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. 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 olake (ldtype=1 as defined for LakeData.txt), no lakebasins are allowed.

DamData.txt is a tab-separated file located in the modeldir folder. Lakes and lake basins 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, but must not longer than ten characters. Columns containing character strings, e.g. descriptive meta-data, must not exceed a length of 50 characters. The columns may be in any order. A value must exist for every column and row, i.e. empty cells are not allowed. Maximum 50 columns allowed.

Example snippet of a DamData.txt file structure, showing an unregulated single basin lake, and a regulated lake with two lake basins:

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```
LAKEDATAID LAKEID LDTYPE LAKE_DEPTH  AREA W0REF QPROD1 DATUM1 REGVOL REGAMP
RATE EXP ...
         1      0      1         3.6  5000  7.67      0      0      0      0
40   2 ...
         0      1      2         7.2 34000 21.94   13.5    401    200    0.4
155 0.3 ...
         2      1      3         6.9  4000     0      0      0      0      0
0   0 ...
         3      1      4           5 30000     0      0      0      0      0
0   0 ...
       ...    ...    ...         ...   ...   ...    ...    ...    ...    ...
... ... ...
```

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

Variable ID	Unit	Type	LdType	Description
lakedataid	-	*general*	1/3/4	lake/lake basin ID (integer), used to connect lakes/lake basins to subbasins in GeoData.txt (mandatory)
lakeid	-	*general*	2/3/4	lake ID (integer), used to connect lake basins to multi-basin lakes. Unique integer, 0 for simple outlet lakes (ldtype = 1)

Variable ID	Unit	Type	LdType	Description
ldtype	-	*general*	*all*	code for lake data type (*LdType*), integer betwen 1 and 4 (mandatory): **1** - simple outlet lake **2** - multi-basin lake, i.e. covering several HYPE sub-basins, generic lake/outflow properties **3** - upstream lake basin of a multi-basin lake **4** - last/outlet lake basin of a multi-basin lake
lake_depth	*m*	*physical property*	*all*	water depth below threshold for outlet lake (mean depth), can also be defined in GeoData.txt (must be > 0)
area	*m²*	*physical property*	*all*	lake or lake basin area, used for multi-basin lakes and to check which fraction of the sub-basin is covered by the outlet lake for simple outlet lakes (compared with SLC class fraction in GeoData.txt), mandatory for `ldtype = 2`
w0ref	*m*	*general*	*1/3/4*	reference water level to be added to simulated water level before print out, for lake outflow threshold
deltaw0	*m*	*regulation*	*1/3/4*	difference in lake threshold for regulation with two rating curves (m). Determines the lake threshold for regulation period 2 (w0=w0ref + deltaw0), see qprod1 and qprod2
qprod1	*m³/s*	*regulation*	*1/3/4*	parameter for regulated olake, constant production flow down to lowest allowed waterstage for regulation period 1
qprod2	*m³/s*	*regulation*	*1/3/4*	parameter for regulated olake, constant production flow down to lowest allowed waterstage for regulation period 2
datum1	-	*regulation*	*1/3/4*	parameter for regulated olake, start of regulation period 1 (if not defined only one period is used) (4 character month-day string *mmdd*)
datum2	-	*regulation*	*1/3/4*	parameter for regulated olake, start of regulation period 2 (4 character month-day string *mmdd*)
qamp	-	*regulation*	*1/3/4*	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), where the minimum of the sinus wave occurs for day number qpha
qpha	-	*regulation*	*1/3/4*	parameter for regulated olake, seasonally varying flow below the threshold. day number for the minimum of the sinus wave. Default is qpha = 102.
rate	*m²/time step*	*regulation*	*1/3/4*	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	-	*regulation*	*1/3/4*	parameter for specific rating curve or for spillway flow of regulated olake above threshold (w0ref), equation $q = rate\ (w - w0)^{exp}$
regvol	*10⁶ m³*	*regulation*	*1/3/4*	regulation volume for general regulation routine. Determines lowest water stage for production flow. (must be less than lake depth * lake area)
prodpp	*m/d*	*nutrient cycling*	*1/2*	parameter for internal load of Part-P

Variable ID	Unit	Type	LdType	Description
prodsp	*m/d*	*nutrient cycling*	*1/2*	parameter for internal load of SRP (m/d)
Qmean	*mm/y*	*physical property*	*1/2*	initial value for calculation of mean flow, can also be defined in [par.txt](par.txt)
tpmean	*mg/l*	*nutrient cycling*	*1/2*	mean concentration of total P, used for production if P is not simulated. Also used as initial value of particulate P concentration in lakes. Can also be defined in [par.txt](par.txt)
tnmean	*mg/l*	*nutrient cycling*	*1/2*	mean concentration of total N (mg/l), used as initial value N concentration in lakes. Can also be defined in [par.txt](par.txt)
tocmean	*mg/l*	*nutrient cycling*	*1/2*	mean concentration of TOC (mg/l), used as initial value of TOC concentration in lakes. Can also be defined in [par.txt](par.txt)
limqprod	-	*regulation*	*1/2*	parameter for water level below which there is reduced production flow from a dam (fraction of regulating volume), the flow reduction is linear to wmin. Can also be defined in [par.txt](par.txt)
sedon	*m/d*	*nutrient cycling*	*1/2*	sedimentation rate for ON in lakes. Can also be defined in [par.txt](par.txt)
sedpp	*m/d*	*nutrient cycling*	*1/2*	sedimentation rate for PP in lakes. Can also be defined in [par.txt](par.txt)
sedoc	*m/d*	*nutrient cycling*	*1/2*	sedimentation rate for OC in lakes. Can also be defined in [par.txt](par.txt)
wprodn	*kg/(m^3 d)*	*nutrient cycling*	*1/2*	production/degradation in water for N. Can also be defined in [par.txt](par.txt)
wprodp	*kg/(m^3 d)*	*nutrient cycling*	*1/2*	production/degradation in water for P. Can also be defined in [par.txt](par.txt)
wprodc	*kg/(m^3 d)*	*nutrient cycling*	*1/2*	production/degradation in water for C. Can also be defined in par.txt.
denitwl	*kg/(m^2 d)*	*nutrient cycling*	*1/2*	parameter for denitrification in lakes. Can also be defined in [par.txt](par.txt)
deeplake	-	*physical property*	*1/2*	fraction of the lake's initial volume which is considered as slow (SLP), between 0 and 1. 0 means that the lake is not divided into a slow and a fast part. Can also be defined in [par.txt](par.txt)
fastlake	-	*physical property*	*1/2*	fraction of lake outflow that comes from the fast lake part (FLP), between 0 and 1. Can also be defined in [par.txt](par.txt)