

# HYPE variables

Variable IDs given in the table below are used in [info.txt](#) files to specify variables which are written in any of the possible output files, e.g.:

```
!! basinfile output of measured and simulated discharge
basinoutput variable rout cout
```

They appear accordingly in output file headers.

The variable IDs are also used in HYPE's observation data files, [Xobs.txt](#). For a complete list of input files, [see here](#). Input data from the files [Pobs.txt](#), [Tobs.txt](#) and [Qobs.txt](#) has also variable IDs to be used in output and performance criteria determination.

As a general rule, observation variable IDs begin with an 'r' for *recorded*, and corresponding simulated variables with a 'c' for *computed*, Cf. rout and cout, the IDs for measured and simulated discharge. There are exceptions to the rule, though.

All variables in the table relates to a subbasin, either to the local subbasin or a part of it, or to the upstream area (e.g. outflow of a subbasin, cout). Additional output variables can be created for output regions or upstream areas by extending the name of the variable with 'rg' in the beginning (e.g. rgsnow) for regional values or with 'up' for upstream average value (e.g. upsnow). This method does not work on all variables, partly because the result would be nonsense (e.g. upcout or rgwcom) and partly because they are not yet defined for that area (i.e. variables referring to the area of soil layer 2 or 3 or water surface areas are not handled).

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. Similarly single time step values represent either averages, weighted averages, or sums over the timestep.

Column **Component** links result variables to model components in [HYPE model description](#).

The general unit (U) is used in tables of parameters and input data where the unit is not defined.

#	Variable ID	Unit	Description	Agg.	Reference area	Component
1	temp	°C	air temperature, provided in <a href="#">Tobs.txt/Tobs_nnn.txt</a>	Avg.	subbasin area	<a href="#">Temp. &amp; Precip.</a>
2	ctmp	°C	corrected air temperature	Avg.	subbasin area	<a href="#">Temp. &amp; Precip.</a>
3	snow	mm	snow water equivalent	Avg.	subbasin land area	<a href="#">Snow</a>
4	sdep	cm	snow depth	Avg.	subbasin land area	<a href="#">Snow</a>
5	rswe	mm	observed snow water equivalent, provided in <a href="#">Xobs.txt</a>	Avg.	subbasin land area	<a href="#">Snow</a>
6	rsnw	cm	observed snow depth, provided in <a href="#">Xobs.txt</a>	Avg.	subbasin land area	<a href="#">Snow</a>

#	Variable ID	Unit	Description	Agg.	Reference area	Component
7	soim	mm	computed soil moisture (including standing water)	Avg.	subbasin land area	Soil
8	som2	mm	soil water of upper two soil layers (including standing water)	Avg.	subbasin land area	Soil
9	sml1	mm	soil moisture upper soil layer (not including standing water)	Avg.	area of soil layer	Soil
10	sml2	mm	soil moisture second soil layer	Avg.	area of soil layer	Soil
11	sml3	mm	soil moisture third soil layer	Avg.	area of soil layer	Soil
12	smrz	mm	soil moisture root zone (upper two soil layers) (not including standing water)	Avg.	subbasin land area	Soil
13	sm13	mm	soil moisture all soil layers (not including standing water)	Avg.	subbasin land area	Soil
14	stsw	mm	standing soil water	Avg.	subbasin land area	Soil
15	srff	-	soil moisture root zone (upper two soil layers) (not including standing water) as fraction of wcf c volume	Avg.	subbasin land area	Soil
16	smfd	-	soil moisture (not including standing water) as fraction of soil depth	Avg.	subbasin land area	Soil
17	srfd	-	soil moisture root zone (upper two soil layers) (not including standing water) as fraction of root depth	Avg.	subbasin land area	Soil
18	smfp	-	soil moisture (not including standing water) as fraction of pore volume	Avg.	subbasin land area	Soil
19	srfp	-	soil moisture root zone (upper two soil layers) (not including standing water) as fraction of pore volume	Avg.	subbasin land area	Soil
20	smdf	mm	soil moisture deficit to field capacity of upper two soil layers	Avg.	subbasin land area	Soil
21	gwat	m	groundwater level	Avg.	subbasin land area	Soil
22	sfst	cm	frost depth	Avg.	subbasin land area	Soil
23	stmp	°C	soil temperature	Avg.	subbasin land area	Soil Temp.
24	stm1	°C	upper soil layer temperature	Avg.	area of soil layer	Soil Temp.
25	stm2	°C	middle soil layer temperature	Avg.	area of soil layer	Soil Temp.

#	Variable ID	Unit	Description	Agg.	Reference area	Component
26	stm3	°C	lowest soil layer temperature	Avg.	area of soil layer	Soil Temp.
27	resf	cm	observed frost depth, provided in <a href="#">Xobs.txt</a>	Avg.	subbasin land area	missing
28	regw	m	observed groundwater level, provided in <a href="#">Xobs.txt</a>	Avg.	subbasin land area	missing
29	pfN1, pfN2, pfN3	kg/km <sup>2</sup>	pools of fastN in soil layers 1 to 3	Avg.	area of soil layer	missing
30	phN1, phN2, phN3	kg/km <sup>2</sup>	pool humusN in soil layers 1 to 3	Avg.	area of soil layer	missing
31	pIN1, pIN2, pIN3	kg/km <sup>2</sup>	pool of inorg-N in soil layers 1 to 3	Avg.	area of soil layer	missing
32	pfP1, pfP2, pfP3	kg/km <sup>2</sup>	pool of fastP in soil layers 1 to 3	Avg.	area of soil layer	missing
33	phP1, phP2, phP3	kg/km <sup>2</sup>	pool humusP in soil layers 1 to 3	Avg.	area of soil layer	missing
34	ppP1, ppP2, ppP3	kg/km <sup>2</sup>	pool of partP in soil layers 1 to 3	Avg.	area of soil layer	missing
35	pSP1, pSP2, pSP3	kg/km <sup>2</sup>	pool of SRP in soil layers 1 to 3	Avg.	area of soil layer	missing
36	phC1, phC2, phC3, pFC1, pFC2, pFC3	kg/km <sup>2</sup>	pool humusC/fastC in soil layers 1 to 3	Avg.	area of soil layer	missing
37	pON1, pON2, pON3	kg/km <sup>2</sup>	pool ON in soil layers 1 to 3	Avg.	area of soil layer	missing
38	cfsc	-	computed fractional snow cover area	Avg.	subbasin land area	missing
39	rfsc	-	recorded fractional snow cover area, provided in <a href="#">Xobs.txt</a>	Avg.	subbasin land area	missing
40	smax	mm	computed snowmax in winter	Avg.	subbasin land area	missing
41	rfse	-	recorded fractional snow cover area error, provided in <a href="#">Xobs.txt</a>	Avg.	subbasin land area	missing
42	rfsm	-	recorded fractional snow cover multi, provided in <a href="#">Xobs.txt</a> ?	Avg.	subbasin land area	missing
43	rfme	-	recorded fractional snow cover multi error, provided in <a href="#">Xobs.txt</a>	Avg.	subbasin land area	missing

#	Variable ID	Unit	Description	Agg.	Reference area	Component
44	wcom	m	water level olake (for the last lakebasin this is the whole lake water level) at end of timestep	Avg.	outlet lake area	missing
45	wcav	m	water stage olake (for the last lakebasin this is the whole lake water level) average over timestep	Avg.	outlet lake area	missing
46	wstr	m	observed water level olake, provided in <a href="#">Xobs.txt</a>	Avg.	outlet lake area	missing
47	cout	m <sup>3</sup> /s	simulated outflow from olake/subcatchment	Avg.	subbasin upstream area	missing
48	rout	m <sup>3</sup> /s	observed outflow from olake/subcatchment, provided in <a href="#">Qobs.txt</a>	Avg.	subbasin upstream area	missing
49	colv	10 <sup>6</sup> m <sup>3</sup>	computed lake volume of simple olakes and outlets of basin lakes, where upstream lake basin volumes are included (zero for basin lakes which are not lake outlets, use clbv for volumes of those)	Avg.	outlet lake area, incl. upstream lake area for outlets of basin lakes	missing
50	cilv	10 <sup>6</sup> m <sup>3</sup>	computed ilake volume	Avg.	internal lake area	missing
51	clbv	10 <sup>6</sup> m <sup>3</sup>	computed olake volume (volumes for individual basins if any)	Avg.	outlet lake area	missing
52	coum	m <sup>3</sup> /s	simulated outflow to main branch	Avg.	subbasin upstream area	missing
53	coub	m <sup>3</sup> /s	simulated outflow to branch	Avg.	subbasin upstream area	missing
54	cgwl	m <sup>3</sup> /s	simulated outflow from soil groundwater to regional groundwater (losses from subbasin)	Avg.	subbasin area	missing
55	cloc	m <sup>3</sup> /s	local flow from subbasin to its main river	Avg.	subbasin area without olake and main river (and floodplains)	missing
56	cinf	m <sup>3</sup> /s	simulated flow to outlet lake (including P-E of the lake)	Avg.	subbasin upstream area	missing
57	rinf	m <sup>3</sup> /s	observed flow to outlet lake (including P-E of the lake), provided in <a href="#">Xobs.txt</a>	Avg.	subbasin upstream area	missing
58	clrv	m <sup>3</sup>	local watercourse volume	Avg.	local river area	missing
59	cmrv	m <sup>3</sup>	main watercourse volume	Avg.	main river area (not including floodplain)	missing
60	qerr	m <sup>3</sup> /s	daily error in Q (cout - rout)	Avg.	subbasin upstream area	missing

#	Variable ID	Unit	Description	Agg.	Reference area	Component
61	cobc	$m^3/s$	cout prior to <a href="#">updating</a> of Q if update is made	Avg.	subbasin upstream area	<a href="#">missing</a>
62	wtmp	°C	water temperature in outflow from subbasin	Avg.	subbasin upstream area	<a href="#">missing</a>
63	wtm0	°C	water temperature in outflow from subbasin, limited to above zero	Avg.	subbasin upstream area	<a href="#">missing</a>
64	werr	m	daily error in olake water stage (wcom - wstr)	Avg.	subbasin area	<a href="#">missing</a>
65	cwbc	m	computed olake water stage at the end of time step prior to <a href="#">updating</a> if update is used	Avg.	outlet lake area	<a href="#">missing</a>
66	coli	cm	computed olake ice depth	Avg.	outlet lake area	<a href="#">missing</a>
67	cili	cm	computed ilake ice depth	Avg.	internal lake area	<a href="#">missing</a>
68	colb	cm	computed olake blackice depth	Avg.	outlet lake area	<a href="#">missing</a>
69	cilb	cm	computed ilake blackice depth	Avg.	internal lake area	<a href="#">missing</a>
70	cols	cm	computed olake snow depth	Avg.	outlet lake area	<a href="#">missing</a>
71	cils	cm	computed ilake snow depth	Avg.	internal lake area	<a href="#">missing</a>
72	roli	cm	recorded olake ice depth, provided in <a href="#">Xobs.txt</a>	Avg.	outlet lake area	<a href="#">missing</a>
73	rili	cm	recorded ilake ice depth, provided in <a href="#">Xobs.txt</a>	Avg.	internal lake area	<a href="#">missing</a>
74	rolb	cm	recorded olake blackice depth, provided in <a href="#">Xobs.txt</a>	Avg.	outlet lake area	<a href="#">missing</a>
75	rilb	cm	recorded ilake blackice depth, provided in <a href="#">Xobs.txt</a>	Avg.	internal lake area	<a href="#">missing</a>
76	rols	cm	recorded olake snow depth, provided in <a href="#">Xobs.txt</a>	Avg.	outlet lake area	<a href="#">missing</a>
77	rils	cm	recorded ilake snow depth, provided in <a href="#">Xobs.txt</a>	Avg.	internal lake area	<a href="#">missing</a>
78	cmri	cm	computed main river ice depth	Avg.	main river area	<a href="#">missing</a>
79	clri	cm	computed local river ice depth	Avg.	local river area	<a href="#">missing</a>
80	cmrb	cm	computed main river blackice depth	Avg.	main river area	<a href="#">missing</a>
81	clrb	cm	computed local river blackice depth	Avg.	local river area	<a href="#">missing</a>
82	cmrs	cm	computed main river snow depth	Avg.	main river area	<a href="#">missing</a>
83	clrs	cm	computed local river snow depth	Avg.	local river area	<a href="#">missing</a>
84	rmri	cm	recorded main river ice depth, provided in <a href="#">Xobs.txt</a>	Avg.	main river area	<a href="#">missing</a>

#	Variable ID	Unit	Description	Agg.	Reference area	Component
85	rlri	cm	recorded local river ice depth, provided in <a href="#">Xobs.txt</a>	Avg.	local river area	missing
86	rmrb	cm	recorded main river blackice depth, provided in <a href="#">Xobs.txt</a>	Avg.	main river area	missing
87	rlrb	cm	recorded local river blackice depth, provided in <a href="#">Xobs.txt</a>	Avg.	local river area	missing
88	rmrs	cm	recorded main river snow depth, provided in <a href="#">Xobs.txt</a>	Avg.	main river area	missing
89	rlrs	cm	recorded local river snow depth, provided in <a href="#">Xobs.txt</a>	Avg.	local river area	missing
90	olst	°C	computed olake surface temperature	Avg.	outlet lake area	missing
91	olut	°C	computed olake upper temperature	Avg.	outlet lake area	missing
92	ollt	°C	computed olake lower temperature	Avg.	outlet lake area	missing
93	olwt	°C	computed olake mean temperature	Avg.	outlet lake area	missing
94	ilst	°C	computed ilake surface temperature	Avg.	internal lake area	missing
95	ilwt	°C	computed ilake mean temperature	Avg.	internal lake area	missing
96	lrst	°C	computed local river surface temperature	Avg.	local river area	missing
97	lrwt	°C	computed local river mean temperature	Avg.	local river area	missing
98	mrst	°C	computed main river surface temperature	Avg.	main river area	missing
99	mrwt	°C	computed main river mean temperature	Avg.	main river area	missing
100	rolt	°C	recorded olake surface temperature, provided in <a href="#">Xobs.txt</a>	Avg.	outlet lake area	missing
101	rilt	°C	recorded ilake surface temperature, provided in <a href="#">Xobs.txt</a>	Avg.	internal lake area	missing
102	rmrt	°C	recorded main river surface temperature, provided in <a href="#">Xobs.txt</a>	Avg.	main river area	missing
103	mrto	°C	computed main river temperature (old)	Avg.	main river area	missing
104	lrto	°C	computed local river temperature (old)	Avg.	local river area	missing
105	ilto	°C	computed ilake temperature (old)	Avg.	internal lake area	missing
106	olto	°C	computed olake temperature (old)	Avg.	outlet lake area	missing
107	coic	-	computed olake ice cover	Avg.	outlet lake area	missing

#	Variable ID	Unit	Description	Agg.	Reference area	Component
108	ciic	-	computed ilake ice cover	Avg.	internal lake area	missing
109	cmic	-	computed main river ice cover	Avg.	main river area	missing
110	clic	-	computed local stream ice cover	Avg.	local river area	missing
111	glcv	km <sup>3</sup>	glacier volume	Avg.	glacier area	missing
112	glca	km <sup>2</sup>	glacier area	Avg.	glacier area	missing
113	lrdep	m	local river depth	Avg.	local river area	missing
114	mrdep	m	main river depth	Avg.	main river area	missing
115	aqwl	m	aquifer depth to water level	Avg.	subbasin area	missing
116	cgmb	mm	computed glacier mass balance	Avg.	specific glacier area	missing
117	rgmb	mm	recorded glacier mass balance, provided in <a href="#">Xobs.txt</a>	Avg.	specific glacier area	missing
118	cgma	km <sup>2</sup>	area used in computed mass balance	Avg.	specific glacier area	missing
119	rgma	km <sup>2</sup>	area used in recorded mass balance, provided in <a href="#">Xobs.txt</a>	Avg.	specific glacier area	missing
120	rgmp	days	recorded mass balance period, provided in <a href="#">Xobs.txt</a>	Avg.	none	missing
121	S105	-	recorded (FSUHSS) snow cover surrounding terrain open (fraction from 0 to 10), provided in <a href="#">Xobs.txt</a>	Avg.	area of non-forest land cover	missing
122	S106	-	recorded (FSUHSS) snow cover course open (fraction from 0 to 10), provided in <a href="#">Xobs.txt</a>	Avg.	area of non-forest land cover	missing
123	S108	cm	recorded (FSUHSS) mean depth open, provided in <a href="#">Xobs.txt</a>	Avg.	area of non-forest land cover	missing
124	S111	g/cm <sup>3</sup>	recorded (FSUHSS) mean density open, provided in <a href="#">Xobs.txt</a>	Avg.	area of non-forest land cover	missing
125	S114	mm	recorded (FSUHSS) snow water equivalent open, provided in <a href="#">Xobs.txt</a>	Avg.	area of forest land cover	missing
126	S205	-	recorded (FSUHSS) snow cover surrounding terrain forest (fraction from 0 to 10), provided in <a href="#">Xobs.txt</a>	Avg.	area of forest land cover	missing
127	S206	-	recorded (FSUHSS) snow cover course forest (fraction from 0 to 10), provided in <a href="#">Xobs.txt</a>	Avg.	area of forest land cover	missing
128	S208	cm	recorded (FSUHSS) mean depth forest, provided in <a href="#">Xobs.txt</a>	Avg.	area of forest land cover	missing
129	S211	g/cm <sup>3</sup>	recorded (FSUHSS) mean density forest, provided in <a href="#">Xobs.txt</a>	Avg.	area of forest land cover	missing

#	Variable ID	Unit	Description	Agg.	Reference area	Component
130	S214	mm	recorded (FSUHSS) snow water equivalent forest, provided in <a href="#">Xobs.txt</a>	Avg.	area of forest land cover	<a href="#">missing</a>
131	C106	-	computed snow cover open (fraction from 0 to 10)	Avg.	area of non-forest land cover	<a href="#">missing</a>
132	C108	cm	computed mean depth open	Avg.	area of non-forest land cover	<a href="#">missing</a>
133	C111	g/cm <sup>3</sup>	computed mean density open	Avg.	area of non-forest land cover	<a href="#">missing</a>
134	C114	mm	computed snow water equivalent open	Avg.	area of non-forest land cover	<a href="#">missing</a>
135	C206	-	computed snow cover forest (fraction from 0 to 10)	Avg.	area of forest land cover	<a href="#">missing</a>
136	C208	cm	computed mean depth forest	Avg.	area of forest land cover	<a href="#">missing</a>
137	C211	g/cm <sup>3</sup>	comp. mean density forest	Avg.	area of forest land cover	<a href="#">missing</a>
138	C214	mm	computed snow water equivalent forest	Avg.	area of forest land cover	<a href="#">missing</a>
139	coT1	μU/L	simulated concentration of tracer T1 in local runoff from soil, unit dependent on substance simulated	W. Avg.	subbasin land area	<a href="#">tracer T1</a>
140	coT2	°C	simulated water temperature of local runoff from soil	W. Avg.	subbasin land area	<a href="#">missing</a>
141	coIN, coON, coTN, coSP, coPP, coTP	μg/L	simulated concentration of N and P species in local runoff from soil	W. Avg.	subbasin land area	<a href="#">missing</a>
142	reT1	μU/L	observed concentration of tracer T1 in outflow from olake/subbasin, unit dependent on substance simulated, values provided in <a href="#">Xobs.txt</a>	W. Avg.	subbasin upstream area	<a href="#">tracer T1</a>
143	reT2	°C	observed water temperature in outflow from olake/subbasin, provided in <a href="#">Xobs.txt</a> (average based on recorded flow if present)	W. Avg.	subbasin upstream area	<a href="#">missing</a>
144	reIN, reON, reSP, rePP, reTN, reTP	μg/L	observed concentration of N and P species in outflow from olake/subbasin, provided in <a href="#">Xobs.txt</a> (average based on recorded flow if present)	W. Avg.	subbasin upstream area	<a href="#">missing</a>



#	Variable ID	Unit	Description	Agg.	Reference area	Component
145	cpT1	$\mu\text{U/L}$	observed concentration of tracer T1 in precipitation, unit user-provided, values provided in <a href="#">Xobs.txt</a>	W. Avg.	subbasin area	<a href="#">tracer T1</a>
146	ceT1	$\mu\text{U/L}$	simulated concentration of tracer T1 in evapotranspiration, unit dependent on substance simulated	W. Avg.	subbasin area	<a href="#">tracer T1</a>
147	csT1	$\mu\text{U/L}$	simulated concentration of tracer T1 in the soil water, unit dependent on substance simulated	W. Avg.	subbasin land area	<a href="#">tracer T1</a>
148	csT2	$^{\circ}\text{C}$	simulated water temperature in the soil	W. Avg.	subbasin land area	<a href="#">missing</a>
149	csIN	$\mu\text{g/L}$	simulated concentration of IN in the soil, this differs from coXX variables in that the weights are different for soil water concentration averages and runoff concentration averages	W. Avg.	subbasin land area	<a href="#">missing</a>
150	ccT1	$\mu\text{U/L}$	simulated concentration of tracer T1 in outflow from outlet lake/main river, unit dependent on substance simulated	W. Avg.	subbasin upstream area	<a href="#">tracer T1</a>
151	ccT2	$^{\circ}\text{C}$	simulated water temperature in outflow from outlet lake/subbasin	W. Avg.	subbasin upstream area	<a href="#">missing</a>
152	ccIN, ccON, ccTN, ccSP, ccPP, ccTP	$\mu\text{g/L}$	simulated concentration of N and P species in outflow from outlet lake/subbasin	W. Avg.	subbasin upstream area	<a href="#">missing</a>
153	co0C	$\text{mg/L}$	simulated OC concentration in runoff from soil	W. Avg.	subbasin land area	<a href="#">missing</a>
154	cs0C	$\text{mg/L}$	simulated OC concentration in soil	W. Avg.	subbasin land area	<a href="#">missing</a>
155	cc0C	$\text{mg/L}$	simulated OC concentration in outflow from olake/subbasin	W. Avg.	subbasin upstream area	<a href="#">missing</a>
156	re0C	$\text{mg/L}$	observed OC concentration in outflow from olake/subbasin, provided in <a href="#">Xobs.txt</a>	W. Avg.	subbasin upstream area	<a href="#">missing</a>
157	c1C0	$\text{mg/L}$	simulated OC concentration in local flow from subbasin	W. Avg.	subbasin area without olake and main river (and floodplains)	<a href="#">missing</a>

#	Variable ID	Unit	Description	Agg.	Reference area	Component
158	cLIN, cLON, cLTN, cLSP, cLPP, cLTP	µg/L	simulated concentration in local flow from subbasin	W. Avg.	subbasin area without olake and main river (and floodplains)	missing
159	prec	mm/[period]	precipitation as provided in <a href="#">Pobs.txt/Pobs_nnn.txt</a>	Sum	subbasin area	missing
160	cprc	mm/[period]	corrected precipitation	Sum	subbasin area	missing
161	cpSF	mm/[period]	corrected precipitation that falls as snow	Sum	subbasin area	missing
162	cpRF	mm/[period]	corrected precipitation that falls as rain	Sum	subbasin area	missing
163	evap	mm/[period]	evapotranspiration	Sum	subbasin area	missing
164	epot	mm/[period]	potential evapotranspiration	Sum	subbasin area	missing
165	repo	mm/[period]	observed potential evapotranspiration, provided in <a href="#">Xobs.txt</a>	Sum	subbasin area	missing
166	eobs	mm/[period]	observed evapotranspiration, provided in <a href="#">Xobs.txt</a>	Sum	subbasin area	missing
167	icpe	mm/[period]	losses due to interception (simulated as precipitation corrections)	Sum	subbasin area	missing
168	evsn	mm/[period]	snow and glacier evaporation (Note that evsn is included in evap, which still is the total evaporation from the subbasin)	Sum	subbasin area	missing
169	levp	mm/[period]	land evapotranspiration	Sum	subbasin land area	missing
170	evpt	mm/[period]	total evapotranspiration, including "interception losses"	Sum	subbasin area	missing
171	psim	mm/[period]	precipitation including water that will be removed as "interception losses"	Sum	subbasin area	missing
172	cpIN	µg/L	observed concentration of inorganic nitrogen in precipitation, provided in <a href="#">Xobs.txt</a>	W. Avg.	subbasin area	missing
173	cpSP	µg/L	observed concentration of soluble phosphorus in precipitation, provided in <a href="#">Xobs.txt</a>	W. Avg.	subbasin area	missing
174	crun	mm/[period]	calculated local runoff from land area. Note that this is not the same as the flow to the local stream if floodplains are used.	Sum	subbasin land area	missing
175	rrun	mm/[period]	observed local runoff from land area, provided in <a href="#">Xobs.txt</a>	Sum	subbasin land area	missing

#	Variable ID	Unit	Description	Agg.	Reference area	Component
176	cro1, cro2, cro3	mm/[period]	simulated runoff from soil layers 1 to 3. Note that this is not the same as the flow to the local stream if floodplains are used.	Sum	area of soil layer	missing
177	crod	mm/[period]	simulated runoff from tile drains. Note that this is not the same as the flow to the local stream if floodplains are used.	Sum	subbasin land area	missing
178	croS	mm/[period]	simulated surface runoff (ros1+ros2). Note that this is not the same as the flow to the local stream if floodplains are used.	Sum	subbasin land area	missing
179	ros1	mm/[period]	simulated saturated surface runoff. Note that this is not the same as the flow to the local stream if floodplains are used.	Sum	subbasin land area	missing
180	ros2	mm/[period]	simulated surface runoff due to excess infiltration. Note that this is not the same as the flow to the local stream if floodplains are used.	Sum	subbasin land area	missing
181	acdf	mm/[period]	accumulated volume error	Sum	subbasin upstream area	missing
182	cINL, cONL, cTNL, cSPL, cPPL, cTPL, cOCL	kg/[period]	total simulated nutrient or organic carbon load out from subbasin	Sum	subbasin upstream area	missing
183	deni	kg/km <sup>2</sup> [period]	denitrification in soil	Sum	subbasin land area	missing
184	crut	kg/km <sup>2</sup> [period]	N crop uptake	Sum	subbasin land area	missing
185	faIN	kg/km <sup>2</sup> [period]	flow of fastN to IN pool	Sum	subbasin land area	missing
186	atmd, atmp	kg/km <sup>2</sup> [period]	atmospheric deposition of IN/TP on land	Sum	subbasin land area	missing
187	rtoN, rtoP	kg/[period]	recorded nutrient load out from subbasin (calculated from recorded flow rout and concentration reTN/reTP)	Sum	subbasin upstream area	missing
188	irra	m <sup>3</sup> /[period]	applied irrigation water to the soil	Sum	area of irrigated SLCs	missing
189	irld	m <sup>3</sup> /[period]	abstractions from local dam(s)	Sum	none	missing
190	irlr	m <sup>3</sup> /[period]	abstractions from local river	Sum	none	missing
191	irrg	m <sup>3</sup> /[period]	abstractions from local groundwater	Sum	none	missing

#	Variable ID	Unit	Description	Agg.	Reference area	Component
192	irrs	$m^3/[period]$	surface water abstractions sent to other connected subbasins from this subbasin	Sum	none	missing
193	irel	$m^3/[period]$	evaporation losses due to irrigation	Sum	area of irrigated SLCs	missing
194	rLIN, rLON, rLSP, rLPP, rLTN, rLTP, rLOC	$kg/[period]$	recorded load out from subbasin (calculated from computed flow out and recorded concentration reIN etc)	Sum	subbasin upstream area	missing
195	aqin	$m^3/[period]$	aquifer recharge	Sum	subbasin area	missing
196	aqut	$m^3/[period]$	aquifer outflow	Sum	main river area	missing
197	speq	$mm/[period]$	specific discharge (replaces upro)	Sum	subbasin upstream area	missing
198	clwc	m	lake water stage (wcom) cleaned from w0ref reference level	Avg.	outlet lake area	missing
199	clws	m	observed water stage (wstr) cleaned from w0ref reference level	Avg.	outlet lake area	missing
200	sl01	kg	gross load of soil layer 1 and 2 of inorganic nitrogen	Sum	subbasin area	Soil load
201	sl02	kg	net load of soil layer 1 and 2 of inorganic nitrogen	Sum	subbasin area	Soil load
202	sl03	kg	gross load of soil layer 1 and 2 of organic nitrogen	Sum	subbasin area	Soil load
203	sl04	kg	net load of soil layer 1 and 2 of organic nitrogen	Sum	subbasin area	Soil load
204	sl05	kg	gross load of soil layer 1 and 2 of total nitrogen	Sum	subbasin area	Soil load
205	sl06	kg	net load of soil layer 1 and 2 of total nitrogen	Sum	subbasin area	Soil load
206	sl07	kg	gross load of soil layer 1 and 2 of SRP	Sum	subbasin area	Soil load
207	sl08	kg	net load of soil layer 1 and 2 of SRP	Sum	subbasin area	Soil load
208	sl09	kg	gross load of soil layer 1 and 2 of particulate phosphorus	Sum	subbasin area	Soil load
209	sl10	kg	net load of soil layer 1 and 2 of particulate phosphorus	Sum	subbasin area	Soil load
210	sl11	kg	gross load of soil layer 1 and 2 of total phosphorus	Sum	subbasin area	Soil load
211	sl12	kg	net load of soil layer 1 and 2 of total phosphorus	Sum	subbasin area	Soil load
212	sl13	kg	gross load of soil layer 3 of inorganic nitrogen	Sum	subbasin area	Soil load

#	Variable ID	Unit	Description	Agg.	Reference area	Component
213	sL14	kg	net load of soil layer 3 of inorganic nitrogen	Sum	subbasin area	Soil load
214	sL15	kg	gross load of soil layer 3 of organic nitrogen	Sum	subbasin area	Soil load
215	sL16	kg	net load of soil layer 3 of organic nitrogen	Sum	subbasin area	Soil load
216	sL17	kg	gross load of soil layer 3 of total nitrogen	Sum	subbasin area	Soil load
217	sL18	kg	net load of soil layer 3 of total nitrogen	Sum	subbasin area	Soil load
218	sL19	kg	gross load of soil layer 3 of SRP	Sum	subbasin area	Soil load
219	sL20	kg	net load of soil layer 3 of SRP	Sum	subbasin area	Soil load
220	sL21	kg	gross load of soil layer 3 of particulate phosphorus	Sum	subbasin area	Soil load
221	sL22	kg	net load of soil layer 3 of particulate phosphorus	Sum	subbasin area	Soil load
222	sL23	kg	gross load of soil layer 3 of total phosphorus	Sum	subbasin area	Soil load
223	sL24	kg	net load of soil layer 3 of total phosphorus	Sum	subbasin area	Soil load
224	sL25	kg	gross load of soil layer 3 + tile of inorganic nitrogen	Sum	subbasin area	Soil load
225	sL26	kg	net load of soil layer 3 + tile of inorganic nitrogen	Sum	subbasin area	Soil load
226	sL27	kg	gross load of soil layer 3 + tile of organic nitrogen	Sum	subbasin area	Soil load
227	sL28	kg	net load of soil layer 3 + tile of organic nitrogen	Sum	subbasin area	Soil load
228	sL29	kg	gross load of soil layer 3 + tile of total nitrogen	Sum	subbasin area	Soil load
229	sL30	kg	net load of soil layer 3 + tile of total nitrogen	Sum	subbasin area	Soil load
230	sL31	kg	gross load of soil layer 3 + tile of SRP	Sum	subbasin area	Soil load
231	sL32	kg	net load of soil layer 3 + tile of SRP	Sum	subbasin area	Soil load
232	sL33	kg	gross load of soil layer 3 + tile of particulate phosphorus	Sum	subbasin area	Soil load
233	sL34	kg	net load of soil layer 3 + tile of particulate phosphorus	Sum	subbasin area	Soil load
234	sL35	kg	gross load of soil layer 3 + tile of total phosphorus	Sum	subbasin area	Soil load
235	sL36	kg	net load of soil layer 3 + tile of total phosphorus	Sum	subbasin area	Soil load
236	den3	kg	denitrification soil layer 3	Sum	subbasin area	missing
237	denz	kg	denitrification soil layer 1 and 2	Sum	subbasin area	missing
238	cIN1	µg/L	simulated concentration of IN in soil layer 1	W. Avg.	area of soil layer	missing

#	Variable ID	Unit	Description	Agg.	Reference area	Component
239	cIN2	$\mu\text{g/L}$	simulated concentration of IN in soil layer 2	W. Avg.	area of soil layer	missing
240	cIN3	$\mu\text{g/L}$	simulated concentration of IN in soil layer 3	W. Avg.	area of soil layer	missing
241	sm19	mm	soil moisture upper soil layer (including standing water)	Avg.	area of soil layer	missing
242	mrfp	m	main river floodplain water depth	Avg.	floodplain area	Floodplain
243	olfp	m	outlet lake floodplain water depth	Avg.	floodplain area	Floodplain
244	mrfg	%	main river floodplain degree of flooded area (% of floodplain area)	Avg.	floodplain area	Floodplain
245	olfg	%	outlet lake floodplain degree of flooded area (% of floodplain area)	Avg.	floodplain area	Floodplain
246	sden	$\text{g/cm}^3$	snow density	Avg.	subbasin land area	Snow
247	melt	mm/[period]	snow melt	Sum	subbasin land area	Snow
248	roum	$\text{m}^3/\text{s}$	observed outflow from olake outlet 1	Avg.	subbasin upstream area	missing
249	roub	$\text{m}^3/\text{s}$	observed outflow from olake outlet 2	Avg.	subbasin upstream area	missing
250	aT11	$\mu\text{U}/\text{km}^2$	simulated pool of adsorbed T1 in soil layer 1	Avg.	subbasin land area	tracer T1
251	aT12	$\mu\text{U}/\text{km}^2$	simulated pool of adsorbed T1 in soil layer 2	Avg.	area of soil layer	tracer T1
252	aT13	$\mu\text{U}/\text{km}^2$	simulated pool of adsorbed T1 in soil layer 3	Avg.	area of soil layer	tracer T1
253	sT11	$\mu\text{U}/\text{km}^2$	simulated pool of T1 in soil water in soil layer 1	Avg.	subbasin land area	tracer T1
254	sT12	$\mu\text{U}/\text{km}^2$	simulated pool of T1 in soil water in soil layer 2	Avg.	area of soil layer	tracer T1
255	sT13	$\mu\text{U}/\text{km}^2$	simulated pool of T1 in soil water in soil layer 3	Avg.	area of soil layer	tracer T1
256	Tsmr	U	simulated pool of T1 in main river sediment	Avg.	main river area (not including floodplain)	tracer T1
257	Tslr	U	simulated pool of T1 in local river sediment	Avg.	local river area	tracer T1
258	T1sf	$\mu\text{U}/\text{km}^2$	simulated pool of T1 above soil	Avg.	subbasin land area	tracer T1
259	clT1	$\mu\text{U}/\text{L}$	simulated concentration of T1 in flow of local river	W. Avg.	subbasin area without olake and main river (and floodplains)	tracer T1

#	Variable ID	Unit	Description	Agg.	Reference area	Component
260	Tcr1	$\mu\text{U/L}$	simulated concentration of T1 in runoff from soil layer 1	W. Avg.	subbasin land area	tracer T1
261	Tcr2	$\mu\text{U/L}$	simulated concentration of T1 in runoff from soil layer 2	W. Avg.	area of soil layer	tracer T1
262	Tcr3	$\mu\text{U/L}$	simulated concentration of T1 in runoff from soil layer 3	W. Avg.	area of soil layer	tracer T1
263	Tcrd	$\mu\text{U/L}$	simulated concentration of T1 in tile runoff	W. Avg.	subbasin land area	tracer T1
264	Tcrs	$\mu\text{U/L}$	simulated concentration of T1 in surface runoff	W. Avg.	subbasin land area	tracer T1
265	coSS	$\text{mg/L}$	computed suspended sediment concentration in runoff	W. Avg.	subbasin land area	missing
266	ccSS	$\text{mg/L}$	computed suspended sediment concentration in lake outflow	W. Avg.	subbasin upstream area	missing
267	reSS	$\text{mg/L}$	recorded suspended sediment concentration in lake outflow	W. Avg.	subbasin upstream area	missing
268	ccAE	$\text{mg-N/L}$	computed algae concentration in lake outflow	W. Avg.	subbasin upstream area	missing
269	ccTS	$\text{mg/L}$	computed total suspended sediment concentration in lake outflow	W. Avg.	subbasin upstream area	missing
270	xom0..9	<i>depends on variable type</i>	observations of not predefined variable (to be averaged over output time interval) provided in <a href="#">Xobs.txt</a> or <a href="#">XobsXOMn.txt</a>	Avg.	depends on variable type	missing
271	xos0..9	<i>depends on variable type</i>	observations of not predefined variable (to be summed over output time interval) provided in <a href="#">Xobs.txt</a> or <a href="#">XobsXOSn.txt</a>	Sum	depends on variable type	missing
272	dwttr	$\text{m}^3/\text{s}$	demanded water transfer flow	Avg.	-	missing
273	rpwl	$\text{m}$	main river floodplain water level	Avg.	floodplain area	Floodplain
274	lpwl	$\text{m}$	outlet lake floodplain water level	Avg.	floodplain area	Floodplain
275	gm1t	$\text{mm}/[\text{period}]$	glacier melt	Sum	glacier slc area	missing
276	loff	$\text{L}/\text{km}^2/\text{s}$	calculated local runoff from land area. Note that this is not the same as the flow to the local stream if floodplains are used.	Sum	subbasin land area	missing
277	lrfa	-	local river fractional area	Avg.	local river area	Evaporation
278	mrfa	-	main river fractional area	Avg.	main river area	Evaporation
279	lred	$\text{m}$	local river effective depth when area is reduced	Avg.	local river area	missing
280	mred	$\text{m}$	main river effective depth when area is reduced	Avg.	main river area	missing
281	cSSL, cTSL	$\text{kg}/[\text{period}]$	total simulated sediment load out from subbasin	Sum	subbasin upstream area	missing

#	Variable ID	Unit	Description	Agg.	Reference area	Component
282	infi	mm/[period]	infiltration to soil, including macropore flow and water staying standing on the surface of the soil	Sum	subbasin land area	infiltration
283	reTS	mg/L	recorded total suspended sediment concentration in lake outflow	W. Avg.	subbasin upstream area	missing
284	clTS	mg/L	computed total suspended sediment concentration in local flow from subbasin	W. Avg.	subbasin area without olake and main river (and floodplains)	missing
285	clSS	mg/L	computed suspended sediment concentration in local flow from subbasin	W. Avg.	subbasin area without olake and main river (and floodplains)	missing
286	n1TS	kg/[period]	computed total suspended sediment routing net load	Sum	subbasin main river and olake area	missing
287	n1SS	kg/[period]	computed suspended sediment routing net load	Sum	subbasin main river and olake area	missing
288	wilk	m	internal lake water stage above threshold	Avg.	internal lake area	missing
289	isps	kg/km <sup>2</sup>	intermediate storage pool SS	Avg.	subbasin land area	Soil erosion
290	ispp	kg/km <sup>2</sup>	intermediate storage pool PP	Avg.	subbasin land area	Soil Erosion
291	Psmr	kg	main river PP storage in sediments	Avg.	main river area	Sed. & Resusp.
292	Pslr	kg	local river PP storage in sediments	Avg.	local river area	Sed. & Resusp.
293	Ssmr	kg	main river SS storage in sediments	Avg.	main river area	Sed. & Resusp.
294	Sslr	kg	local river SS storage in sediments	Avg.	local river area	Sed. & Resusp.

Table of upstream variables that have different unit compared to the subbasin variable.

New variable ID	Unit	Description	Value	Subbasin unit
upcolv	mm	lake volume of simple olakes and basin lakes spread over upstream area	Avg.	10 <sup>6</sup> m <sup>3</sup>
upcilv	mm	lake volume of ilakes spread over upstream area	Avg.	10 <sup>6</sup> m <sup>3</sup>
upclbv	mm	lake volume of olakes and individual lake basins spread over upstream area	Avg.	10 <sup>6</sup> m <sup>3</sup>



<b>New variable ID</b>	<b>Unit</b>	<b>Description</b>	<b>Value</b>	<b>Subbasin unit</b>
upclrv	mm	local watercourse volume spread over upstream area	Avg.	m <sup>3</sup>
upcmrv	mm	main watercourse volume spread over upstream area	Avg.	m <sup>3</sup>
upglcv	mm	glacier volume spread over upstream area	Avg.	km <sup>3</sup>
upglca	-	glacier area, fraction of upstream area	Avg.	km <sup>2</sup>
upirra	mm/[period]	applied irrigation water to the soil	Sum	m <sup>3</sup> /[period]
upirld	mm/[period]	abstractions from local dam(s) spread over upstream area	Sum	m <sup>3</sup> /[period]
upirlr	mm/[period]	abstractions from local river spread over upstream area	Sum	m <sup>3</sup> /[period]
upirrg	mm/[period]	abstractions from local groundwater spread over upstream area	Sum	m <sup>3</sup> /[period]
upirrs	mm/[period]	abstractions from surface water spread over upstream area	Sum	m <sup>3</sup> /[period]
upirel	mm/[period]	evaporation losses due to irrigation spread over upstream area	Sum	m <sup>3</sup> /[period]

Table of removed HYPE variables IDs, and what variable is replacing them.

<b>Old ID</b>	<b>New variable ID</b>	<b>Unit</b>	<b>Description</b>	<b>Value</b>
upsn	upsnow	mm	upstream catchment average snow water	Avg.
upso	upsoim	mm	upstream catchment average soil water	Avg.
uppr	upcprc	mm/[period]	upstream catchment average precipitation, corrected precipitation if correction is used	Sum
upev	upevap	mm/[period]	upstream catchment average evaporation	Sum
upepe	upepot	mm/[period]	upstream catchment average potential evaporation	Sum
upro	speq	mm/[period]	specific discharge	Sum
upsf	upcpsf	mm/[period]	upstream catchment average snowfall, corrected snowfall if correction is used	Sum
uprf	upcprf	mm/[period]	upstream catchment average rainfall, corrected rainfall if correction is used	Sum
upsd	upsmdf	mm/[period]	upstream average soil deficit to field capacity for upper two soil layers	Sum
upfp	upsmfp	-	upstream soil moisture as fraction of pore volume (not including standing water)	Avg.
upme	upmelt	mm/[period]	average upstream snow melt	Sum
upte	upctmp	°C	average upstream corrected air temperature	Avg.