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**
**      Wasserhaushaltsberechnung Deponie DK0 "Froser Berg" Reinstedt      **
**
**      HELP Version 3.95 D          (10 August 2012)                      **
**      developed at                                                         **
**      Institute of Soil Science, University of Hamburg, Germany          **
**      based on                                                             **
**      US HELP MODEL VERSION 3.07 (1 NOVEMBER 1997)                      **
**      DEVELOPED BY ENVIRONMENTAL LABORATORY                              **
**      USAE WATERWAYS EXPERIMENT STATION                                  **
**      FOR USEPA RISK REDUCTION ENGINEERING LABORATORY                    **
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TIME: 11.20 DATE: 15.01.2021

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PRECIPITATION DATA FILE:      Y:\HELP\HELP Reinstedt\Reinstedt 2010-19.d4
TEMPERATURE DATA FILE:       Y:\HELP\HELP Reinstedt\Reinstedt 2010-19.d7
SOLAR RADIATION DATA FILE:   Y:\HELP\HELP Reinstedt\Reinstedt 12-2020.D13
EVAPOTRANSPIRATION DATA F. 1: Y:\HELP\HELP Reinstedt\Reinstedt neu.D11
SOIL AND DESIGN DATA FILE 1: Y:\HELP\HELP Reinstedt\Reinstedt 12.2020.D10
OUTPUT DATA FILE:            Y:\HELP\HELP Reinstedt\Reinstedt 01-2021.out
YEARLY OUTPUT DATA FILE:     Y:\HELP\HELP Reinstedt\Reinstedt 01-2021.YR

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COLUMNS OF YEARLY OUTPUT DATA FILE:

- 1 DATE OF ULTIMO (yyyy1231)
- 2 PRECIPITATION (MM)
- 3 RUNOFF (MM)
- 4 POTENTIAL EVAPOTRANSPIRATION (MM)
- 5 ACTUAL EVAPOTRANSPIRATION (MM)
- 6 LEAK #1: PERCOLATION/LEAKAGE THROUGH LAYER 1 (MM)
- 7 CHANGE IN TOTAL WATER STORAGE (MM)
- 8 CHANGE IN SOIL WATER STORAGE (MM)
- 9 CHANGE IN INTERCEPTION WATER STORAGE (MM)
- 10 CHANGE IN SNOW WATER STORAGE (MM)
- 11 ANNUAL WATER BUDGET BALANCE (MM)

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TITLE: Deponie Reinstedt DK 0

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WEATHER DATA SOURCES

NOTE: PRECIPITATION DATA FOR Reinstedt Sachsen-Anhalt
WAS ENTERED FROM A TEXT FILE.

NOTE: TEMPERATURE DATA FOR Reinstedt Sachsen-Anhalt
WAS ENTERED FROM A TEXT FILE.

NOTE: SOLAR RADIATION DATA FOR Reinstedt Sachsen-Anhalt
WAS ENTERED BY THE USER.

LAYER DATA 1

VALID FOR 10 YEARS

NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER

MATERIAL TEXTURE NUMBER 0

THICKNESS = 100.00 CM
POROSITY = 0.3500 VOL/VOL
FIELD CAPACITY = 0.2500 VOL/VOL
WILTING POINT = 0.1100 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.2500 VOL/VOL
EFFECTIVE SAT. HYD. CONDUCT.= 0.1360E-02 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA 1

VALID FOR 10 YEARS

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT
SOIL DATA BASE USING SOIL TEXTURE # 5 WITH A
GOOD STAND OF GRASS, A SURFACE SLOPE OF 33.0%
AND A SLOPE LENGTH OF 32. METERS.

SCS RUNOFF CURVE NUMBER	=	55.60	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	10.7000	HECTARES
EVAPORATIVE ZONE DEPTH	=	100.0	CM
INITIAL WATER IN EVAPORATIVE ZONE	=	25.000	CM
UPPER LIMIT OF EVAPORATIVE STORAGE	=	35.000	CM
FIELD CAPACITY OF EVAPORATIVE ZONE	=	25.000	CM
LOWER LIMIT OF EVAPORATIVE STORAGE	=	11.000	CM
SOIL EVAPORATION ZONE DEPTH	=	44.6	CM
INITIAL SNOW WATER	=	2.920	CM
INITIAL INTERCEPTION WATER	=	0.052	CM
INITIAL WATER IN LAYER MATERIALS	=	25.000	CM
TOTAL INITIAL WATER	=	27.972	CM
TOTAL SUBSURFACE INFLOW	=	0.00	MM/YR

EVAPOTRANSPIRATION DATA 1

VALID FOR 10 YEARS

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Reinstedt Sachsen-Anhalt

STATION LATITUDE	=	51.46	DEGREES
MAXIMUM LEAF AREA INDEX	=	5.00	
START OF GROWING SEASON (JULIAN DATE)	=	72	
END OF GROWING SEASON (JULIAN DATE)	=	338	
EVAPORATIVE ZONE DEPTH	=	100.0	CM
AVERAGE ANNUAL WIND SPEED	=	9.00	KPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	84.2	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	70.6	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	68.5	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	81.2	%

ANNUAL TOTALS FOR YEAR 2010

	MM	CU. METERS	PERCENT
	-----	-----	-----
PRECIPITATION	778.30	83278.117	100.00
RUNOFF	0.000	0.000	0.00
POTENTIAL EVAPOTRANSPIRATION	738.704	79041.336	
ACTUAL EVAPOTRANSPIRATION	521.149	55762.961	66.96
PERC./LEAKAGE THROUGH LAYER 1	257.171448	27517.346	33.04
CHANGE IN WATER STORAGE	-0.021	-2.213	0.00
SOIL WATER AT START OF YEAR	250.000	26750.000	
SOIL WATER AT END OF YEAR	250.000	26750.000	
INTERCEPTION WATER AT START OF YEAR	0.522	55.857	
INTERCEPTION WATER AT END OF YEAR	0.501	53.645	
SNOW WATER AT START OF YEAR	29.201	3124.460	3.75
SNOW WATER AT END OF YEAR	29.201	3124.460	3.75
ANNUAL WATER BUDGET BALANCE	0.0002	0.020	0.00

ANNUAL TOTALS FOR YEAR 2011

	MM	CU. METERS	PERCENT
	-----	-----	-----
PRECIPITATION	438.40	46908.801	100.00
RUNOFF	0.000	0.000	0.00
POTENTIAL EVAPOTRANSPIRATION	756.200	80913.359	

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ACTUAL EVAPOTRANSPIRATION	449.947	48144.293	102.63
PERC./LEAKAGE THROUGH LAYER 1	68.698898	7350.782	15.67
CHANGE IN WATER STORAGE	-80.246	-8586.303	-18.30
SOIL WATER AT START OF YEAR	250.000	26750.000	
SOIL WATER AT END OF YEAR	199.195	21313.863	
INTERCEPTION WATER AT START OF YEAR	0.501	53.645	
INTERCEPTION WATER AT END OF YEAR	0.261	27.937	
SNOW WATER AT START OF YEAR	29.201	3124.460	6.66
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0003	0.031	0.00

ANNUAL TOTALS FOR YEAR 2012

	MM	CU. METERS	PERCENT
	-----	-----	-----
PRECIPITATION	536.20	57373.414	100.00
RUNOFF	0.000	0.000	0.00
POTENTIAL EVAPOTRANSPIRATION	773.550	82769.820	
ACTUAL EVAPOTRANSPIRATION	547.992	58635.172	102.20
PERC./LEAKAGE THROUGH LAYER 1	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-11.792	-1261.758	-2.20
SOIL WATER AT START OF YEAR	199.195	21313.863	
SOIL WATER AT END OF YEAR	187.664	20080.043	
INTERCEPTION WATER AT START OF YEAR	0.261	27.937	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	

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SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.003	0.00

ANNUAL TOTALS FOR YEAR 2013

	MM	CU. METERS	PERCENT
	-----	-----	-----
PRECIPITATION	587.30	62841.094	100.00
RUNOFF	18.944	2026.967	3.23
POTENTIAL EVAPOTRANSPIRATION	745.425	79760.438	
ACTUAL EVAPOTRANSPIRATION	451.160	48274.125	76.82
PERC./LEAKAGE THROUGH LAYER 1	54.523632	5834.029	9.28
CHANGE IN WATER STORAGE	62.673	6705.972	10.67
SOIL WATER AT START OF YEAR	187.664	20080.043	
SOIL WATER AT END OF YEAR	250.000	26750.000	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.337	36.016	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.001	0.00

ANNUAL TOTALS FOR YEAR 2014

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	MM	CU. METERS	PERCENT
PRECIPITATION	525.70	56249.926	100.00
RUNOFF	0.000	0.000	0.00
POTENTIAL EVAPOTRANSPIRATION	765.374	81895.008	
ACTUAL EVAPOTRANSPIRATION	561.333	60062.578	106.78
PERC./LEAKAGE THROUGH LAYER 1	36.016048	3853.717	6.85
CHANGE IN WATER STORAGE	-71.649	-7666.396	-13.63
SOIL WATER AT START OF YEAR	250.000	26750.000	
SOIL WATER AT END OF YEAR	178.688	19119.617	
INTERCEPTION WATER AT START OF YEAR	0.337	36.016	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0003	0.032	0.00

ANNUAL TOTALS FOR YEAR 2015

	MM	CU. METERS	PERCENT
PRECIPITATION	486.50	52055.512	100.00
RUNOFF	0.000	0.000	0.00
POTENTIAL EVAPOTRANSPIRATION	768.990	82281.969	
ACTUAL EVAPOTRANSPIRATION	439.949	47074.539	90.43
PERC./LEAKAGE THROUGH LAYER 1	0.000000	0.000	0.00

CHANGE IN WATER STORAGE	46.551	4980.956	9.57
SOIL WATER AT START OF YEAR	178.688	19119.617	
SOIL WATER AT END OF YEAR	224.943	24068.943	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.296	31.631	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0001	0.016	0.00

ANNUAL TOTALS FOR YEAR 2016

	MM	CU. METERS	PERCENT
	-----	-----	-----
PRECIPITATION	374.50	40071.527	100.00
RUNOFF	0.000	0.000	0.00
POTENTIAL EVAPOTRANSPIRATION	763.790	81725.531	
ACTUAL EVAPOTRANSPIRATION	378.055	40451.863	100.95
PERC./LEAKAGE THROUGH LAYER 1	32.917465	3522.169	8.79
CHANGE IN WATER STORAGE	-36.472	-3902.520	-9.74
SOIL WATER AT START OF YEAR	224.943	24068.943	
SOIL WATER AT END OF YEAR	188.767	20198.055	
INTERCEPTION WATER AT START OF YEAR	0.296	31.631	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00

ANNUAL WATER BUDGET BALANCE 0.0001 0.013 0.00

ANNUAL TOTALS FOR YEAR 2017

	MM	CU. METERS	PERCENT
	-----	-----	-----
PRECIPITATION	476.20	50953.414	100.00
RUNOFF	0.000	0.000	0.00
POTENTIAL EVAPOTRANSPIRATION	747.223	79952.852	
ACTUAL EVAPOTRANSPIRATION	476.757	51012.996	100.12
PERC./LEAKAGE THROUGH LAYER 1	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-0.557	-59.604	-0.12
SOIL WATER AT START OF YEAR	188.767	20198.055	
SOIL WATER AT END OF YEAR	187.930	20108.527	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.280	29.924	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0002	0.022	0.00

ANNUAL TOTALS FOR YEAR 2018

	MM	CU. METERS	PERCENT
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PRECIPITATION	329.50	35256.516	100.00
RUNOFF	8.438	902.890	2.56
POTENTIAL EVAPOTRANSPIRATION	765.267	81883.547	
ACTUAL EVAPOTRANSPIRATION	324.747	34747.918	98.56
PERC./LEAKAGE THROUGH LAYER 1	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-3.685	-394.295	-1.12
SOIL WATER AT START OF YEAR	187.930	20108.527	
SOIL WATER AT END OF YEAR	184.525	19744.154	
INTERCEPTION WATER AT START OF YEAR	0.280	29.924	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.005	0.00

ANNUAL TOTALS FOR YEAR 2019

	MM	CU. METERS	PERCENT
	-----	-----	-----
PRECIPITATION	427.10	45699.715	100.00
RUNOFF	0.000	0.000	0.00
POTENTIAL EVAPOTRANSPIRATION	785.747	84074.945	
ACTUAL EVAPOTRANSPIRATION	427.498	45742.258	100.09
PERC./LEAKAGE THROUGH LAYER 1	0.000000	0.000	0.00
CHANGE IN WATER STORAGE	-0.398	-42.574	-0.09
SOIL WATER AT START OF YEAR	184.525	19744.154	

SOIL WATER AT END OF YEAR	184.127	19701.578	
INTERCEPTION WATER AT START OF YEAR	0.000	0.000	
INTERCEPTION WATER AT END OF YEAR	0.000	0.000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0003	0.031	0.00

FINAL WATER STORAGE AT END OF YEAR 2019

LAYER	(CM)	(VOL/VOL)
----	-----	-----
1	18.4127	0.1841
TOTAL WATER IN LAYERS	18.413	
SNOW WATER	0.000	
INTERCEPTION WATER	0.000	
TOTAL FINAL WATER	18.413	

PEAK DAILY VALUES FOR YEARS 2010 THROUGH 2019

	(MM)	(CU. METERS)
	-----	-----
PRECIPITATION	62.20	6655.400
RUNOFF	6.791	726.5937
PERCOLATION/LEAKAGE THROUGH LAYER 1	24.771452	2650.54541

SNOW WATER 43.88 4695.3252

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.2667

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.1100

AVERAGE MONTHLY VALUES (MM) FOR YEARS 2010 THROUGH 2019

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
	-----	-----	-----	-----	-----	-----
PRECIPITATION						

TOTALS	34.74 69.25	18.62 55.26	27.21 49.32	21.81 37.62	68.82 38.90	42.41 32.01
STD. DEVIATIONS	8.63 44.97	13.34 33.62	14.52 26.73	6.03 16.59	43.82 34.94	23.49 16.69
RUNOFF						

TOTALS	0.128 0.000	0.175 0.000	1.715 0.000	0.720 0.000	0.000 0.000	0.000 0.000
STD. DEVIATIONS	0.406 0.000	0.552 0.000	3.616 0.000	2.278 0.000	0.000 0.000	0.000 0.000
POTENTIAL EVAPOTRANSPIRATION						

TOTALS	11.779 141.679	13.109 111.690	32.642 73.554	78.184 29.389	105.596 16.439	131.379 15.587
STD. DEVIATIONS	1.287 12.819	1.818 8.956	7.203 3.879	8.136 2.151	13.094 0.832	7.968 1.972
ACTUAL EVAPOTRANSPIRATION						

TOTALS	9.425 74.097	7.787 55.578	20.236 31.489	36.677 13.847	85.031 10.030	103.043 10.617
STD. DEVIATIONS	2.247 33.470	2.453 24.660	6.380 15.727	8.130 4.392	17.599 4.229	32.442 2.578

PERCOLATION/LEAKAGE THROUGH LAYER 1

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TOTALS	10.6464	8.8159	2.2517	2.1641	7.3703	0.5200
	0.0000	0.0000	0.0000	0.0000	9.6276	3.5366
STD. DEVIATIONS	18.1130	14.8632	4.7812	6.8434	12.4374	1.6443
	0.0000	0.0000	0.0000	0.0000	30.4452	9.5338

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 2010 THROUGH 2019

	MM		CU. METERS	PERCENT
	-----		-----	-----
PRECIPITATION	495.97	(125.414)	53068.8	100.00
RUNOFF	2.738	(6.2813)	292.99	0.552
POTENTIAL EVAPOTRANSPIRATION	761.027	(14.2654)	81429.88	
ACTUAL EVAPOTRANSPIRATION	457.859	(73.5086)	48990.87	92.316
PERCOLATION/LEAKAGE THROUGH LAYER 1	44.93275	(78.89565)	4807.804	9.05957
CHANGE IN WATER STORAGE	-9.560	(1.7722)	-1022.87	-1.927

