Delta Evapotranspiration of Applied Water (DETAW v2.0)

Preliminary User's Manual

Lan Liang and Bob Suits
Delta Modeling Section
Modeling Support Branch
Bay-Delta Office
June 2018

Table of Contents

1. Introduction

DETAW v2.0 simulates the daily actual evapotranspiration(ET) and root zone water balance on 168 subareas in the Sacramento-San Joaquin River Delta. The root zone water balance on each Delta subarea counts as part of the applied water, rainfall, seepage and the change in soil water content to satisfy the water demand, ET. The model calculates and outputs all the elements related to the root zone water balance.

The major technical algorithms in DETAW 2.0 are described in two documents in this package. One is the DETAW v1.0 report which describes the fundamental technical algorithm, and the other is Chapter 3 of 2017 Delta Modeling Annual Report which describes the technical improvements in DETAW v2.0.

This document serves as a guide for setting up all the input files of the DETAW historical scenario and running the model. The historical scenario uses available observed data as much as possible and simulates the historical Delta island consumptive use from 1922 through September 2016. All the required inputs for running the historical scenario have been included in the package. A schematic representation of the file structure for the DETAW historical scenario is given in Figure 1.

Figure 1. The file structure for the DETAW v2.0 historical scenario

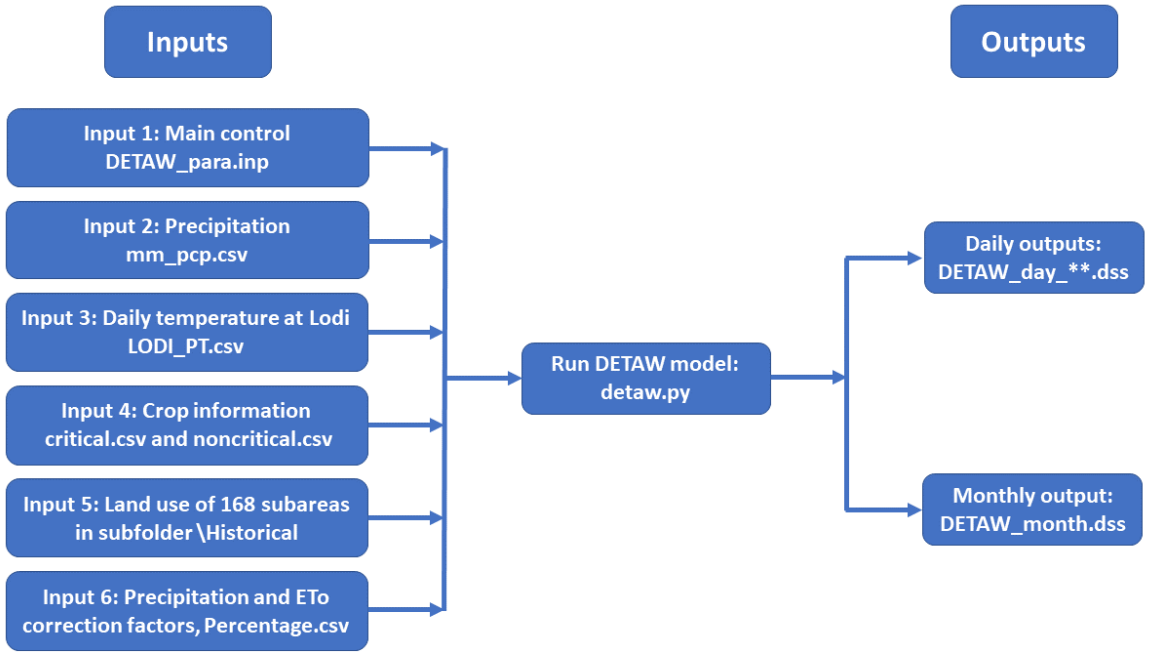

Figure 1 shows that the inputs of the historical scenario include main control parameters, the daily precipitation at seven stations, Lodi daily maximum and minimum temperature, parameters related to 15 crop categories, and the annual land use for 168 sub-areas.

At this time, the provided data format of each input file should be followed if changing inputs. DETAW was initially developed to understand Delta island consumptive use and the model's flexibility for easily studying other factors is currently limited. However, changing inputs is possible with some minor change. For example, for a planning study with different climatic data and land use, keep all the paths and names of the input files as the historical scenario but replace the climatic data and land use following the same format as in each original input file.

A general overview of the input files for DETAW v2.0 is provided below, followed by instructions for running the model.

2. Model Inputs

2.1 Input 1: Main Control Parameters

The main control parameters are in the input file, DETAW_para.inp. The options for each parameter are listed and explained in Table 1.

Table 1 The options of the main control parameters.

Parameter	Query	Possible Responses
Daily Output	Produce daily output?	1 – Yes, 0 – No. The default value is 1.
Monthly output	Produce monthly output?	1 – Yes, 0 – No. The default value is 1.
Yearly output	Produce the yearly output?	1 – Yes, 0 – No. The yearly output is rarely used, so the default value is 0.
Project run	Projected run or historical run?	1 – the projected run, 0 – the historical run. The default value is 0.
Delta output	Generate ETc, ETaw, Espg and Er for the whole Delta?	1 – Yes, 0 – No. The default value is 0.
Daily output unit	Specify unit of the original daily output terms.	1 – "A-FT", 0 – "mm". The default value is 1 for DSM2 study.
forDSM2_daily	Is the daily outputs for the DSM2 model or according to original output setting?	1 – The daily output is for DSM2, 0 – all the outputs are generated as the original output set. Further description of the option is provided below.
End year	Specify the end water year.	The end year. For example, 2016, for the simulation used in this package.
Days	Specify the number of days the model simulates.	The simulation days, for example, 34700 days from Sep.30,1921 to

		Sep.30,2016. Open the input files LODI_PT.csv or mm_pcp.csv and the rows of each file minus one is the simulation days.

If the parameter "ForDSM2_daily" is set to 0 to obtain the original output set, the daily outputs should include most factors related to the root zone water balance calculation, such as reference ET(ETo), crop ET(ETc), total precipitation(Pcp), effective rainfall(Er), calculated seepage based on the plant rooting depth(Spg), effective seepage(Espg), the daily drop in soil water content(Dsw), ET of applied water(ETaw), soil water depletion(SWD), field capacity(FC), soil water content(SWC),yield threshold(YT), net irrigation application(NA), and in-season cumulative values (CPcp, CEr, CEspg, CETc, CDsw, CETaw).

If the parameter "ForDSM2_daily" is set as 1 to obtain input for the DSM2 model, the daily outputs only have ETc, Pcp, Espg, Dsw, ETaw, and Er.

2.2 Input 2: Precipitation

Precipitation data can be retrieved from the California weather database, Statewide Integrated Pest Management Program, University of California (UC IPM). This database collects the data from California Irrigation Management Information System (CIMIS) and National Climatic Data Center(NCDC) in National Oceanic and Atmospheric Administration (NOAA). Generally, DETAW uses NCDC data. If the national climatic data is not available, CIMIS data substitutes.

The precipitation data comes from seven stations, Brentwood, Davis, Galt, Lodi, Rio Vista, Stockton, and Tracy. UC IPM currently only provides the precipitation data at Davis, Lodi, Stockton and Tracy. The other three stations do not have data for recent years. During the development of DETAW v1.0, correlations were established to estimate the precipitation at these three stations:

$$P(\text{Brentwood}) = 1.37 * P(\text{Tracy}) \quad [1]$$

$$P(\text{Galt}) = 1.01 * P(\text{Lodi}) \quad [2]$$

$$P(\text{Rio Vista}) = 0.98 * P(\text{Davis}) \quad [3]$$

The precipitation input file, mm_pcp.csv in this package includes the precipitation data for water years 1922 through 2016. Although this file consists of daily data, any updating must include an entire year as the running loop in the program requires increments of water years. For example, if the observed data is available until Nov. 30th, 2015, the file must be extended to

Sep. 30th, 2016 and the table from Dec.1st, 2015 to Sep.30th, 2016 must be filled with some placeholder values.

2.3 Input 3: Air Temperature

Daily maximum and minimum air temperature at Lodi is a required input of DETAW. This can also be downloaded from UC IPM. UC IPM collects data at two Lodi stations, LODI.C from NCDC and LODI_WEST.A from CIMIS. LODI.C is preferred as the primary air temperature source since all the precipitation data in DETAW also comes from NCDC. If errors or missing data for this station are found, data from LODI-WEST.A are used. The air temperature data at these two stations match very well.

The air temperature input file, LODI_PT.csv, in this package has the air temperature data at Lodi from water years 1922 through 2016. The same as for the precipitation input file, this input file must be extended for the entire water year. If the simulation includes part of an incomplete year, data for the future days to the end of the water year must still be filled.

2.4 Input 4: Crop Information

DETAW v1.0 defined 15 crop categories in the Delta and its report specified how to classify crops according to the crop categories. Table 2 shows the parameters needed for each of 15 crop categories. Two input files, critical.csv and noncritical.csv in Table 3 and Table 4 respectively, provide crop information under critical and noncritical (normal and wet) water year types. The crop coefficients in the two csv files are the result of being calibrated in DETAW v2.0, so should only be changed after further analysis.

Table 2 Crop and soil information

Symbol	Variable
BD	Beginning calendar date for the in-season period
ED	Ending calendar date for the in-season period
BD	Beginning day of the year for the in-season period
ED	Ending day of the year for the in-season period. Subtract 365 for bigger numbers.
F	Frequency of irrigation during initial growth of type 1 crops (default = 30days)
Kc1	Crop coefficient on date B and between dates A and B
Kc2	Crop coefficient between dates C and D
Kc3	Crop coefficient on date E
a-b	Percentage of the season from date A to B
a-c	Percentage of the season from date A to C
a-d	Percentage of the season from date A to D
SDx	Maximum soil depth (mm)
RDx_Lo	Maximum crop root depth in Delta lowlands (mm)

RDx_Up	Maximum crop root depth in Delta uplands (mm)
AW_Lo	Available water content in Delta lowland soil (mm)
AW_Up	Available water content in Delta upland soil (mm)
AD%	Allowable depletion of available water (%)

Table 3 The critical year information of 15 crop categories

			Irrig				Irrig		Truck				Riparian	Native	Non-irrig	Water
Crop		Urban	Pasture	Alfalfa	Field	Sugarbeet	Grains	Rice	Crops	Tomato	Orchard	Vineyard	Vegetatio	Vegetatio	Grain	Surfaces
Code	Type	UR	PA	AL	FI	SB	GR	RI	TR	TO	OR	VI	RV	NV	DG	WS
Number	#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Type		3	2	2	1	1	1	1	1	1	3	3	3	3	1	2
BD		1-Jan	1-Jan	14-Apr	28-Apr	14-Mar	31-Oct	14-May	28-Jan	31-Mar	30-Mar	31-Mar	1-Jan	1-Jan	31-Oct	1-Jan
ED		31-Dec	31-Dec	30-Oct	29-Sep	29-Sep	30-May	29-Sep	3-Dec	30-Aug	13-Nov	31-Oct	31-Dec	31-Dec	31-May	31-Dec
BD		1	1	105	119	74	305	135	29	91	90	91	1	1	305	1
ED		366	366	304	273	273	516	273	339	243	318	305	366	366	517	366
F		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Kc1		0.59	0.75	0.77	0.21	0.2	0.33	1.2	0.37	0.3	0.55	0.45	0.8	1	0.33	1.1
Kc2		0.35	0.75	0.77	0.9	0.8	1.1	0.8	0.6	0.7	0.75	0.45	0.85	0.5	0.9	1.1
Kc3		0.59	0.75	0.77	0.57	0.95	0.15	0.8	0.38	0.65	0.8	0.35	0.8	1	0.15	1.1
a-b		0	0	0	19	15	20	22	14	25	0	0	0	0	20	0
a-c		33	33	33	44	45	45	37	31	50	49	25	33	33	45	33
a-d		67	67	67	76	80	75	86	92	80	75	75	67	67	75	67
SDx		1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
RDx_Lo		400	610	1219	610	1219	610	305	1219	1219	1524	1219	1524	762	610	1524
RDx_Up		400	610	1829	1219	1524	1219	610	1524	1524	1829	1524	1524	610	610	1524
AW_Lo		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
AW_Up		0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
AD %		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50

Table 4 The noncritical year information of 15 crop categories

			Irrig				Irrig		Truck				Riparian	Native	Non-irrig	Water
Crop		Urban	Pasture	Alfalfa	Field	Sugarbeet	Grains	Rice	Crops	Tomato	Orchard	Vineyard	Vegetatio	Vegetatio	Grain	Surfaces
Code	Type	UR	PA	AL	FI	SB	GR	RI	TR	TO	OR	VI	RV	NV	DG	WS
Number	#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Type		3	2	2	1	1	1	1	1	1	3	3	3	3	1	2
BD		1-Jan	1-Jan	14-Apr	22-Apr	14-Mar	31-Oct	14-May	2-Feb	31-Mar	21-Mar	31-Mar	1-Jan	1-Jan	31-Oct	1-Jan
ED		31-Dec	31-Dec	30-Oct	6-Sep	29-Sep	30-May	29-Sep	27-Nov	30-Aug	3-Nov	31-Oct	31-Dec	31-Dec	30-May	31-Dec
BD		1	1	105	113	74	305	135	34	91	81	91	1	1	305	1
ED		366	365	304	251	273	516	273	333	243	308	305	366	366	516	366
F		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Kc1		0.62	0.75	0.77	0.2	0.2	0.45	1.2	0.43	0.3	0.55	0.45	0.8	1	0.33	1.1
Kc2		0.35	0.75	0.77	0.9	0.8	1.1	0.8	0.6	0.7	0.75	0.45	0.85	0.5	0.9	1.1
Kc3		0.62	0.75	0.77	0.47	0.95	0.15	0.8	0.42	0.65	0.75	0.35	0.8	1	0.15	1.1
a-b		0	0	0	19	15	20	22	15	25	0	0	0	0	20	0
a-c		33	33	33	44	45	45	37	33	50	49	25	33	33	45	33
a-d		67	67	67	76	80	75	86	90	80	78	75	67	67	75	67
SDx		1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524	1524
RDx_Lo		400	610	1219	610	1219	610	305	1219	1219	1524	1219	1524	762	610	1524
RDx_Up		400	610	1829	1219	1524	1219	610	1524	1524	1829	1524	1524	610	610	1524
AW_Lo		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
AW_Up		0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
AD %		50	50	50	50	50	50	50	50	50	50	50	50	50	50	50

2.5 Input 5: Land Use

Identical to DETAW v1.0, DETAW v2.0 depicts the Delta as 168 subareas. The land use of each subarea is assigned to 15 land use categories. Table 5 lists the crop categories used to identify the Delta land use in DETAW v2.0.

Table 5 15 crop categories in DETAW v2.0

	Crop categories	Land Use ID
1	Urban	UR
2	Pasture	PA
3	Alfalfa	AL
4	Field crops	FI
5	Sugar Beets	SB
6	Grain	GR
7	Rice	RI
8	Trucks	TR
9	Tomatoes	TO
10	Orchards	OR
11	Vineyards	VI
12	Riparian Vegetation	RV
13	Native Vegetation	NV
14	Non-irrigated Grain	DGR
15	Water Surfaces	WS

Two sets of land use data have been developed for the historical scenario and the projected scenario in DETAW v2.0. The sole difference between these two scenarios is the land use. The input file DETAW_para.inp mentioned above provides the option “Projected run” for users to select the scenario.

The historical scenario attempts to simulate past reality as much as possible. It applies, if available, the processed crop-specific land cover data of survey or satellite images as the land use input. DETAW v1.0 includes the land use data of 15 land-use categories by 168 sub-areas for the water years from 1922 to 2003. DETAW v2.0 extends the land use to cover 2004 through 2016 by interpolating the available land use data for 2007, 2009 and 2015. DWR processed these three years’ land use GIS data and determined crop acreages for each of the 168 sub-areas. The land use survey data for 2007 was provided by the Division of Statewide Integrated Water Management, Department of Water Resources(DWR). The 2009 land use data came from the United States Department of Agriculture, National Agricultural Statistics Service (NASS which uses satellite imagery to provide the digital crop-categorized geo-referenced data. The

2015 land use was integrated from the survey data and multiple satellite and aerial images by Land IQ.

The historical scenario includes a total of 168 csv files for the land use data from 1922 to 2016, saved under the folder, .\Historical\. Each file lists the crop acreages for each sub-area. The unit of the area in these files is *hectare.* An example is shown in Table 6. This table named as SA0001.csv includes the water year type (dry/critical or wet/normal) and the annual acreages of 15 crop categories of sub-area 1 from WY1922 to WY2016. The land use files of other sub-areas have the same format.

The projected scenario has the same data format of land use as the historical scenario. It also has 168 csv files for the land use data from 1922 through 2016, under the folder .\Projected\. In each csv file, the annual land use is determined by the water year type.

If the land use data need to be extended after 2016, all the 168 files must be appended in the same format.

2.6 Input 6: Precipitation and ETo correction factors

DETAW first estimates the precipitation at seven weather stations and ETo at the Lodi NCDC station. Then local values are spatially distributed onto 168 sub-areas with the rules described in the DETAW v1.0 report. Percentage.csv provides the percentages and correction factors for the spatial distributions. If no additional reliable data is available to justify the input data, the original data set should be used.

Table 6 Land use of sub-area 1 from WY1922 to 2016.

DATE	TYPE	UR	PA	AL	FI	SB	GR	RI	TR	TO	OR	VI	RV	NV	DGR	WS
number	#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1922	AN	13	75	387	1070	147	879	0	1642	0	227	0	36	178	0	141
1923	BN	13	90	385	1082	160	825	0	1459	0	236	0	49	302	0	195
1924	C	13	18	442	934	180	1042	0	1334	0	235	0	52	338	0	208
1925	D	13	90	370	902	141	950	0	1314	0	186	0	65	507	0	258
1926	D	13	72	372	1108	67	871	0	1401	0	257	0	55	364	0	217
1927	W	13	47	375	1093	122	854	0	1345	0	250	0	58	409	0	231
1928	AN	13	108	382	1153	124	812	0	1444	0	229	0	48	292	0	192
1929	C	13	47	387	1071	181	858	0	1549	0	216	0	44	254	0	176
1930	D	13	131	384	1226	203	822	0	1688	0	210	0	14	50	0	55
1931	C	13	217	384	1173	261	733	0	1601	0	157	0	27	121	0	109
1932	D	13	217	391	1112	266	774	0	1593	0	148	0	30	135	0	117
1933	C	13	216	400	1050	272	813	0	1587	0	137	0	32	150	0	126
1934	C	13	216	409	988	278	852	0	1580	0	128	0	34	164	0	134
1935	BN	13	214	417	927	285	891	0	1573	0	117	0	36	182	0	143
1936	BN	13	214	427	865	292	933	0	1565	0	107	0	38	194	0	149
1937	BN	13	212	436	805	298	972	0	1559	0	97	0	39	208	0	156
1938	W	13	212	445	743	304	1012	0	1552	0	90	0	41	222	0	162
1939	D	13	230	442	723	298	1045	0	1552	0	88	0	39	209	0	156
1940	AN	13	250	439	703	293	1077	0	1550	0	87	0	38	196	0	150
1941	W	13	268	435	685	286	1111	0	1549	0	87	0	36	183	0	144
1942	W	13	287	430	663	279	1143	0	1548	0	85	0	35	174	0	139
1943	W	13	307	427	643	274	1176	0	1546	0	85	0	33	160	0	132
1944	D	13	325	423	623	267	1208	0	1545	0	84	0	32	151	0	127
1945	BN	13	347	420	601	262	1241	1	1545	82	82	0	22	92	0	89
1946	BN	13	366	415	583	255	1274	1	1543	124	81	0	16	60	0	64
1947	D	13	386	414	564	249	1306	1	1543	165	79	0	9	30	0	36
1948	BN	13	404	409	544	244	1341	1	1542	207	79	0	2	5	0	6
1949	D	13	402	420	617	245	1277	2	1509	225	79	0	1	3	0	4
1950	BN	13	400	432	689	247	1213	2	1479	243	78	0	0	0	0	0
1951	AN	13	398	442	759	248	1149	2	1448	262	76	0	0	0	0	0
1952	W	13	395	454	829	249	1083	3	1414	280	76	0	0	0	0	0
1953	W	13	393	465	898	250	1019	3	1383	298	74	0	0	0	0	0
1954	AN	13	390	475	968	251	953	3	1352	317	74	0	0	0	0	0
1955	D	13	389	487	1036	252	889	4	1319	335	72	2	0	0	0	0
1956	W	13	375	487	1081	257	872	3	1294	338	75	2	0	0	0	0
1957	AN	13	360	485	1124	262	856	3	1272	341	78	2	0	0	0	0
1958	W	13	347	482	1168	267	839	2	1249	344	83	2	0	0	0	0
1959	BN	13	333	481	1213	272	822	2	1228	347	86	0	0	0	0	0
1960	D	13	320	479	1256	276	806	2	1205	352	89	0	0	0	0	0
1961	D	13	301	474	1287	279	824	1	1172	352	92	0	0	0	0	0
1962	BN	13	302	474	1319	271	852	1	1119	348	95	0	0	0	0	0
1963	W	13	303	474	1348	261	880	1	1071	345	99	0	0	0	0	0
1964	D	14	304	474	1377	252	908	1	1021	342	100	2	0	0	0	0
1965	W	14	305	475	1405	243	935	1	972	339	104	4	0	0	0	0
1966	BN	14	306	475	1435	234	963	1	920	335	107	6	0	0	0	0
1967	W	15	307	476	1463	224	992	1	869	331	110	8	0	0	0	0
1968	BN	15	306	477	1493	214	1021	1	820	327	114	8	0	0	0	0
1969	W	16	307	478	1522	204	1049	1	769	325	116	10	0	0	0	0
1970	W	16	307	477	1548	194	1076	1	716	320	119	14	1	3	0	4

1971	W	17	307	475	1573	183	1102	1	661	316	122	20	2	7	0	10
1972	BN	18	307	474	1597	173	1102	1	608	311	125	30	6	19	0	25
1973	AN	19	307	472	1623	162	1127	1	555	306	128	41	7	20	0	27
1974	W	20	307	471	1654	153	1150	1	502	303	131	53	7	18	0	28
1975	W	21	291	442	1758	185	1099	1	432	294	131	53	11	32	0	46
1976	C	23	273	414	1858	219	1049	1	360	286	131	55	15	48	0	65
1977	C	24	295	493	1741	138	1192	0	324	343	131	55	7	20	0	32
1978	AN	24	266	405	1882	137	1159	0	376	343	129	57	2	5	0	9
1979	BN	25	264	379	1902	140	1133	1	355	331	129	61	9	26	0	40
1980	AN	25	286	393	1767	166	1012	1	361	314	134	63	30	117	0	128
1981	D	26	275	391	1771	171	1164	1	370	317	134	65	13	39	0	58
1982	W	27	260	376	1964	108	857	1	371	327	137	67	32	129	0	139
1983	W	28	250	388	1560	130	730	1	115	301	137	71	77	675	0	332
1984	W	29	237	421	1808	186	841	1	408	303	136	75	37	156	0	159
1985	D	29	228	445	1580	205	930	1	413	294	137	81	44	216	0	192
1986	W	29	226	462	1289	176	975	1	414	287	137	85	61	392	0	262
1987	D	29	225	499	1203	208	980	0	420	272	139	89	62	404	0	267
1988	C	30	225	525	1170	227	1014	0	426	280	139	95	58	356	0	251
1989	D	30	217	523	1230	201	1184	0	428	320	143	101	42	193	0	182
1990	C	30	210	523	1364	195	1205	0	429	331	146	107	29	102	0	124
1991	C	31	210	523	1364	195	1205	0	429	331	146	107	29	101	0	124
1992	C	32	210	523	1364	195	1205	0	429	331	146	107	29	99	0	124
1993	AN	33	216	526	1375	213	1032	0	389	312	141	97	46	217	0	199
1994	C	34	210	523	1364	195	1205	0	429	331	146	107	29	97	0	125
1995	W	35	257	516	2077	77	414	0	527	353	140	140	30	101	0	129
1996	W	35	162	528	2043	37	592	0	435	370	133	241	26	82	0	113
1997	W	35	241	519	2184	34	432	0	375	342	129	307	24	70	0	103
1998	W	36	293	574	2038	26	303	0	433	378	121	345	29	94	0	125
1999	W	36	318	578	1973	34	476	0	420	343	131	331	20	52	0	84
2000	AN	37	284	531	1908	44	455	0	392	325	145	411	31	102	0	133
2001	D	37	251	583	1835	0	612	0	390	275	144	434	28	86	0	120
2002	D	38	251	583	1835	0	612	0	390	275	144	434	28	85	0	120
2003	AN	38	284	531	1908	44	455	0	392	325	145	411	31	100	0	133
2004	BN	63	8	1696	490	54	308	0	324	848	176	146	41	699	0	71
2005	AN	63	8	1696	490	54	308	0	324	848	176	146	41	699	0	71
2006	W	63	8	1696	490	54	308	0	324	848	176	146	41	699	0	71
2007	D	63	8	1696	490	54	308	0	324	848	176	146	41	699	0	71
2008	C	63	8	1597	575	27	310	0	324	899	176	147	41	619	0	71
2009	D	64	8	1498	660	0	312	0	324	950	176	148	42	539	0	71
2010	BN	64	8	1498	660	0	312	0	324	950	176	148	42	539	0	71
2011	W	64	8	1498	660	0	312	0	324	950	176	148	42	539	0	71
2012	BN	0	127	1731	32	0	0	0	194	1055	287	172	66	1079	0	50
2013	D	0	127	1731	32	0	0	0	194	1055	287	172	66	1079	0	50
2014	C	0	127	1731	32	0	0	0	194	1055	287	172	66	1079	0	50
2015	C	0	127	1731	32	0	0	0	194	1055	287	172	66	1079	0	50
2016	W	0	127	1731	32	0	0	0	194	1055	287	172	66	1079	0	50

3. Run DETAW v2.0

3.1 Prerequisites

Certain software needs to be installed before running DETAW v2.0.

3.1.1 Install Window command prompt

If not already installed, double click two files in the folder /tools/window_command to install. This allows you to open a command window by clicking the current folder in Windows File explorer. Python scripts run in the command window.

3.1.2 Python

Download Python 2.7 from the websites of Python or Anaconda or find it in the folder /tools/python, and double click on the executable file to install.

3.1.3 HEC-DSSVue

Download and install HEC-DSSVue. DETAW v2.0 outputs are in DSS files. HEC_DSSVue is convenient to visualize, examine, and process the model outputs.

3.2 Launch DETAW v2.0

Once all the required software and the model inputs are prepared, the model can be run. Below are the steps to run the model:

a) Open Windows File Explorer, right click the folder where the DETAW package is located, and select “Windows Command Prompt Here”
b) In the command window, type:
   python detaw.py

The released package includes all the inputs of the historical scenario from October 1922 through September 2016. The parameters in the models have been calibrated and validated, and the historical simulation results can be produced by running the model directly without any change to the released input files.