Xobs.txt

The file is used for introducing time series of several different variables into the model. The time series can be observations used for evaluation of the model, e.g. `rswe` snow water equivalent. A few of the time series can be used as forcing data, i.e. concentrations of precipitation and observed potential evaporation (`repo`).

The file is located in the `modeldir` folder. File should include a continuous time period of values for each time step, which doesn't need to cover the whole simulation time period. Missing values should be given as -9999.

The first row is a comment row which is skipped when reading the file. The second row gives the variable names. For the first column, the date column, the name "date" can be used (no name may not be omitted). The third row gives which subbasin (`subid` in GeoData.txt) the column's data is given for. The date column may in this case belong to subbasin 0 (may not be omitted). The first column is date in format yyyy-mm-dd [HH:MM]. If set in info.txt that matlab-format should be read (`readformat 1`) the date format is yyyymmdd[HHMM]. Second to last columns are data columns.

Example snippet of *Xobs.txt* file:

```
Comment, this file hold observed snow water equivalent
date          rswe  rswe
0             1234  1245
1990-01-01    0     0
1990-01-02    1     5.5
...
```

Observation variables that can be given in *Xobs.txt* are tabled below. They are a selection of the HYPE variables. Column **#** refers to the same column in HYPE variable table.

Column **Agg.** indicates the type of aggregation of the variables. The type determines how the variable is treated when asked for as an output variable or in a criterion calculation. The `meanperiod` of the output/criterion determines the period over which the variables values will be aggregated. They will be averaged, weight-averaged or summed according to the type of aggregation. The weight-averaged variables are weighted with the flow/water volume that they are associated to. For the concentration of precipitation that is `pobs` and for the flow concentrations `rout`. Similarly variable values in *Xobs.txt* represent either averages, weighted averages, or sums over the timestep.

#	Variable ID	Unit	Description	Agg.	Reference area	Component
5	`rswe`	*mm*	observed snow water equivalent, provided in Xobs.txt	Avg.	subbasin land area	Snow
6	`rsnw`	*cm*	observed snow depth, provided in Xobs.txt	Avg.	subbasin land area	Snow
27	`resf`	*cm*	observed frost depth, provided in Xobs.txt	Avg.	subbasin land area	missing
28	`regw`	*m*	observed groundwater level, provided in Xobs.txt	Avg.	subbasin land area	missing
39	`rfsc`	-	recorded fractional snow cover area, provided in Xobs.txt	Avg.	subbasin land area	missing

#	Variable ID	Unit	Description	Agg.	Reference area	Component
41	rfse	-	recorded fractional snow cover area error, provided in Xobs.txt	Avg.	subbasin land area	missing
42	rfsm	-	recorded fractional snow cover multi, provided in Xobs.txt	Avg.	subbasin land area	missing
43	rfme	-	recorded fractional snow cover multi error, provided in Xobs.txt	Avg.	subbasin land area	missing
46	wstr	*m*	observed water level olake, provided in Xobs.txt	Avg.	outlet lake area	missing
57	rinf	m^3/s	observed flow to outlet lake (including P-E of the lake), provided in Xobs.txt	Avg.	subbasin upstream area	missing
72	roli	*cm*	recorded olake ice depth, provided in Xobs.txt	Avg.	outlet lake area	missing
73	rili	*cm*	recorded ilake ice depth, provided in Xobs.txt	Avg.	internal lake area	missing
74	rolb	*cm*	recorded olake blackice depth, provided in Xobs.txt	Avg.	outlet lake area	missing
75	rilb	*cm*	recorded ilake blackice depth, provided in Xobs.txt	Avg.	internal lake area	missing
76	rols	*cm*	recorded olake snow depth, provided in Xobs.txt	Avg.	outlet lake area	missing
77	rils	*cm*	recorded ilake snow depth, provided in Xobs.txt	Avg.	internal lake area	missing
84	rmri	*cm*	recorded main river ice depth, provided in Xobs.txt	Avg.	main river area	missing
85	rlri	*cm*	recorded local river ice depth, provided in Xobs.txt	Avg.	local river area	missing
86	rmrb	*cm*	recorded main river blackice depth, provided in Xobs.txt	Avg.	main river area	missing
87	rlrb	*cm*	recorded local river blackice depth, provided in Xobs.txt	Avg.	local river area	missing
88	rmrs	*cm*	recorded main river snow depth, provided in Xobs.txt	Avg.	main river area	missing
89	rlrs	*cm*	recorded local river snow depth, provided in Xobs.txt	Avg.	local river area	missing
100	rolt	*°C*	recorded olake surface temperature, provided in Xobs.txt	Avg.	outlet lake area	missing
101	rilt	*°C*	recorded ilake surface temperature, provided in Xobs.txt	Avg.	internal lake area	missing
102	rmrt	*°C*	recorded main river surface temperature, provided in Xobs.txt	Avg.	main river area	missing
117	rgmb	*mm*	recorded glacier mass balance, provided in Xobs.txt	Avg.	specific glacier area	missing
119	rgma	km^2	area used in recorded mass balance, provided in Xobs.txt	Avg.	specific glacier area	missing
120	rgmp	*days*	recorded mass balance period, provided in Xobs.txt	Avg.	none	missing

#	Variable ID	Unit	Description	Agg.	Reference area	Component
121	S105	-	recorded (FSUHSS) snow cover surrounding terrain open (fraction from 0 to 10), provided in Xobs.txt	Avg.	area of non-forest land cover	missing
122	S106	-	recorded (FSUHSS) snow cover course open (fraction from 0 to 10), provided in Xobs.txt	Avg.	area of non-forest land cover	missing
123	S108	*cm*	recorded (FSUHSS) mean depth open, provided in Xobs.txt	Avg.	area of non-forest land cover	missing
124	S111	g/cm^3	recorded (FSUHSS) mean density open, provided in Xobs.txt	Avg.	area of non-forest land cover	missing
125	S114	*mm*	recorded (FSUHSS) snow water equivalent open, provided in Xobs.txt	Avg.	area of forest land cover	missing
126	S205	-	recorded (FSUHSS)snow cover surrounding terrain forest (fraction from 0 to 10), provided in Xobs.txt	Avg.	area of forest land cover	missing
127	S206	-	recorded (FSUHSS) snow cover course forest (fraction from 0 to 10), provided in Xobs.txt	Avg.	area of forest land cover	missing
128	S208	*cm*	recorded (FSUHSS) mean depth forest, provided in Xobs.txt	Avg.	area of forest land cover	missing
129	S211	g/cm^3	recorded (FSUHSS) mean density forest, provided in Xobs.txt	Avg.	area of forest land cover	missing
130	S214	*mm*	recorded (FSUHSS) snow water equivalent forest, provided in Xobs.txt	Avg.	area of forest land cover	missing
142	reT1	*µU/L*	observed concentration of tracer T1 in outflow from olake/subbasin, unit dependent on substance simulated, values provided in Xobs.txt	W. Avg.	subbasin upstream area	tracer T1
143	reT2	*°C*	observed water temperature in outflow from olake/subbasin, provided in Xobs.txt (average based on recorded flow if present)	W. Avg.	subbasin upstream area	missing
144	reIN, reON, reSP, rePP, reTN, reTP	*µg/L*	observed concentration of N and P species in outflow from olake/subbasin, provided in Xobs.txt (average based on recorded flow if present)	W. Avg.	subbasin upstream area	missing
145	cpT1	*µU/L*	observed concentration of tracer T1 in precipitation, unit user-provided, values provided in Xobs.txt	W. Avg.	subbasin area	tracer T1
156	reOC	*mg/L*	observed OC concentration in outflow from olake/subbasin, provided in Xobs.txt	W. Avg.	subbasin upstream area	missing

#	Variable ID	Unit	Description	Agg.	Reference area	Component
165	repo	*mm/[period]*	observed potential evapotranspiration, provided in Xobs.txt	Sum	subbasin area	missing
166	eobs	*mm/[period]*	observed evapotranspiration, provided in Xobs.txt	Sum	subbasin area	missing
171	rrun	*mm/[period]*	observed local runoff from land area, provided in Xobs.txt	Sum	subbasin land area	missing
194	cpIN	*µg/L*	observed concentration of inorganic nitrogen in precipitation, provided in Xobs.txt	W. Avg.	subbasin area	missing
195	cpSP	*µg/L*	observed concentration of soluble phosphorus in precipitation, provided in Xobs.txt	W. Avg.	subbasin area	missing
248	roum	m^3/s	observed outflow from olake outlet 1	Avg.	subbasin upstream area	missing
249	roub	m^3/s	observed outflow from olake outlet 2	Avg.	subbasin upstream area	missing
270	xom0..9	*depends on variable type*	observations of not predefined variable (to be averaged over output time interval) provided in Xobs.txt or XobsXOMn.txt	Avg.	depends on variable type	missing
271	xos0..9	*depends on variable type*	observations of not predefined variable (to be summed over output time interval) provided in Xobs.txt or XobsXOSn.txt	Sum	depends on variable type	missing