ...     ...     ...
...
```

The table below describes all *DamData.txt* columns read by HYPE.

| Variable ID | Unit | Purpose | Description |
|---|---|---|---|
| `subid` | - | *all* | subbasin ID (integer), used to connect lake basins to lakes (mandatory) |
| `purpose` | - | *all* | the main purpose of the reservoir, 1= irrigation, 2=water supply, 3=flood control, 4=hydropower (mandatory) |
| `lake_depth` | *m* | *all* | water depth below threshold for outlet lake (mean depth), can also be defined in GeoData.txt (must be > 0) |
| `w0ref` | *m* | *all* | reference water level to be added to simulated water level before print out, for lake outflow threshold |
| `qprod1` | $m^3/s$ | *1/2/4* | parameter for regulated olake, constant production flow down to lowest allowed waterstage for regulation period 1 |

| Variable ID | Unit | Purpose | Description |
|---|---|---|---|
| qprod2 | $m^3/s$ | *1/2/4* | parameter for regulated olake, constant production flow down to lowest allowed waterstage for regulation period 2 |
| datum1 | - | *1/2/4* | parameter for regulated olake, start of regulation period 1 (if not defined only one period is used) (4 character month-day string *mmdd*) |
| datum2 | - | *1/2/4* | parameter for regulated olake, start of regulation period 2 (4 character month-day string *mmdd*) |
| qamp | - | *4* | parameter for regulated olake, seasonally varying flow in regulated volume. Variation defined in form of a sinus wave with this amplitude (as fraction of current qprod: 0-1), where the minimum of the sinus wave occurs for day number qpha |
| qpha | - | *4* | parameter for regulated olake, seasonally varying flow below the threshold. Default is qpha = 102. |
| snowfrac | - | *4* | fraction of the precipitation in the dam's catchment that falls as snow (can be taken from a model run with this as output), used to give default seasonal varying production flow for high latitude dams (for snowfrac>0.35: qamp=0.71, qpha must be set) |
| rate | - | *all* | parameter for specific rating curve of unregulated lakes or for spillway flow of regulated olakes above threshold (w0ref), equation *q = rate (w - w0)^exp* |
| exp | - | *all* | parameter for specific rating curve or for spillway flow of regulated olake above threshold (w0ref), equation*q = rate (w - w0)^exp* |
| regvol | $10^6$ $m^3$ | *all* | regulation volume for general regulation routine. Determines lowest water stage for production flow. (must be less than lake depth * lake area) (suggest 85% of dam volume if data can't be found) |
| wamp | *m* | *all* | regulation amplitude. Usually larger than water depth given by regvol. Used for scaling computed water stage variation (below threshold) similar to variation of observations. Set to -9999 for not to use. |
| qinfjan | $m^3/s$ | *all* | mean January inflow to reservoir (can be taken from a model run without reservoirs for example) |
| qinffeb | $m^3/s$ | *all* | mean Fabruary inflow to reservoir (can be taken from a model run without reservoirs for example) |
| qinfmar | $m^3/s$ | *all* | mean March inflow to reservoir (can be taken from a model run without reservoirs for example) |
| qinfapr | $m^3/s$ | *all* | mean April inflow to reservoir (can be taken from a model run without reservoirs for example) |
| qinfmay | $m^3/s$ | *all* | mean May inflow to reservoir (can be taken from a model run without reservoirs for example) |
| qinfjun | $m^3/s$ | *all* | mean June inflow to reservoir (can be taken from a model run without reservoirs for example) |
| qinfjul | $m^3/s$ | *all* | mean July inflow to reservoir (can be taken from a model run without reservoirs for example) |
| qinfaug | $m^3/s$ | *all* | mean August inflow to reservoir (can be taken from a model run without reservoirs for example) |
| qinfsep | $m^3/s$ | *all* | mean September inflow to reservoir (can be taken from a model run without reservoirs for example) |
| qinfoct | $m^3/s$ | *all* | mean October inflow to reservoir (can be taken from a model run without reservoirs for example) |
| qinfnov | $m^3/s$ | *all* | mean November inflow to reservoir (can be taken from a model run without reservoirs for example) |

| Variable ID | Unit | Purpose | Description |
|---|---|---|---|
| qinfdec | $m^3/s$ | *all* | mean December inflow to reservoir (can be taken from a model run without reservoirs for example) |