

DSM2 Quick Start: Historical Simulation Demo and Hands-On

June 23, 2023



Overview

1. Introduction to DSS
2. Introduction to HDF5 (DSM2 tidefiles)
3. Quick Review of DSM2 input setup
4. Hands-on exercises

Historical
base case

Run 1: Base historical study

Sac River Flow
+30%

Run 2: Sacramento River flow increased by 30%

Temporary
Barrier
increased width

Run 3: Increased temporary barrier width (optional)

1a. Introduction to DSS

DSS = Data Storage System

- USACE Hydrologic Engineering Center (HEC) **D**ata **S**torage **S**ystem
- Time series database, **not** a relational database
- time series input and output
- HEC-DSSVue, Vista, pyhecdss
- For more information: HEC-DSSVue:
 - <https://www.hec.usace.army.mil/software/hec-dss/>

1b. Introduction to DSS

HEC-DSSVue

hist0717Modified.dss - HEC-DSSVue

File Edit View Display Groups Data Entry Tools Advanced Help

File Name: D:/delta/dsm2_v8.2beta_2/studies/hist0717Modified.dss

Pathnames Shown: 30 Pathnames Selected: 1 Pathnames in File: 5155 File Size: 105.13 MB

historical_base.dss SLR_1FT.dss SLR_3FT.dss SLR_6.92FT.dss SLR_6FT.dss hist0717Modified.dss

Search A: C: E:

By Parts: B: D: F:

Number	Part A	Part B	Part C	Part D /range	Part E	Part F
1	FILL+CHAN	BYOLO040	FLOW	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
2	FILL+CHAN	CHCCC006	FLOW-DIVERSION	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
3	FILL+CHAN	CHDMC004	FLOW-EXPORT	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
4	FILL+CHAN	CHSWP003	FLOW-EXPORT	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
5	FILL+CHAN	CHVCT001	FLOW-EXPORT	01JAN1988 - 01JAN2017	1DAY	DWR-DMS-201707
6	FILL+CHAN	RCAL009	FLOW	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
7	FILL+CHAN	RCSM075	FLOW	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
8	FILL+CHAN	RMKL070	FLOW	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
9	FILL+CHAN	ROLD034	FLOW-EXPORT	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
10	FILL+CHAN	RSAC054	EC	01OCT1989 - 01AUG2017	1HOUR	DWR-DMS-201707 ...

RKI Value = River Kilometer Index

River or slough abbreviation + distance from some downstream reference point

Example:

RSAC054 = Sacramento River, 54 km from Golden Gate (Martinez)

**Column headers:
Pathname Parts**

1c. Introduction to DSS

HEC-DSSVue: Time Intervals

Regular Time Series data

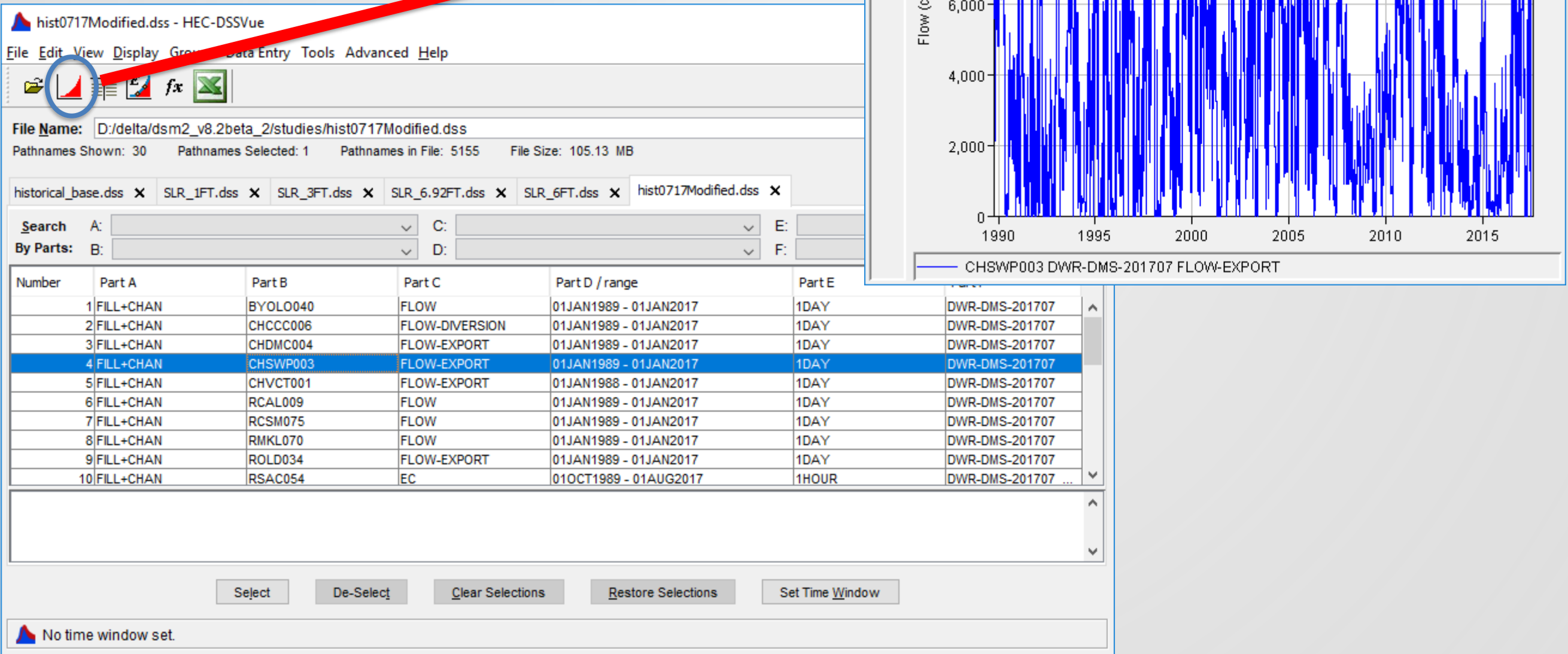
Number	Part A	Part B	Part C	Part D / range	Part E	Part F
1	FILL+CHAN	BYOLO040	FLOW	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
2	FILL+CHAN	CHCCC006	FLOW-DIVERSION	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
3	FILL+CHAN	CHDMC004	FLOW-EXPORT	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
4	FILL+CHAN	CHSWP003	FLOW-EXPORT	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
5	FILL+CHAN	CHVCT001	FLOW-EXPORT	01JAN1988 - 01JAN2017	1DAY	DWR-DMS-201707
6	FILL+CHAN	RCAL009	FLOW	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
7	FILL+CHAN	RCSM075	FLOW	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707

Irregular Time Series data

Number	Part A	Part B	Part C	Part D / range	Part E	Part F
1	HIST+GATE	CHWST000	POS	30Apr1971 - 01Aug2017	IR-YEAR	DWR-OM-JOC-DSM2
2	HIST+GATE	GL_CN	INSTALL	30Sep1986 - 01Jan2020	IR-DECADE	DWR-BDO
3	HIST+GATE	GL_CN	PIPE_OP_DOWN	30Sep1986 - 01Jan2020	IR-DECADE	DWR-BDO
4	HIST+GATE	GL_CN	WEIRELEVATION	30Sep1986 - 31Dec2019	IR-DECADE	DWR-BDO_NAVD
5	HIST+GATE	GL_CN	WEIRWIDTH	30Sep1986 - 31Dec2019	IR-DECADE	DWR-BDO
6	HIST+GATE	MID_R	INSTALL	30Sep1986 - 01Jan2020	IR-DECADE	DWR-BDO
7	HIST+GATE	MID_R	PIPE_OP_DOWN	30Sep1986 - 01Jan2020	IR-DECADE	DWR-BDO
8	HIST+GATE	MID_R	WEIRELEVATION	30Sep1986 - 18Nov2016	IR-DECADE	DWR-BDO_NAVD
9	HIST+GATE	MTZSL	BOATLOCK_OP	01Jan1980 - 01Jan2020	IR-DECADE	DWR-ESO
10	HIST+GATE	MTZSL	FLASHBOARD_OP	01Jan1980 - 01Jan2020	IR-DECADE	DWR-ESO

1d. Introduction to DSS

HEC-DSSVue: Plotting Data



1e. Introduction to DSS

HEC-DSSVue: Tabulating Data

/FILL+CHAN/CHSWP003/FLOW-EXPORT/01JAN1989/1DAY/D... — □ ×

File Edit View Help

Ordinate	Date / Time	CHSWP003 FLOW-EXPORT DWR-DMS-201707
Units		cfs
Type		PER-AVER
1	30 Sep 89, 24:00	6,339
2	01 Oct 89, 24:00	6,330
3	02 Oct 89, 24:00	6,328
4	03 Oct 89, 24:00	6,352
5	04 Oct 89, 24:00	6,343
6	05 Oct 89, 24:00	6,362
7	06 Oct 89, 24:00	6,338
8	07 Oct 89, 24:00	6,371
9	08 Oct 89, 24:00	6,338
10	09 Oct 89, 24:00	6,340
11	10 Oct 89, 24:00	6,354
12	11 Oct 89, 24:00	6,052
13	12 Oct 89, 24:00	6,191
14	13 Oct 89, 24:00	6,329
15	14 Oct 89, 24:00	6,316
16	15 Oct 89, 24:00	5,960

hist0717Modified.dss - HEC-DSSVue

File Edit View Display Groups Data Entry Tools Advanced Help

File Name: D:/delta/dsm2_v8.2beta_2/studies/hist0717Modified.dss
Pathnames Shown: 30 Pathnames Selected: 1 Pathnames in File: 5155 File Size: 105.13 MB

historical_base.dss x SLR_1FT.dss x SLR_3FT.dss x SLR_6.92FT.dss x SLR_6FT.dss x hist0717Modified.dss x

Search A: C: E:

By Parts: B: D: F:

Number	Part A	Part B	Part C	Part D / range	Part E	Part F
1	FILL+CHAN	BYOLO040	FLOW	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
2	FILL+CHAN	CHCCC006	FLOW-DIVERSION	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
3	FILL+CHAN	CHDMC004	FLOW-EXPORT	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
4	FILL+CHAN	CHSWP003	FLOW-EXPORT	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
5	FILL+CHAN	CHVCT001	FLOW-EXPORT	01JAN1988 - 01JAN2017	1DAY	DWR-DMS-201707
6	FILL+CHAN	RCAL009	FLOW	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
7	FILL+CHAN	RCSM075	FLOW	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
8	FILL+CHAN	RMKL070	FLOW	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
9	FILL+CHAN	ROLD034	FLOW-EXPORT	01JAN1989 - 01JAN2017	1DAY	DWR-DMS-201707
10	FILL+CHAN	RSAC054	EC	01OCT1989 - 01AUG2017	1HOUR	DWR-DMS-201707 ...

Select

De-Select

Clear Selections

Restore Selections

Set Time Window

No time window set.

1f. Introduction to DSS

HEC-DSSVue: Smoothing Data

Math Functions

File Edit Display Help

Selected Data Set: /FILL+CHAN/RSAC054/STAGE/01SEP1989/15MIN/BASE_DETRENDED_NAVD/

Arithmetic General Time Functions Hydrologic **Smoothing** Statistics

Operator: Centered Moving Average

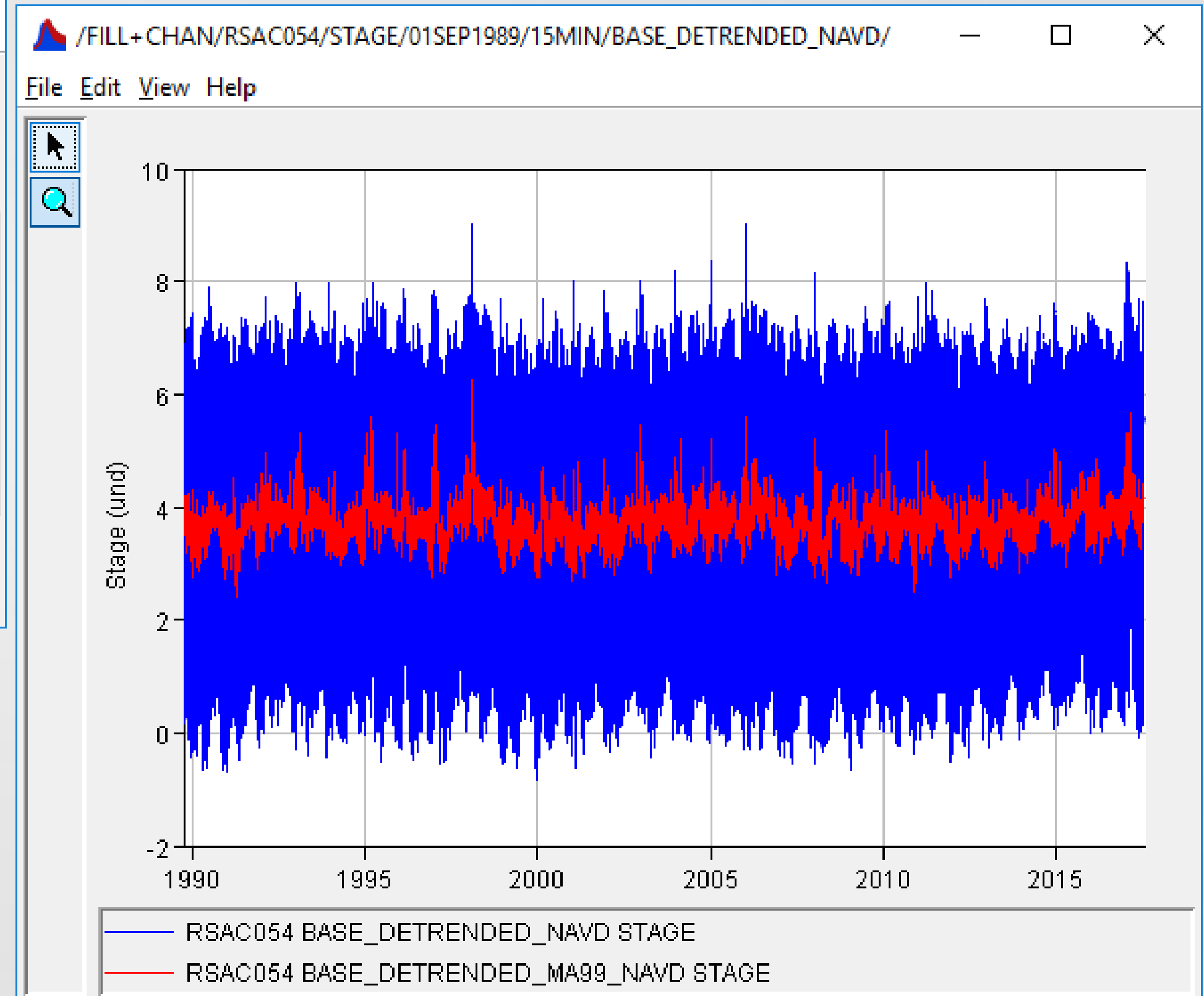
Number to Average Over: 99

☐ Only Valid Values

☐ Use Reduced Number of Values

Compute

Compute Complete



1g. Introduction to DSS

HEC-DSSVue: Importing data from web

hist0717Modified.dss - HEC-DSSVue

File Edit View Display Groups Data Entry Tools Advanced Help

File Name: E:/temp/studies/his

Pathnames Shown: 22 Pathnar

hist0717Modified.dss

Search A: C:

By Parts: B: D:

Number	Part A	Part B	Part C	Part D
1	FILL+CHAN	BYOLO040	FLOW	31Dec
2	FILL+CHAN	CHCCC006	FLOW-DIVER...	30Sep
3	FILL+CHAN	CHDMC004	FLOW-EXPORT	30Sep
4	FILL+CHAN	CHSWP003	FLOW-EXPORT	30Sep
5	FILL+CHAN	CHVCT001	FLOW-EXPORT	31Aug
6	FILL+CHAN	RCAL009	FLOW	01Oct
7	FILL+CHAN	RCSM075	FLOW	30Sep
8	FILL+CHAN	RMKL070	FLOW	29Sep

Select

De-Select

Clear Selections

Restore Selections

Set Time Window

No time window set.

Manual Time Series...

Manual Paired Data...

Manual Text...

Import

Export

SHEF...

WaterML

USGS Web

Time Series Data

RiverGages

NCDC...

Excel

DWR CDEC Plugin

Dssutl Write Data File

Text from File...

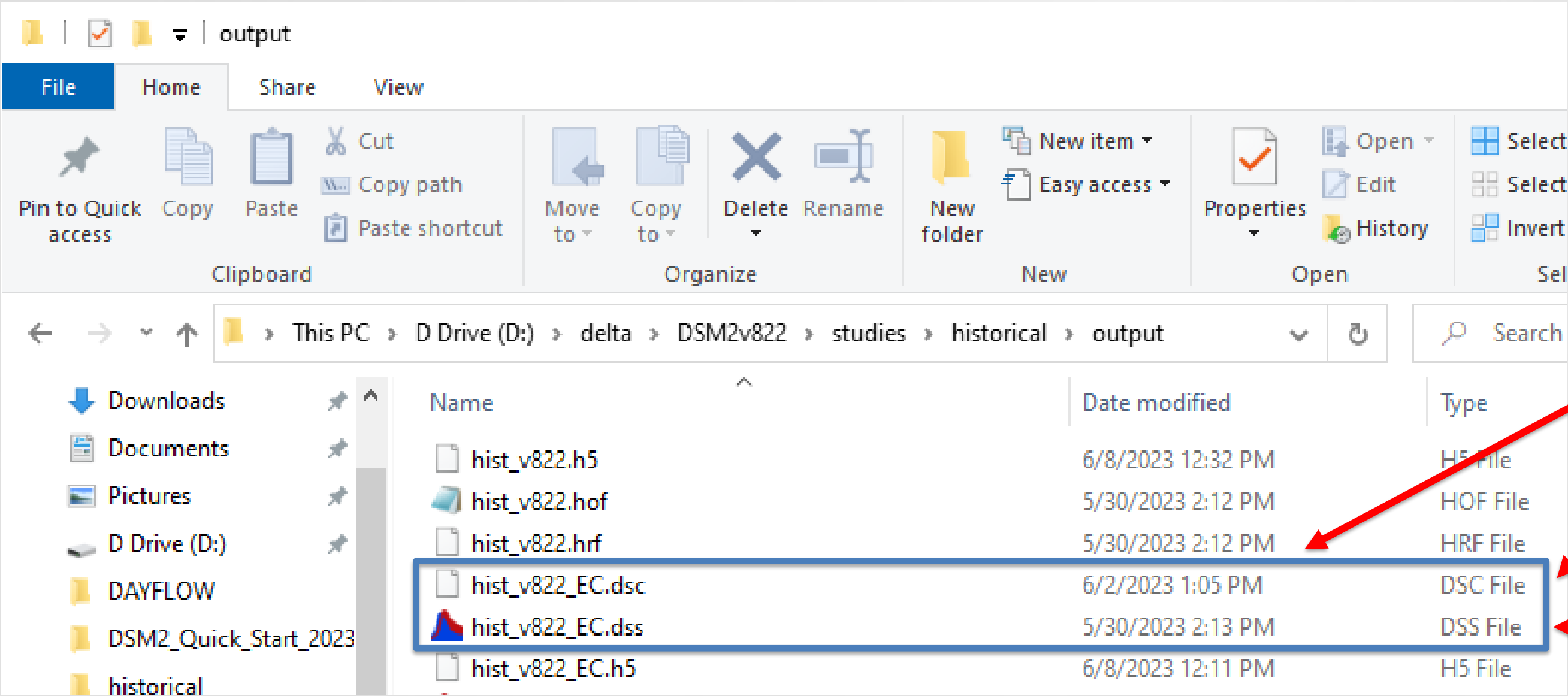
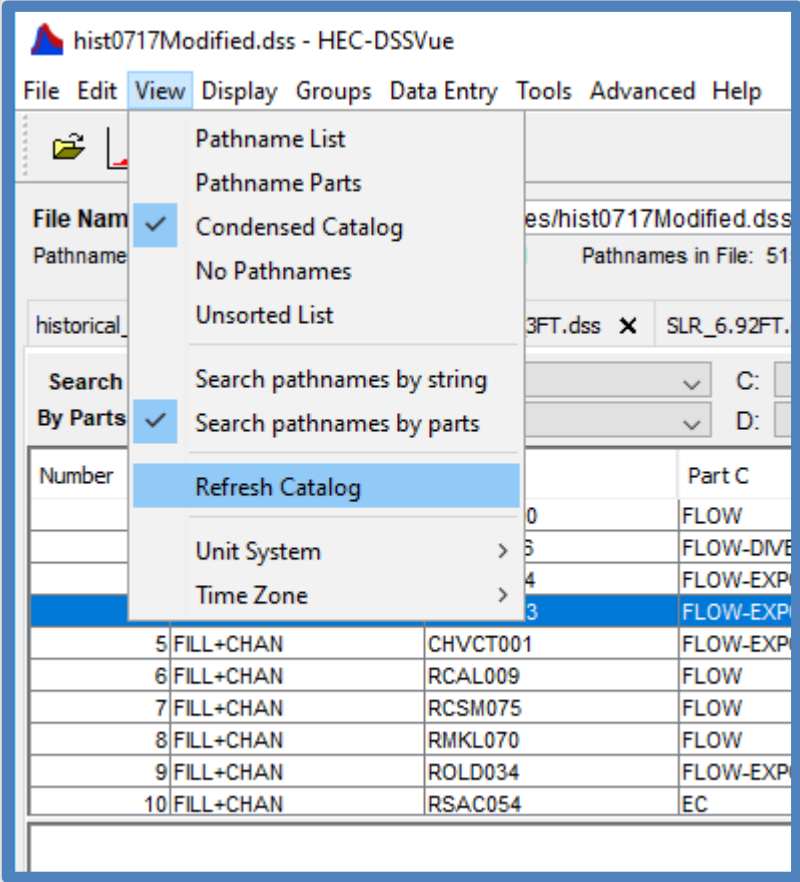
Images...

Files (Generic type)...

1h. Introduction to DSS

DSS Catalog files: check the revision date

- A text file
- Catalog files tell applications like HEC DSSVue how to find data in the file.
- **Revision date** should be same or later than DSS revision date
- If not, View-Refresh Catalog in DSS Vue or delete the catalog file



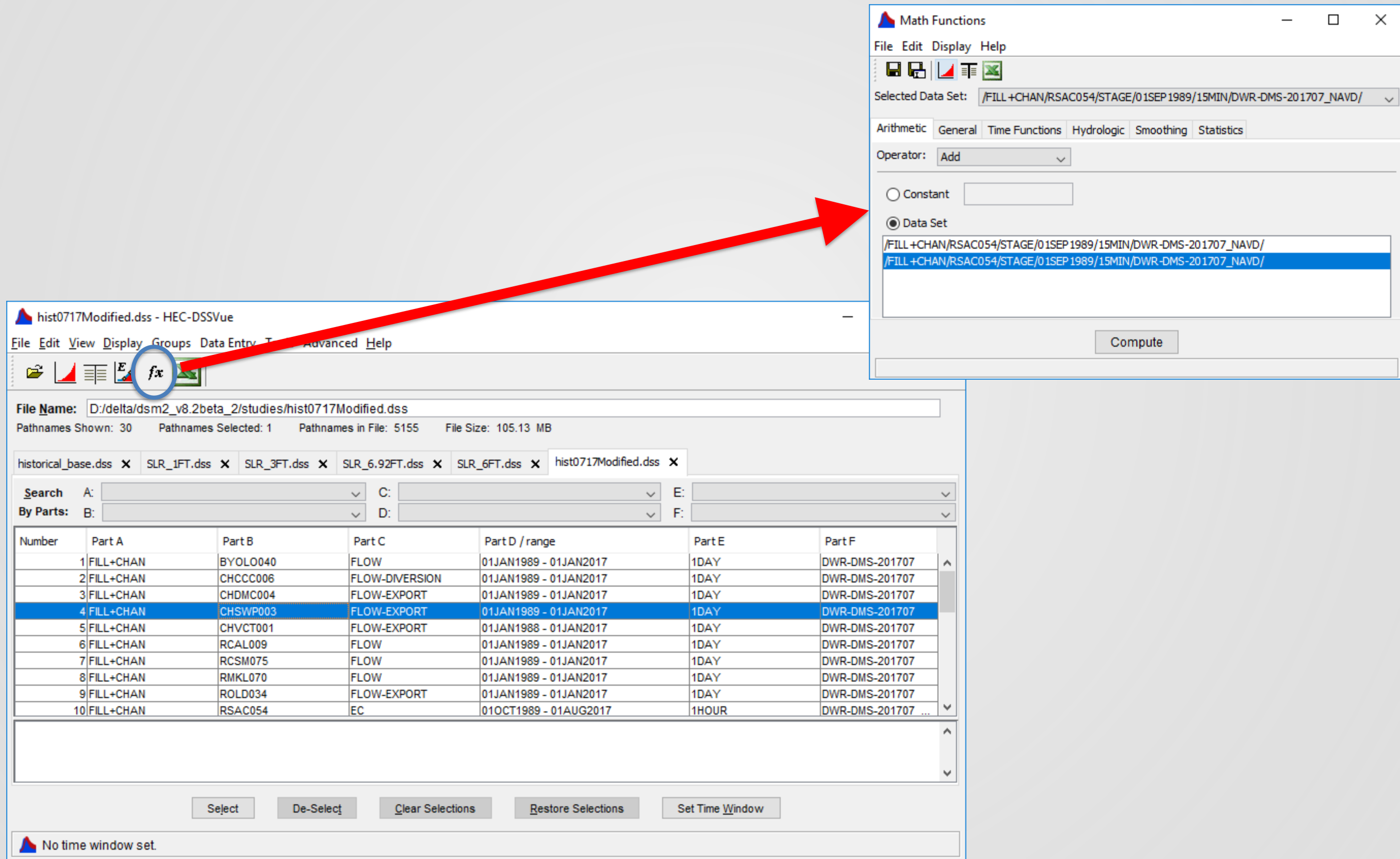
Revision dates

DSS catalog file

DSS database file

1i. Introduction to DSS

HEC-DSSVue: Math Functions



Overview

1. Introduction to DSS
- 2. Introduction to HDF5 (DSM2 tidefiles)**
3. Quick Review of DSM2 input setup
4. Hands-on exercises

Historical
base case

Run 1: Base historical study

Sac River Flow
+30%

Run 2: Sacramento River flow increased by 30%

Temporary
Barrier
increased width

Run 3: Increased temporary barrier width (optional)

2. HDF5 files (DSM2 tidefiles, .h5)

- Hierarchical **D**ata **F**ormat
- Data stored in binary format-can't use a text editor
- Data stored includes:
 - DSM2 fixed input
 - DSM2 output (Hydro), input (Qual, ECO-PTM, GTM)
- Viewing data
 - Vista (time series output)
 - HDF View (time series output, fixed input)
 - DSM2 animator
- For more information: <https://www.hdfgroup.org/solutions/hdf5/>

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Historical
base case

Run 1: Base historical study

Sac River Flow
+30%

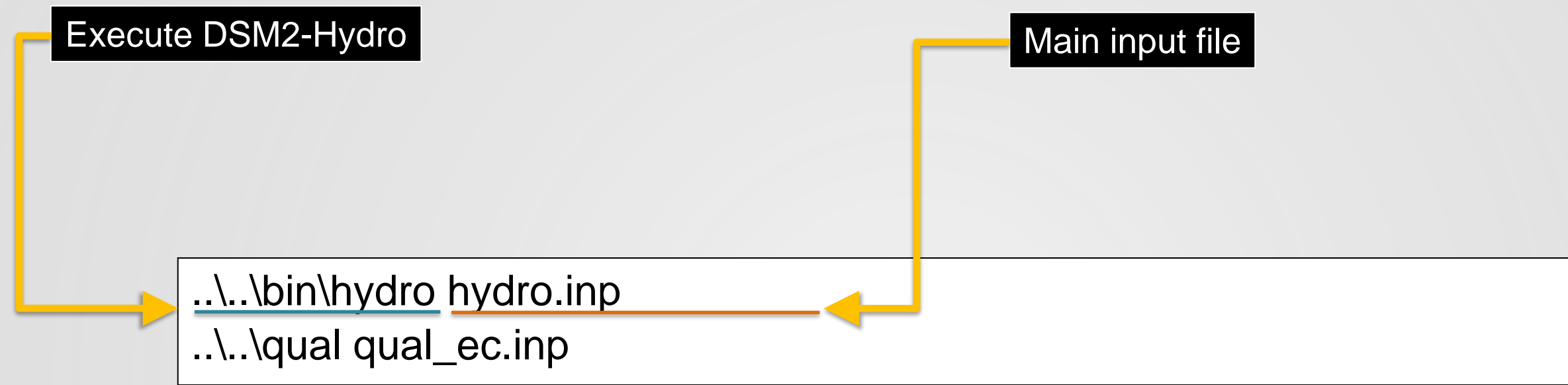
Run 2: Sacramento River flow increased by 30%

Temporary
Barrier
increased width

Run 3: Increased temporary barrier width (optional)

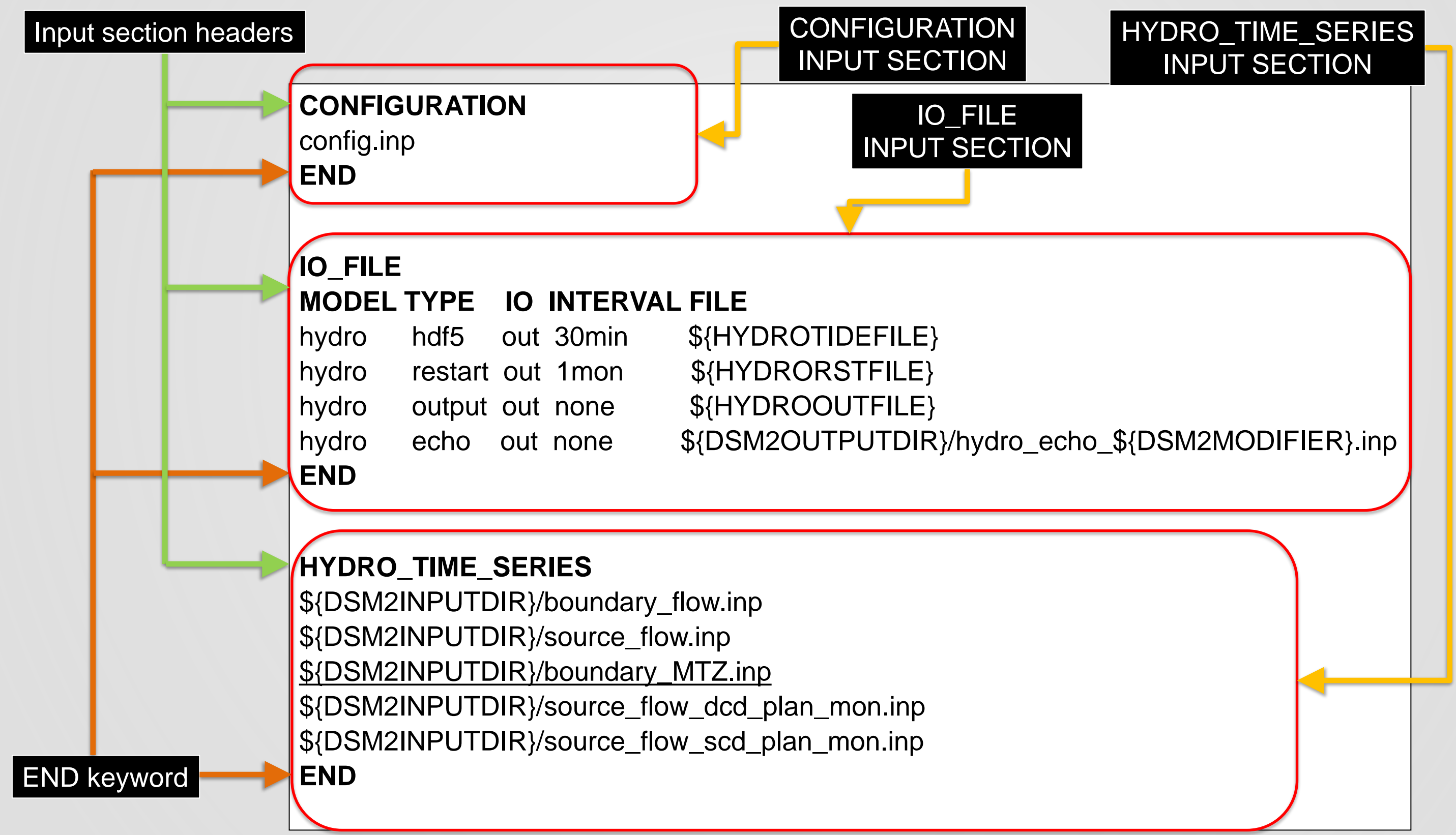
3a. Quick Review of DSM2 input setup

Setting up a DSM2 Study: dsm2.bat file



3b. Quick Review of DSM2 input setup

DSM2 Input files: hydro.inp



3c. Quick Review of DSM2 input setup

DSM2 Input files: config.inp

Defines environment variables, which are used to configure a DSM2 simulation

ENVVAR		
NAME	VALUE	
DSM2MODIFIER	historical	# Study name used for DSM2 output
START_DATE	01Jan1990	
END_DATE	31Dec2019	
END		

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base case

Run 1: Base historical study

Sac River Flow
+30%

Run 2: Sacramento River flow increased by 30%

Temporary
Barrier
increased width

Run 3: Increased temporary barrier width (optional)

4. Hands-on exercises

Reminders

1. Raise your hand (on Teams) when you complete each step
2. If you have a question, enter it into the Teams chat, even if you are in the room

4. Hands-on exercises

Input files to be modified for each study

Historical Base Case	Sac River +30%	Temporary Barrier Increase Width
config.inp	config.inp hist201712.dss boundary_flow_delta_ historical.inp	config.inp hydro.inp gate_std_delta_grid.inp

Run 1. Base Historical Study

Task list

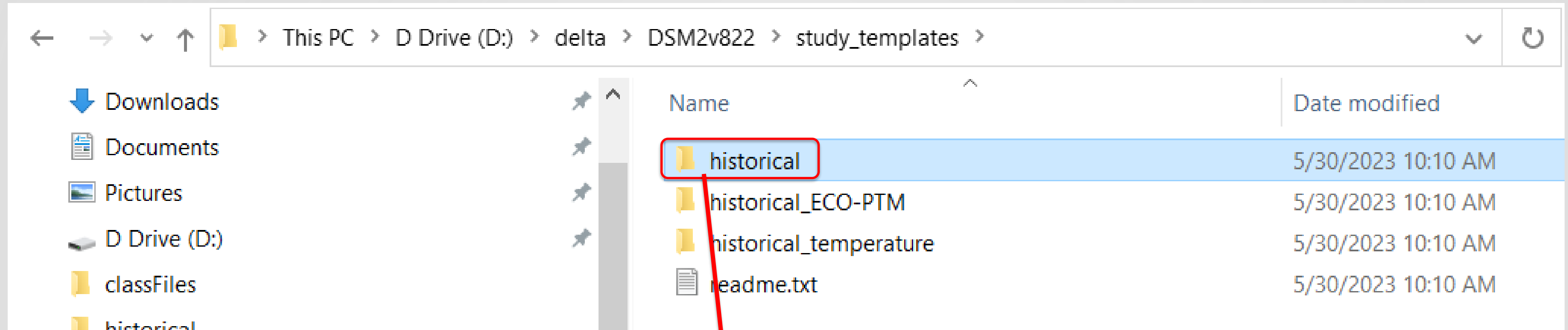
GOAL	Create 3 historical study folders with shortened runtime
TASKS	<ul style="list-style-type: none">• Copy the “historical” folder from “study_templates” to “studies”• Modify the starting and ending dates in <i>config.inp</i>• Make two more copies of the <u>modified</u> “historical” folder: “historical_sac_incr” and “historical_gate_mod”• Edit the qual_ec.inp file, uncommenting the line that creates a qual tidefile
TOOLS	<ul style="list-style-type: none">• Windows Explorer• Text editor



Use underscores _ instead of spaces in folder and file names

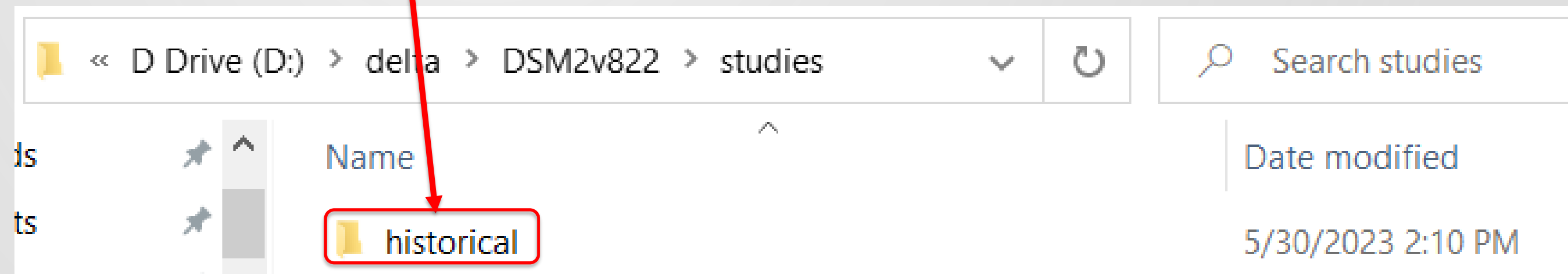
Run 1. Base Historical Study

copy the “historical” study folder from “study_templates” to “studies”



Only make the **historical** folder now

We will make other study folders later



Run 1. Base Historical Study

Changing starting and ending times in config.inp

config.inp

```
ENVVAR
NAME      VALUE
DSM2MODIFIER hist_v822
END

#runtime
START_DATE      01Jan2005
QUAL_START_DATE 02Jan2005
END_DATE        31Jan2005
START_TIME      0000
END_TIME        0000
```

Historical
Base Case

Run 1. Base Historical Study

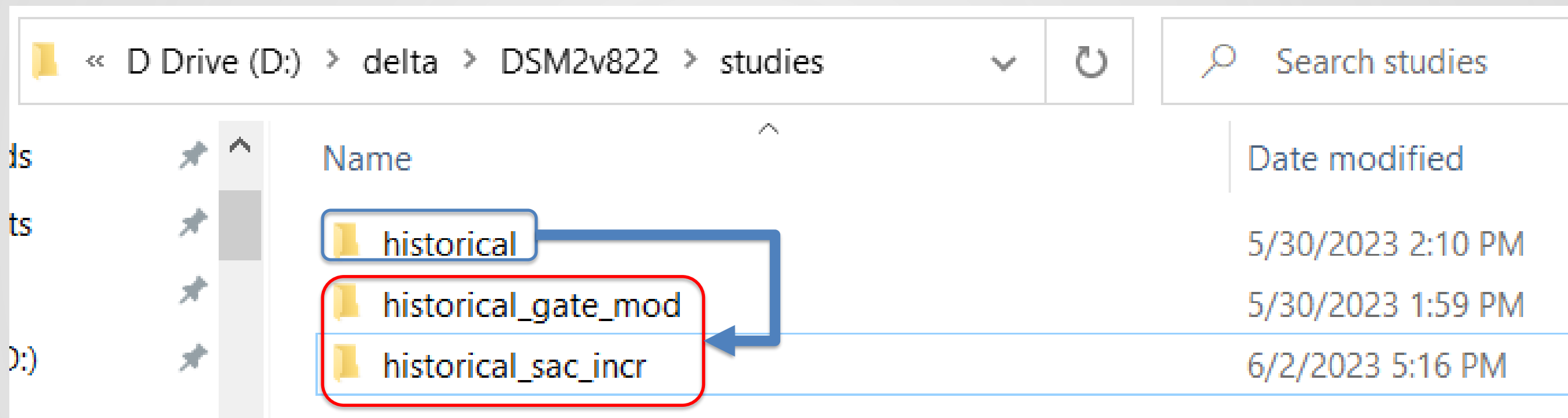
qual_ec.inp: Creating EC tidefile output

“Main Input File” for Qual: qual_ec.inp

```
IO_FILE
MODEL TYPE  IO INTERVAL FILE
#qual hdf5  out 1hour  ${DSM2OUTPUTDIR}/${DSM2MODIFIER}_EC.h5
qual hdf5  out 1hour  ${DSM2OUTPUTDIR}/${DSM2MODIFIER}_EC.h5
qual restart out 1mon  ${DSM2OUTPUTDIR}/qual_${DSM2MODIFIER}_EC.qrf
qual output  out none  ${DSM2OUTPUTDIR}/qual_${DSM2MODIFIER}_EC.qof
qual echo   out none  ${DSM2OUTPUTDIR}/qual_echo_${DSM2MODIFIER}_EC.inp
END
```


Run 1. Base Historical Study

Create 2 copies of the modified “historical” study folder



Run 1. Base Historical Study

Run hydro and qual models

Enter the following commands into a separate command prompt window:

Historical

```
cd D:\delta\DSM2v822\studies\historical\  
DSM2_batch.bat
```

Overview

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Historical
base case

Run 1: Base historical study

Sac River Flow
+30%

Run 2: Sacramento River flow increased by 30%

Temporary
Barrier
increased width

Run 3: Increased temporary barrier width (optional)

Run 2. Increased Sac. R Flow Study

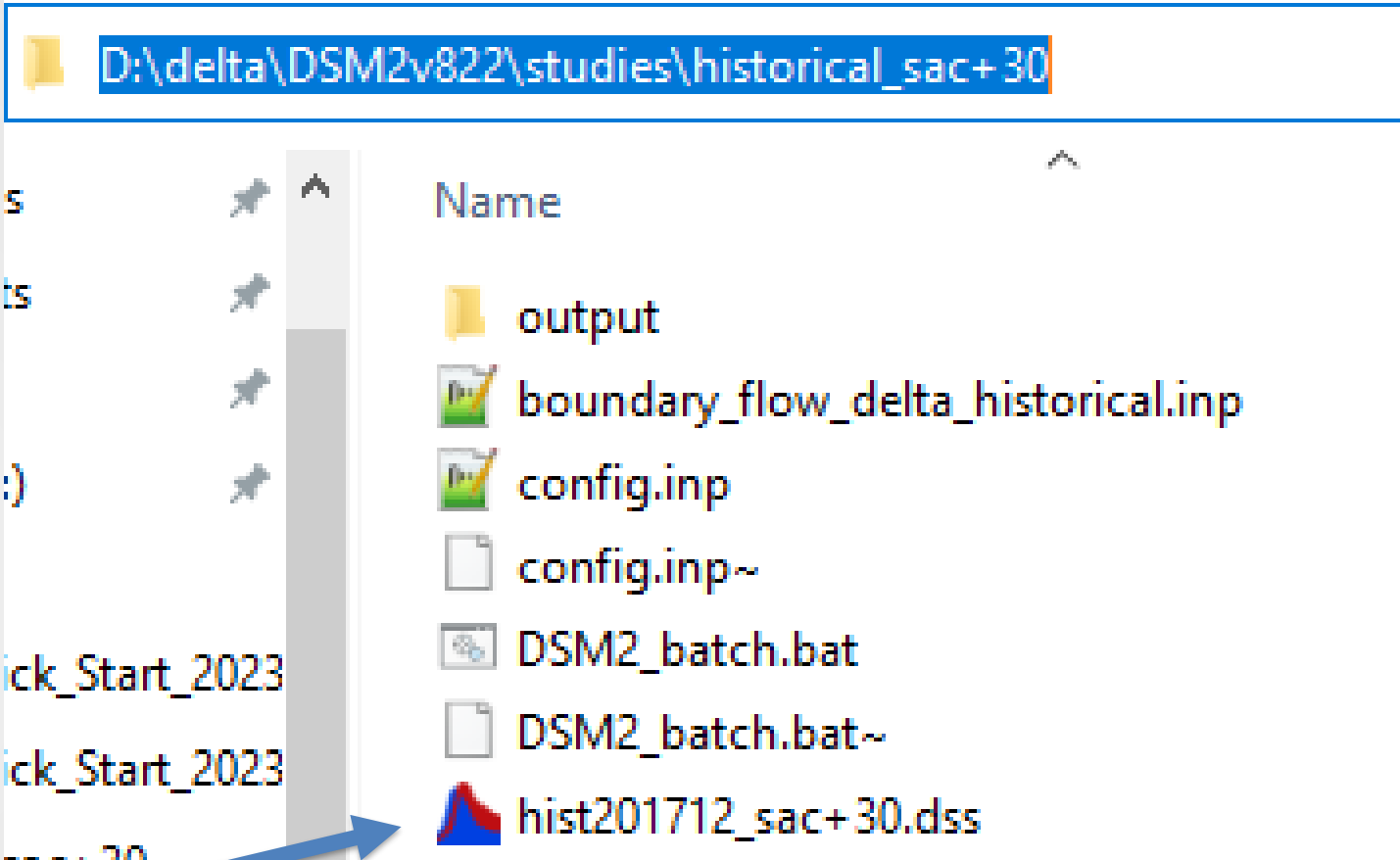
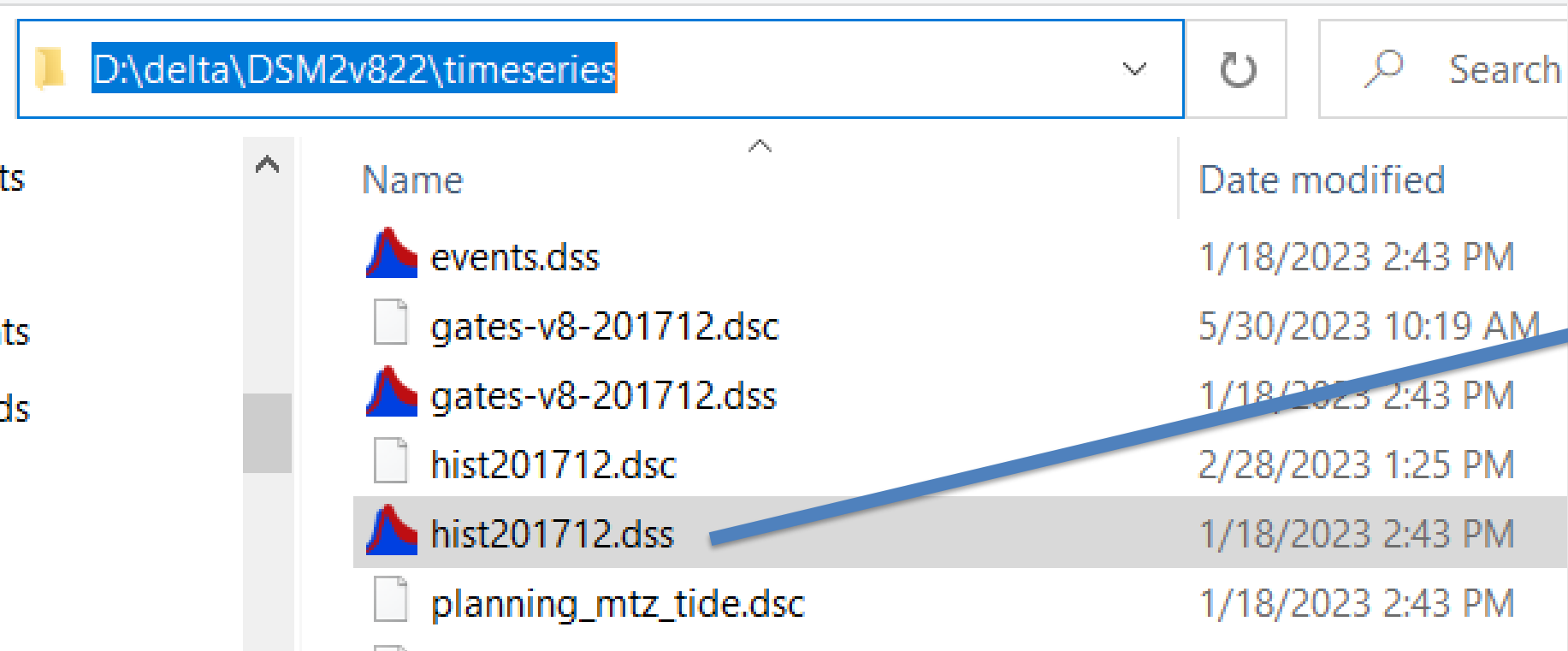
Configure the increased Sacramento River Flow study

GOAL	Modify DSM2 historical simulation to increase Sacramento River flow by 30%
TASKS	<ul style="list-style-type: none">• In the “hist_sac_incr” folder:• Change DSM2MODIFIER in <i>config.inp</i>• Add a copy of <i>hist201712.dss</i>• Edit the <i>hist2017.dss</i> file to increase Sac River flow by 30%• Add a copy of the boundary flow input file (<i>boundary_flow_delta_historical.inp</i>)• Edit hydro.inp to use the local copy of the file• Edit the boundary flow input file to point to the Sac + 30% *.dss time series• Edit the qual_ec.inp file, uncommenting the line that creates a qual tidefile
TOOLS	<ul style="list-style-type: none">• Windows Explorer• HEC-DSSVue• Text editor• WinMerge

Run 2. Increased Sac. R Flow Study

copy hist201712.dss to the study folder

Copy input DSS file to study folder, and rename



Sac
+30%






Run 2. Increased Sac. R Flow Study

HEC DSS-Vue: open Math Functions Window

Sac
+30%

hist201712_sac_incr.dss - HEC-DSSVue

File Edit View Display Groups Data Entry Tools Advanced Help



File Name: D:/delta/DsMath Functionsistorical_sac_incr/hist201712_sac_incr.dss

Pathnames Shown: 18 Pathnames Selected: 1 Pathnames in File: 1178 File Size: 55.96 MB

hist201712_sac_incr.dss x

Search A: C: E:

By Parts: B: D: F:

Number	Part A	Part B	Part C	Part D / range	
1	FILL+CHAN	BYOLO040	FLOW	31Dec1989 - 01Jan2018	1
2	FILL+CHAN	CHCCC006	FLOW-DIVERSION	30Sep1989 - 01Jan2018	1
3	FILL+CHAN	CHDMC004	FLOW-EXPORT	30Sep1989 - 02Jan2018	1
4	FILL+CHAN	CHSWP003	FLOW-EXPORT	30Sep1989 - 30Jan2018	1
5	FILL+CHAN	CHVCT001	FLOW-EXPORT	31Aug1988 - 01Jan2018	1
6	FILL+CHAN	RCAL009	FLOW	01Oct1989 - 01Jan2018	1
7	FILL+CHAN	RCSM075	FLOW	30Sep1989 - 01Jan2018	1
8	FILL+CHAN	RMKL070	FLOW	29Sep1989 - 02Aug2017	1
9	FILL+CHAN	RMKL070	FLOW	30Sep1989 - 03Jan2018	1
10	FILL+CHAN	ROLD034	FLOW-EXPORT	30Sep1989 - 01Jan2018	1
11	FILL+CHAN	RSAC054	EC	31Oct1989 - 01Jan2018	1
12	FILL+CHAN	RSAC054	STAGE	30Sep1989 - 01Jan2018	1
13	FILL+CHAN	RSAC139	EC	30Oct1989 - 01Jan2018	1
14	FILL+CHAN	RSAC155	FLOW	30Sep1989 - 01Jan2018	1
15	FILL+CHAN	RSAN112	EC	31Oct1989 - 01Jan2018	1
16	FILL+CHAN	RSAN112	FLOW	30Sep1989 - 01Jan2018	1
17	FILL+CHAN	SLBAR002	FLOW-EXPORT	30Sep1989 - 01Jan2018	1
18	HIST+GATE	CHWST000	POS	30Apr1971 - 01Aug2017	IF

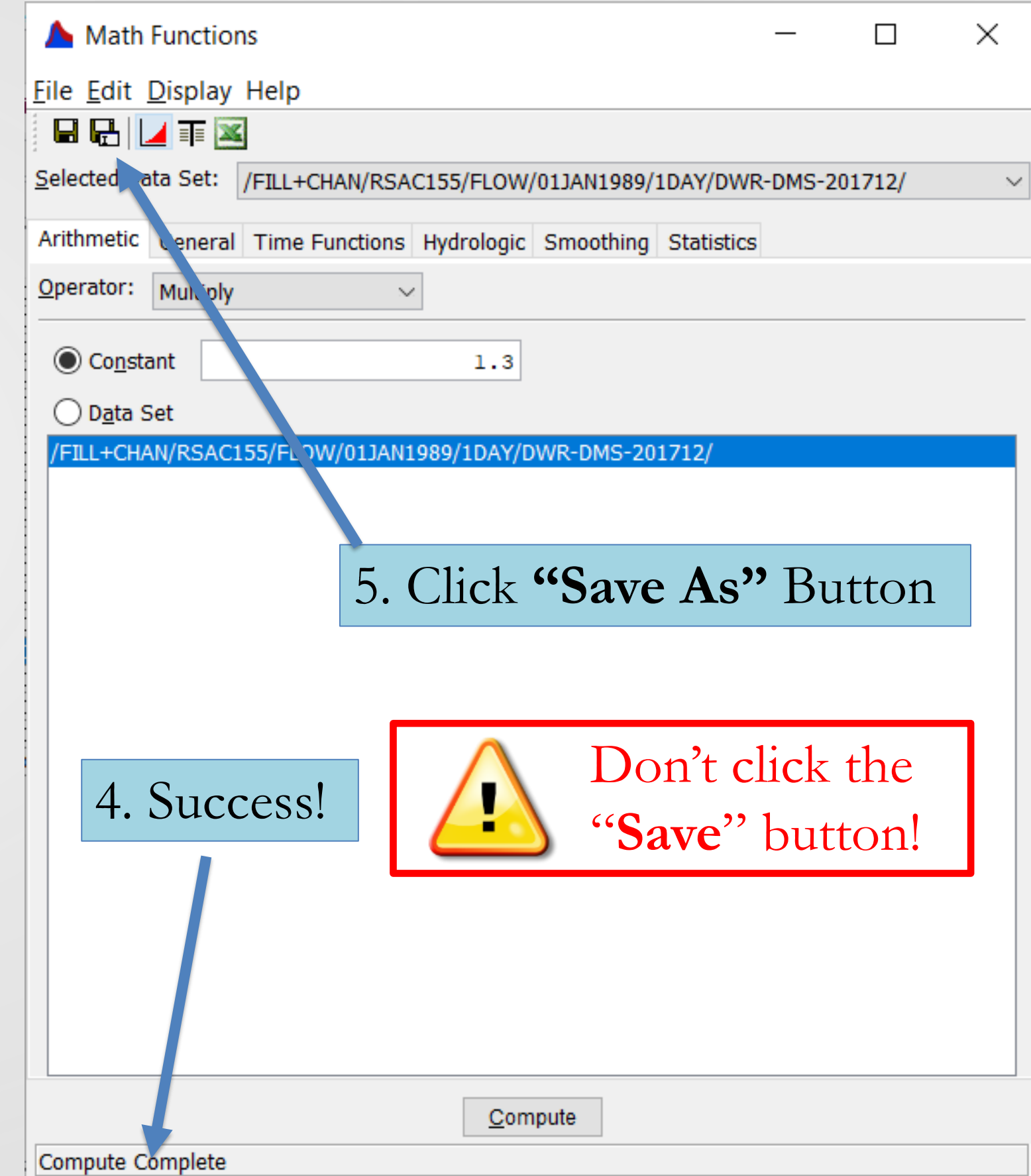
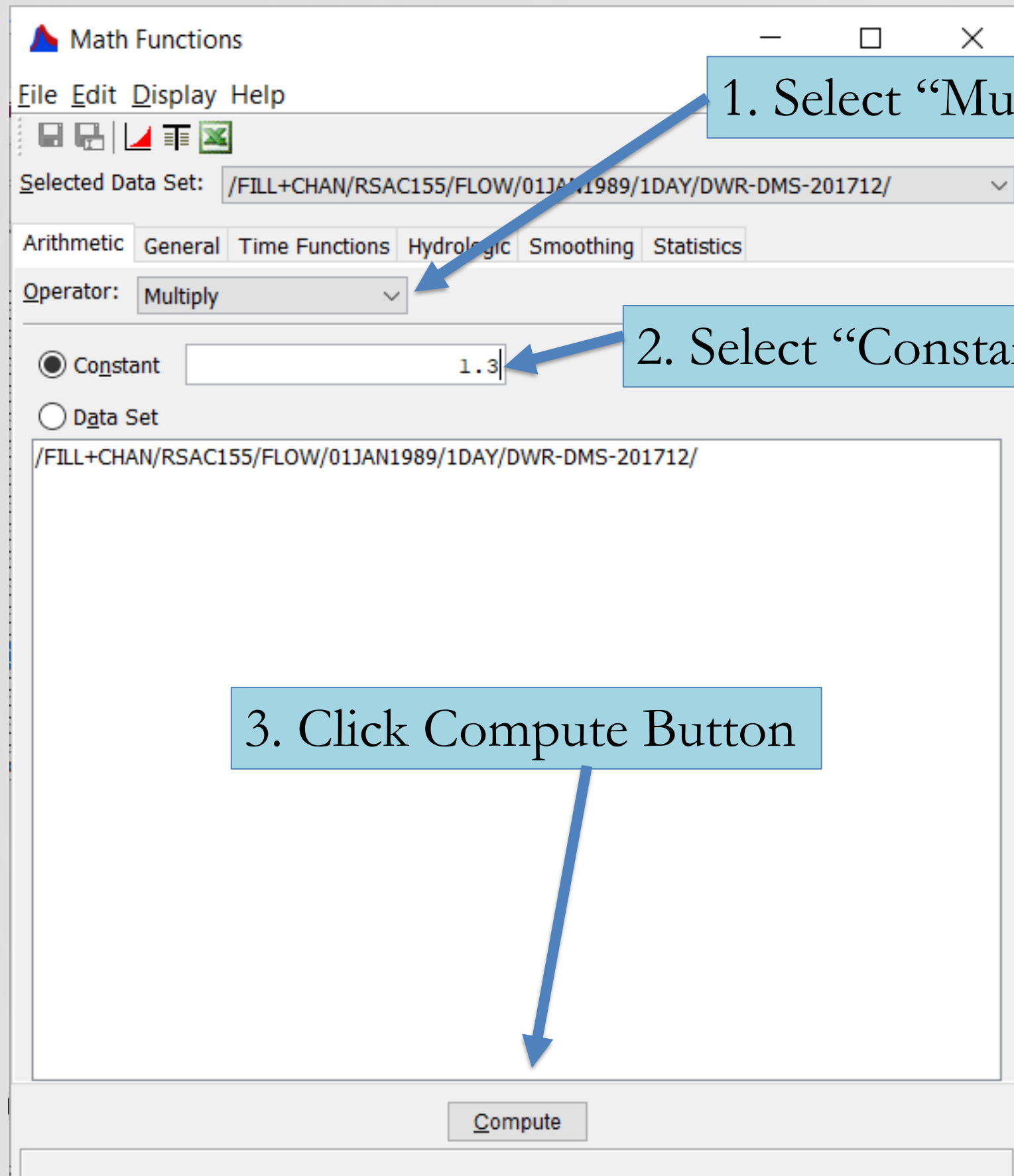
2. Click the Math Functions (“fx”) button

1. Select the Sacramento River Inflow path

Run 2. Increased Sac. R Flow Study

Math Functions: Increase Sac. R Flows

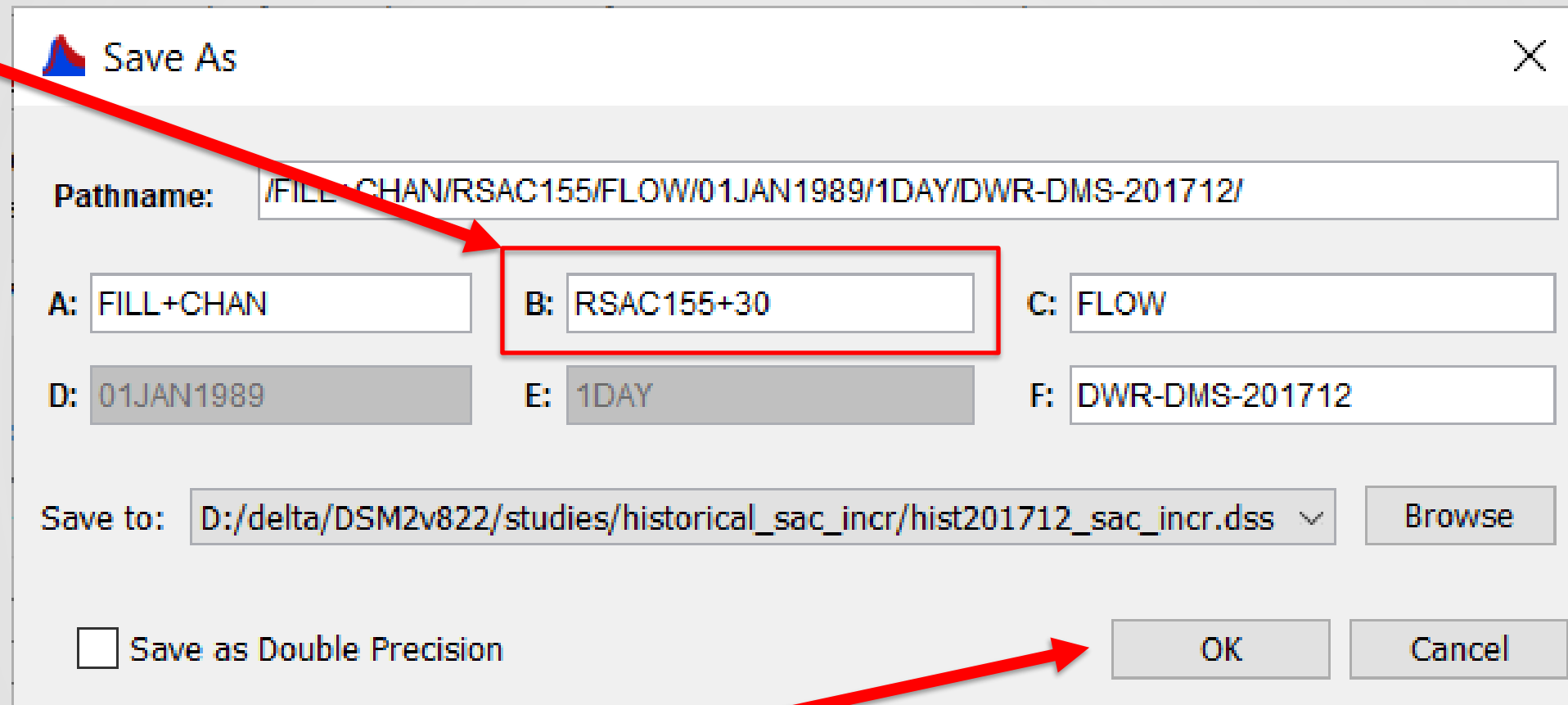
Sac
+30%



Run 2. Increased Sac. R Flow Study

Change the DSS “B part” before saving

1. Modify B part,
adding “+30”



Save As

Pathname: /FILL+CHAN/RSAC155/FLOW/01JAN1989/1DAY/DWR-DMS-201712/

A: FILL+CHAN B: RSAC155+30 C: FLOW

D: 01JAN1989 E: 1DAY F: DWR-DMS-201712

Save to: D:/delta/DSM2v822/studies/historical_sac_incr/hist201712_sac_incr.dss

☐ Save as Double Precision

2. Click “OK”

Sac
+30%

Run 2. Increased Sac. R Flow Study

Verification: compare historical Sac. R flow with modified data set

2. Click the plot button

1. Select both data sets

hist201712_sac+30.dss - HEC-DSSVue

File Edit View Display Groups Data Entry Tools Advanced Help

File Name

Pathnames Shown: 19 Pathnames Selected: 2 Pathnames in File: 1208 File Size: 56.07 MB

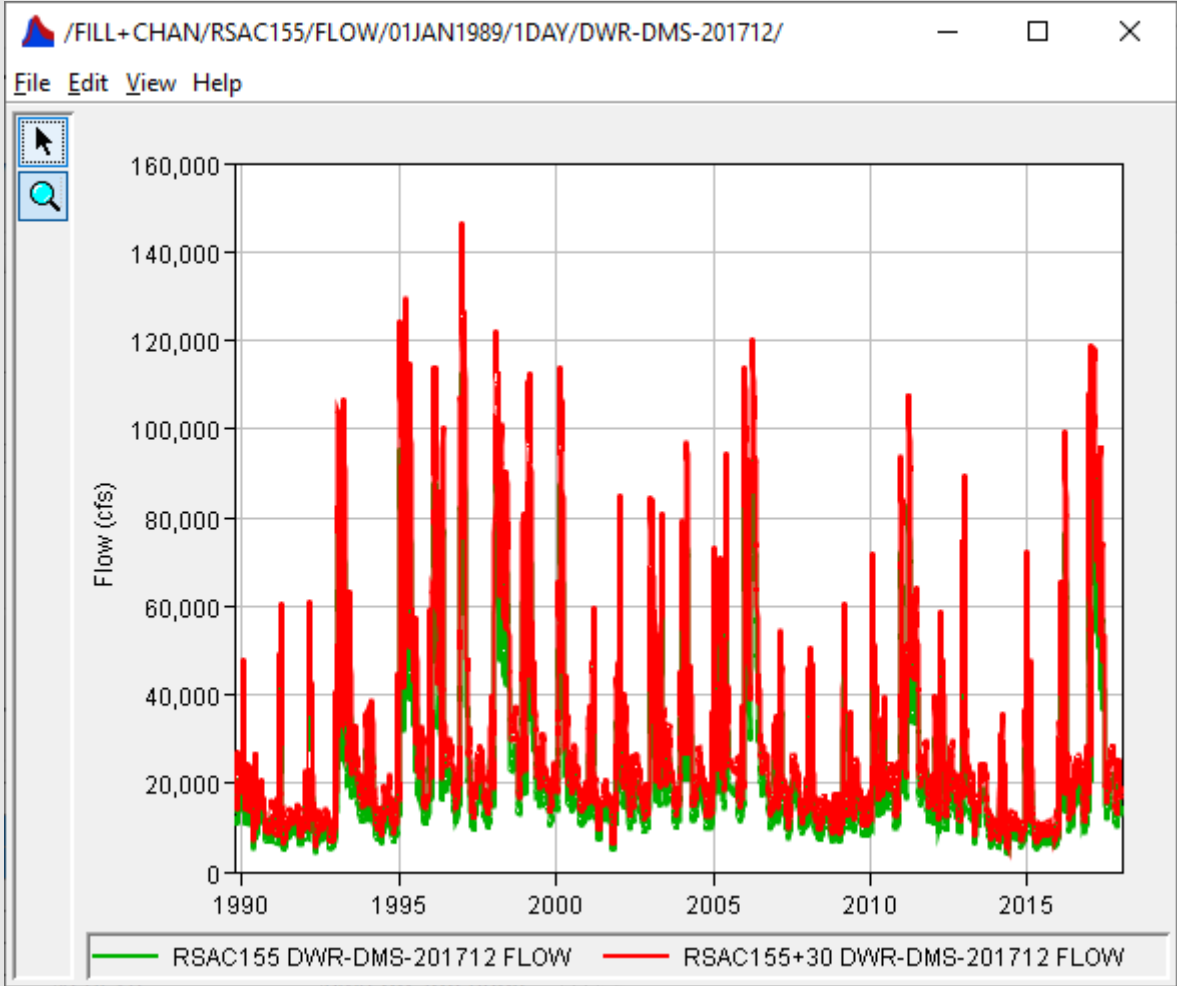
hist201712_sac+30.dss X

Search A: C: E: By Parts: B: D: F:

Number	Part A	Part B	Part C	Part D / range	Part E	Part F
12	FILL+CHAN	RSAC054	STAGE	30Sep1989 - 01Jan2018	15MIN	DWR-DMS-201712_N...
13	FILL+CHAN	RSAC139	EC	30Oct1989 - 01Jan2018	1DAY	DWR-DMS-201712
14	FILL+CHAN	RSAC155	FLOW	30Sep1989 - 01Jan2018	1DAY	DWR-DMS-201712
15	FILL+CHAN	RSAC155+30	FLOW	30Sep1989 - 01Jan2018	1DAY	DWR-DMS-201712
16	FILL+CHAN	RSAN112	EC	31Oct1989 - 01Jan2018	1DAY	DWR-DMS-201712
17	FILL+CHAN	RSAN112	FLOW	30Sep1989 - 01Jan2018	1DAY	DWR-DMS-201712
18	FILL+CHAN	SLBAR002	FLOW-EXPORT	30Sep1989 - 01Jan2018	1DAY	DWR-DMS-201712
19	HIST+GATE	CHWST000	POS	30Apr1971 - 01Aug2017	IR-YEAR	DWR-OM-JOC-DSM2

Select De-Select Clear Selections Restore Selections Set Time Window

No time window set.

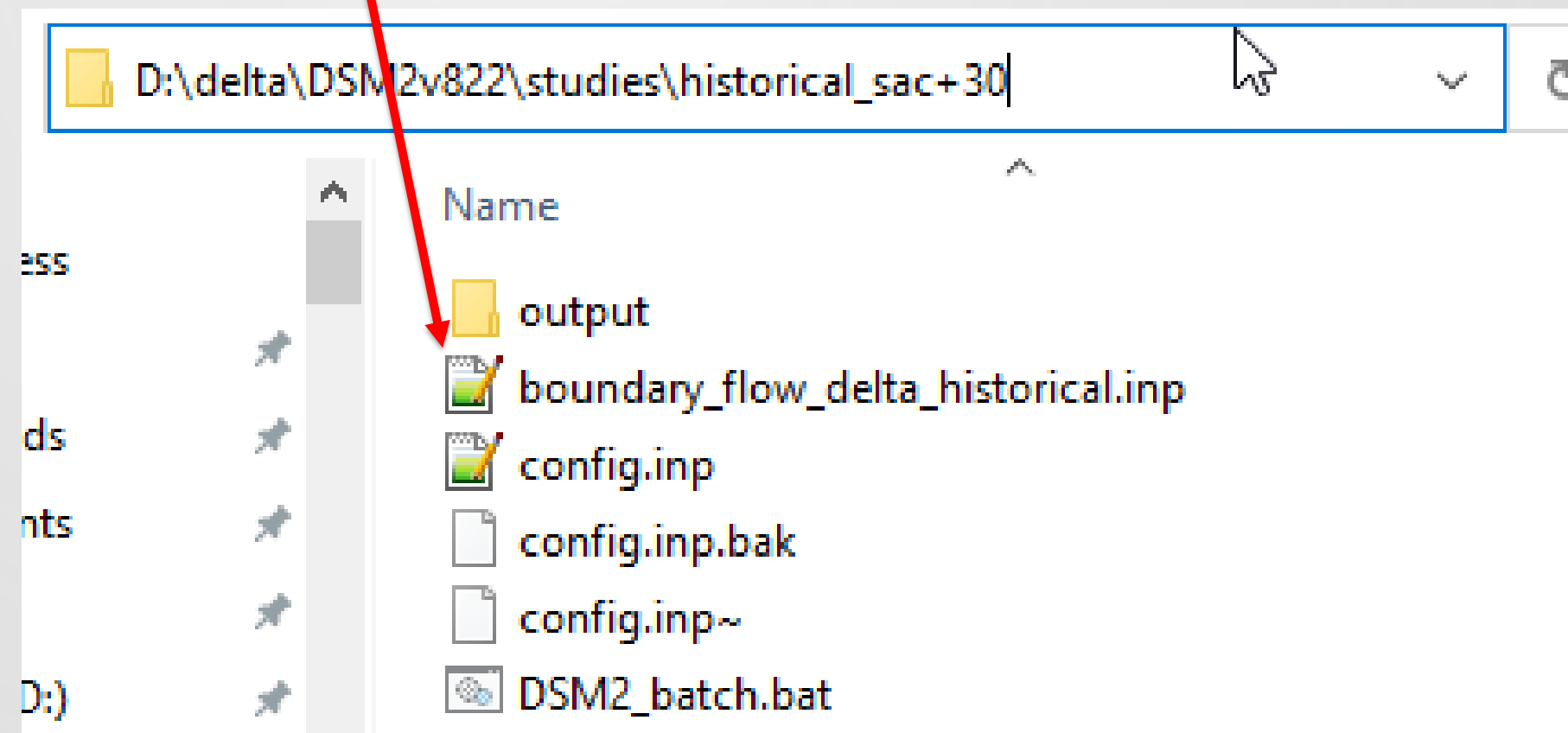
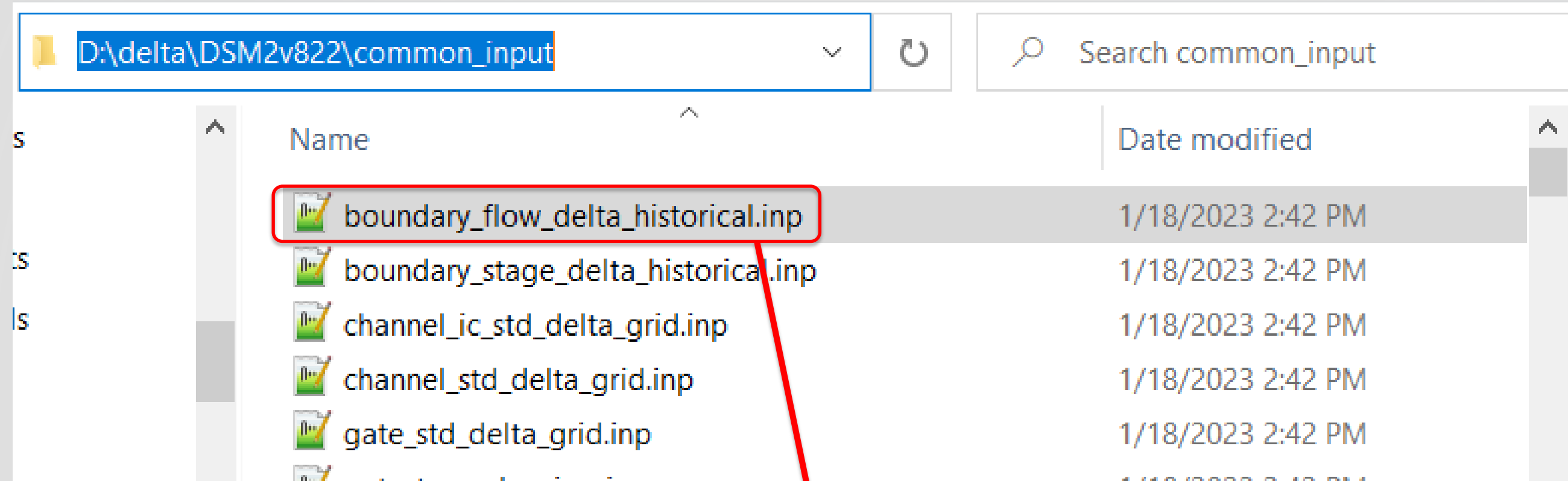


3. Use plot to compare data sets

Sac
+30%

Run 2. Increased Sac. R Flow Study

Copying the boundary_flow_delta_historical.inp file



Sac
+30%

Run 2. Increased Sac. R Flow Study

Change DSM2MODIFIER in config.inp

ENVVAR	
NAME	VALUE
DSM2MODIFIER	hist_v822_sac+30
DSM2INPUTDIR	../../common_input
VERSIONDATE	201712
HISTFLOWVERSION	DWR-DMS-\${VERSIONDATE}
HISTSTAGEVERSION	\${HISTFLOWVERSION}
HISTQUALVERSION	DWR-DMS-\${VERSIONDATE}

Sac
+30%

Run 2. Increased Sac. R Flow Study

Edit the main input file hydro.inp

```
HYDRO TIME SERIES
# ${DSM2INPUTDIR}/boundary_flow_delta_historical.inp
boundary flow delta historical.inp      #20090715
${DSM2INPUTDIR}/source_flow_delta_historical.inp
${DSM2INPUTDIR}/boundary_stage_delta_historical.inp
${DSM2INPUTDIR}/source_flow_dcd_historical_daily.inp
${DSM2INPUTDIR}/source_flow_jones_hydro.inp
${DSM2INPUTDIR}/source_flow_scd_historical_daily.inp
END
```



Run 2. Increased Sac. R Flow Study

Edit the copied boundary_flow_delta_historical.inp file

```
# Description:
# Historical boundary flows to Delta
# 20090715
BOUNDARY_FLOW
NAME      NODE  SIGN  FILLIN  FILE      PATH
calaveras  21    1 last  ${BNDRYINPUT} /FILL+CHAN/RCAL009/FLOW//1DAY/${HISTFLOWVERSION}/
cosumnes   446    1 last  ${BNDRYINPUT} /FILL+CHAN/RCSM075/FLOW//1DAY/${HISTFLOWVERSION}/
moke       447    1 last  ${BNDRYINPUT} /FILL+CHAN/RMKL070/FLOW//1DAY/${HISTFLOWVERSION}/
north_bay  273   -1 last  ${BNDRYINPUT} /FILL+CHAN/SLBAR002/FLOW-EXPORT//1DAY/${HISTFLOWVERSION}/
#sac       330    1 last  ${BNDRYINPUT} /FILL+CHAN/RSAC155/FLOW//1DAY/${HISTFLOWVERSION}/
sac        330    1 last  hist201712_sac+30.dss /FILL+CHAN/RSAC155+30/FLOW//1DAY/${HISTFLOWVERSION}/
vernalis   17     1 last  ${BNDRYINPUT} /FILL+CHAN/RSAN112/FLOW//1DAY/${HISTFLOWVERSION}/
yolo       316    1 last  ${BNDRYINPUT} /FILL+CHAN/BYOLO040/FLOW//1DAY/${HISTFLOWVERSION}/
END
```

Sac
+30%

Run 2. Increased Sac. R. Flow Study

qual_ec.inp: Creating EC tidefile output

“Main Input File” for Qual: qual_ec.inp

IO_FILE

MODEL TYPE IO INTERVAL FILE

#qual hdf5 out 1hour \${DSM2OUTPUTDIR}/\${DSM2MODIFIER}_EC.h5

qual hdf5 out 1hour \${DSM2OUTPUTDIR}/\${DSM2MODIFIER}_EC.h5

qual restart out 1mon \${DSM2OUTPUTDIR}/qual_\${DSM2MODIFIER}_EC.qrf

qual output out none \${DSM2OUTPUTDIR}/qual_\${DSM2MODIFIER}_EC.qof

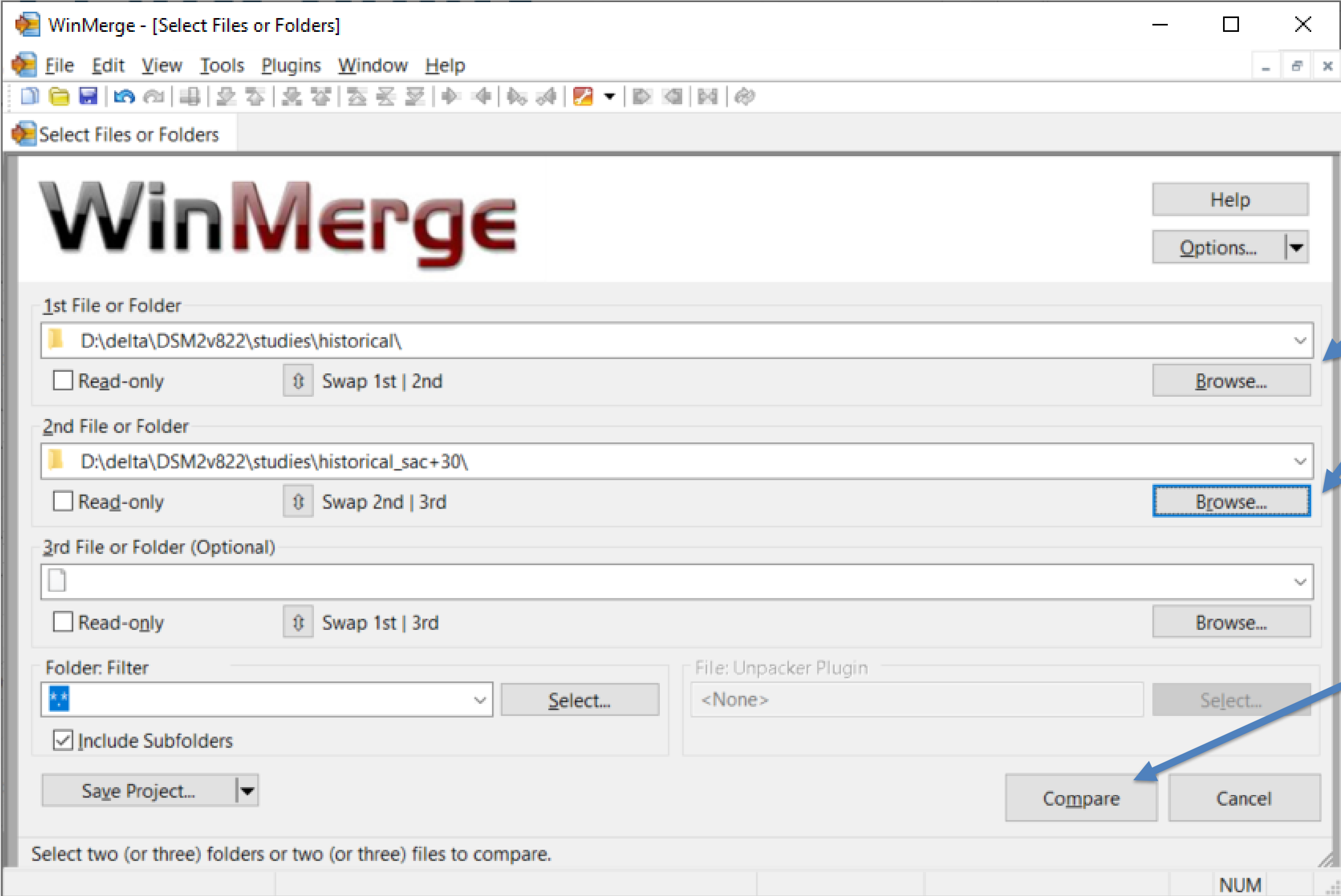
qual echo out none \${DSM2OUTPUTDIR}/qual_echo_\${DSM2MODIFIER}_EC.inp

END

Temp
Barrier

Run 2. Increased Sac. R Flow Study

Compare two folders



1. Click “Browse” buttons to specify the two study folders to compare

2. Click “Compare” button

Sac
+30%

Run 2. Increased Sac. R Flow Study

Comparing historical vs Sac+30 study folders

WinMerge - [historical\ - historical_sac+30\]

File Edit View Merge Tools Plugins Window Help

Select Files or Folders historical\ - historical_sac+30\

D:\delta\DSM2v822\studies\historical\ D:\delta\DSM2v822\studies\historical_sac+30\

Filename	Folder	Comparison result
> output		Folders are different
config.inp		Text files are different
config.inp~		Text files are different
hydro.inp		Text files are different
hist201712_sac+30.dss		Right only: D:\delta\DSM2v822\studies\historical_sac+30
boundary_flow_delta_historical.inp		Right only: D:\delta\DSM2v822\studies\historical_sac+30
config.inp.bak		Right only: D:\delta\DSM2v822\studies\historical_sac+30
hist201712_sac+30.dsc		Right only: D:\delta\DSM2v822\studies\historical_sac+30
DSM2_batch.bat		Text files are identical
DSM2_batch.bat~		Text files are identical
qual_ec.inp		Text files are identical
qual_ec.inp~		Text files are identical
qual_ec_fp.inp		Text files are identical
qual_vol_fp.inp		Text files are identical

Elapsed time: 1859 ms Full Contents *.* Item 1 of 14 NUM

1. files/folders with differences shown in yellow

1. Files/folders existing in only 1 of the folders shown in grey.

Sac
+30%

Run 2. Increased Sac. R Flow Study

comparing two versions of the config.inp file

WinMerge - [config.inp x 2]

File Edit View Merge Tools Plugins Window Help

Select Files or Folders historical\ - historical_sac+30\ config.inp x 2

Location Pane x D:\delta\DSM2v822\studies\historical\config.inp D:\delta\DSM2v822\studies\historical_sac+30\config.inp

# Description		# Description	
# Historical study		# Historical study	
# 202208		# 202208	
ENVVAR		ENVVAR	
NAME	VALUE	NAME	VALUE
DSM2MODIFIER	hist_v822	DSM2MODIFIER	hist_v822_sac
DSM2INPUTDIR	../../common_	DSM2INPUTDIR	../../common_
VERSIONDATE	201712	VERSIONDATE	201712
HISTFLOWVERSION	DWR-DMS-#{VER	HISTFLOWVERSION	DWR-DMS-#{VER
HISTSTAGEVERSION	#{HISTFLOWVER	HISTSTAGEVERSION	#{HISTFLOWVER
HISTQUALVERSION	DWR-DMS-#{VER	HISTQUALVERSION	DWR-DMS-#{VER
#runtime		#runtime	
#START_DATE	01Jan1999 #	#START_DATE	01Jan1999 #
START_DATE	01Jan2005 #0	START_DATE	01Jan2005 #0
#QUAL_START_DATE	02Jan1999 #	#QUAL_START_DATE	02Jan1999 #
QUAL_START_DATE	02Jan2005 #0	QUAL_START_DATE	02Jan2005 #0
PTM_START_DATE	#{QUAL_START	PTM_START_DATE	#{QUAL_START
#END_DATE	31Dec2017	#END_DATE	31Dec2017
END_DATE	31Jan2005	END_DATE	31Jan2005
START_TIME	0000	START_TIME	0000
END TIME	0000	END TIME	0000

Ln: 1 Col: 1/14 Ch: 1/14 windows-1252 Win

Ln: 1 Col: 1/14 Ch: 1/14 windows-1252 Win

1 Difference Found NUM

Lines with differences shown in yellow

Sac +30%

Run 2. Increased Sac. R Flow Study

Run hydro and qual

Enter the following commands into a separate command prompt window:

Sac R
+30%

```
cd D:\delta\DSM2v822\studies\historical_sac_incr\  
DSM2_batch.bat
```

Time Check

Overview

1. Introduction to DSS
2. Introduction to HDF5 (DSM2 tidefiles)
3. Quick Review of DSM2 input setup
4. Hands-on exercises

Historical
base case

Run 1: Base historical study

Sac River Flow
+30%

Run 2: Sacramento River flow increased by 30%

Temporary
Barrier
increased width

Run 3: Increased temporary barrier width (optional)

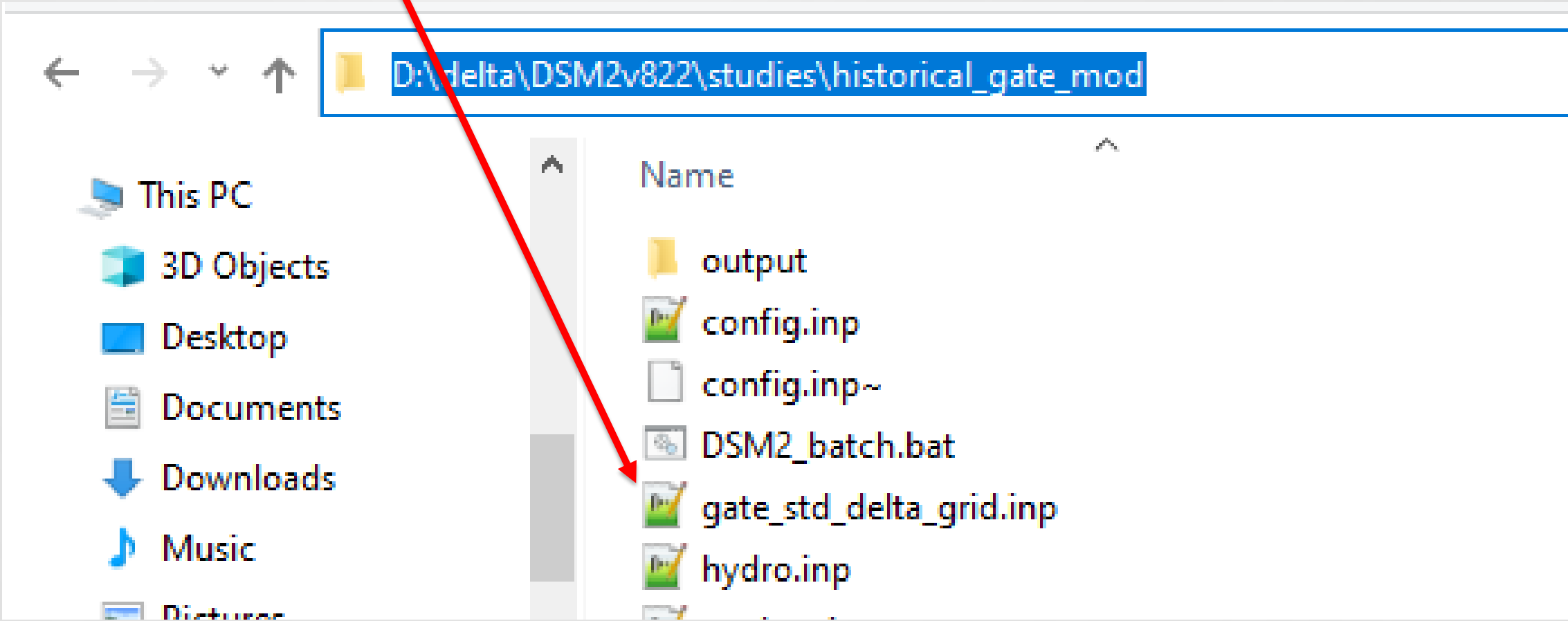
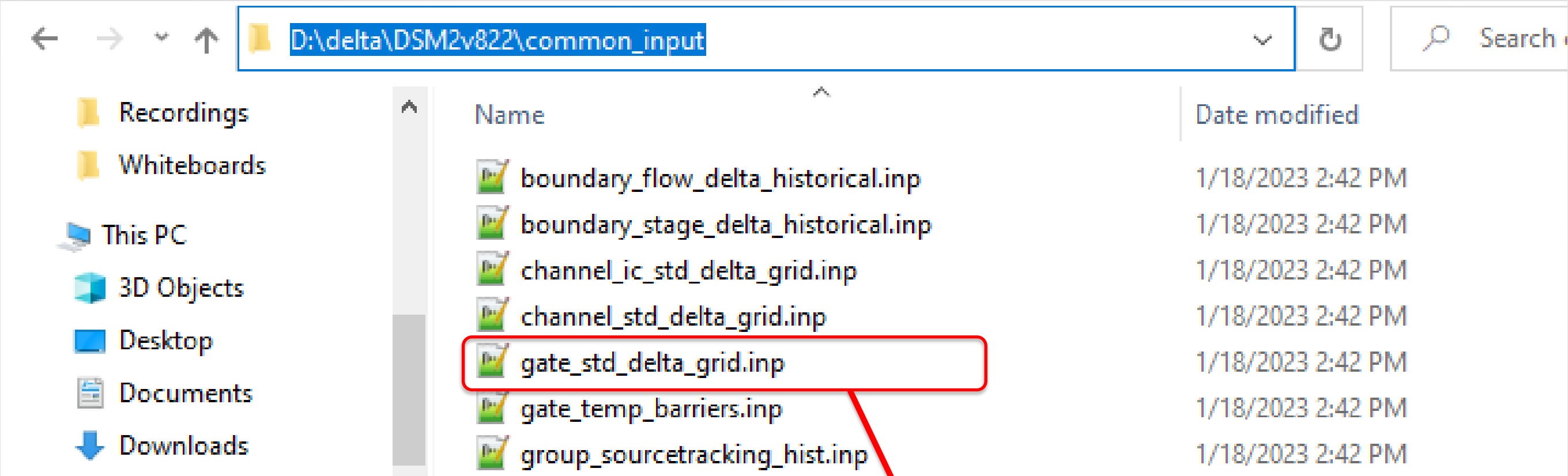
Run 3. Increased Temp. Barr. Width Study

Configuring the “modified temporary barrier width” study

GOAL	Modify DSM2 historical simulation to increase temporary barrier width
TASKS	<ul style="list-style-type: none">• In the “historical_gate_mod” folder:• Change DSM2MODIFIER in <i>config.inp</i>• Add a copy of the gate input file, <i>gate_std_delta_grid.inp</i>• Edit <i>hydro.inp</i> to use the local copy of the gate file• Edit the gate input file to increase the width of the fall Head of Old River barrier to 932ft• Edit the qual_ec.inp file, uncommenting the line that creates a qual tidefile
TOOLS	<ul style="list-style-type: none">• Windows Explorer• Text editor• WinMerge

Run 3. Increased Temp. Barr. Width Study

Copying the gate_std_delta_grid.inp file



Temp
Barrier

Run 3. Increased Temp. Barr. Width Study

Change DSM2MODIFIER in config.inp

ENVVAR NAME	VALUE
DSM2MODIFIER	hist_v822_gate_mod
DSM2INPUTDIR	../../common_input
VERSIONDATE	201712
HISTFLOWVERSION	DWR-DMS-\${VERSIONDATE}
HISTSTAGEVERSION	\${HISTFLOWVERSION}
HISTQUALVERSION	DWR-DMS-\${VERSIONDATE}

Run 3. Increased Temp. Barr. Width Study

hydro.inp & gate_std_delta_grid.inp

“Main Input File” for Hydro: hydro.inp

```
GRID
${DSM2INPUTDIR}/channel_std_delta_grid.inp
${DSM2INPUTDIR}/reservoir_std_delta_grid.inp
# ${DSM2INPUTDIR}/gate_std_delta_grid.inp
gate_std_delta_grid.inp
${DSM2INPUTDIR}/gate_temp_barriers.inp
END
```

gate_std_delta_grid.inp

```
GATE_WEIR_DEVICE
GATE_NAME      DEVICE      DUPLICATE WIDTH  ELEV HEIGHT CF_FROM_NODE CF_TO_NODE DEFAULT_OP
#old_r@head_barrier fall_barrier      1   32.0 2.326  9999.0           0.7           0.7  gate_open
old_r@head_barrier fall_barrier      1  932.0 2.326  9999.0           0.7           0.7  gate_open
END
```

Run 3. Increased Temp. Barr. Width Study

qual_ec.inp: Creating EC tidefile output

“Main Input File” for Qual: qual_ec.inp

IO_FILE

MODEL TYPE IO INTERVAL FILE

#qual hdf5 out 1hour \${DSM2OUTPUTDIR}/\${DSM2MODIFIER}_EC.h5

qual hdf5 out 1hour \${DSM2OUTPUTDIR}/\${DSM2MODIFIER}_EC.h5

qual restart out 1mon \${DSM2OUTPUTDIR}/qual_\${DSM2MODIFIER}_EC.qrf

qual output out none \${DSM2OUTPUTDIR}/qual_\${DSM2MODIFIER}_EC.qof

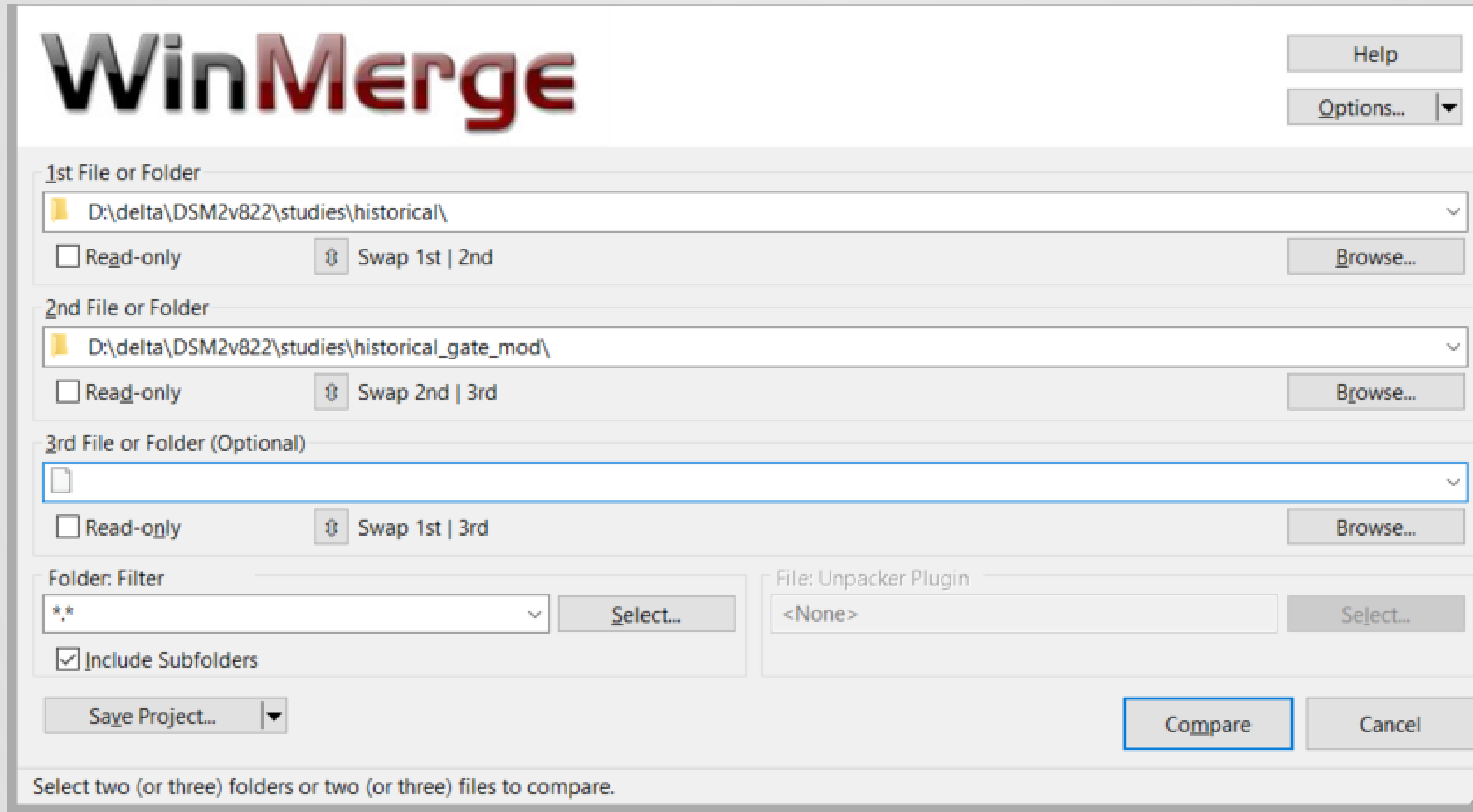
qual echo out none \${DSM2OUTPUTDIR}/qual_echo_\${DSM2MODIFIER}_EC.inp

END

Temp
Barrier

Run 3. Increased Temp. Barr. Width Study

Compare study folders with WinMerge



The image shows the WinMerge application window. The title bar is not visible. The main window has a white background. At the top left is the 'WinMerge' logo in a stylized font. To the right of the logo are two buttons: 'Help' and 'Options...'. Below the logo, there are three sections for selecting files or folders. The first section is labeled '1st File or Folder' and contains a text box with the path 'D:\delta\DSM2v822\studies\historical\' and a 'Browse...' button. Below this text box are two checkboxes: 'Read-only' (unchecked) and 'Swap 1st | 2nd' (checked). The second section is labeled '2nd File or Folder' and contains a text box with the path 'D:\delta\DSM2v822\studies\historical_gate_mod\' and a 'Browse...' button. Below this text box are two checkboxes: 'Read-only' (unchecked) and 'Swap 2nd | 3rd' (checked). The third section is labeled '3rd File or Folder (Optional)' and contains an empty text box and a 'Browse...' button. Below this text box are two checkboxes: 'Read-only' (unchecked) and 'Swap 1st | 3rd' (checked). At the bottom left, there is a 'Folder: Filter' section with a text box containing '*.*' and a 'Select...' button. Below this text box is a checkbox labeled 'Include Subfolders' which is checked. To the right of the 'Folder: Filter' section is a 'File: Unpacker Plugin' section with a text box containing '<None>' and a 'Select...' button. At the bottom right, there are two buttons: 'Compare' and 'Cancel'. At the bottom left, there is a 'Save Project...' button. At the very bottom, there is a status bar with the text 'Select two (or three) folders or two (or three) files to compare.'

WinMerge

Help Options...

1st File or Folder

D:\delta\DSM2v822\studies\historical\

☐ Read-only ☒ Swap 1st | 2nd Browse...

2nd File or Folder

D:\delta\DSM2v822\studies\historical_gate_mod\

☐ Read-only ☒ Swap 2nd | 3rd Browse...

3rd File or Folder (Optional)

☐ Read-only ☒ Swap 1st | 3rd Browse...

Folder: Filter

. Select...

☒ Include Subfolders

File: Unpacker Plugin

<None> Select...

Save Project... Compare Cancel

Select two (or three) folders or two (or three) files to compare.

Temp
Barrier

Run 2. Increased Sac. R Flow Study

Comparing historical vs Sac+30 study folders

WinMerge - [historical\ - historical_gate_mod\]

File Edit View Merge Tools Plugins Window Help

Select Files or Folders historical\ - historical_gate_mod\

D:\delta\DSM2v822\studies\historical\ D:\delta\DSM2v822\studies\historical_gate_mod\

Filename	Folder	Comparison result
> output		Folders are different
config.inp		Text files are different
config.inp~		Text files are different
DSM2_batch.bat		Text files are different
hydro.inp		Text files are different
config.inp.bak		Right only: D:\delta\DSM2v822\studies\historical_gate_mod
gate_std_delta_grid.inp		Right only: D:\delta\DSM2v822\studies\historical_gate_mod
DSM2_batch.bat~		Left only: D:\delta\DSM2v822\studies\historical
qual_ec.inp		Text files are identical
qual_ec.inp~		Text files are identical
qual_ec_fp.inp		Text files are identical
qual_vol_fp.inp		Text files are identical

Elapsed time: 775 ms Full Contents *. * Item 1 of 12 NUM

1. files/folders with differences shown in yellow

1. Files/folders existing in only 1 of the folders shown in grey.

Temp
Barrier

Run 2. Increased Sac. R Flow Study

comparing two versions of the config.inp file

WinMerge - [config.inp x 2]

File Edit View Merge Tools Plugins Window Help

Select Files or Folders historical\ - historical_gate_mod\ config.inp x 2

Location Pane x D:\delta\DSM2v822\studies\historical\config.inp D:\delta\DSM2v822\studies\historical_gate_mod\config.inp

Description
Historical study
202208
ENVVAR
NAME VALUE
DSM2MODIFIER hist_v822
DSM2INPUTDIR ../../common_
VERSIONDATE 201712
HISTFLOWVERSION DWR-DMS-{\$VER
HISTSTAGEVERSION {\$HISTFLOWVER
HISTQUALVERSION DWR-DMS-{\$VER

#runtime
#START_DATE 01Jan1999 #
START_DATE 01Jan2005 #0
#QUAL_START_DATE 02Jan1999 #
QUAL_START_DATE 02Jan2005 #0
PTM_START_DATE {\$QUAL_START_
#END_DATE 31Dec2017
END_DATE 31Jan2005
START_TIME 0000
END TIME 0000
< >

Description
Historical study
202208
ENVVAR
NAME VALUE
DSM2MODIFIER hist_v822_gat
DSM2INPUTDIR ../../common_
VERSIONDATE 201712
HISTFLOWVERSION DWR-DMS-{\$VER
HISTSTAGEVERSION {\$HISTFLOWVER
HISTQUALVERSION DWR-DMS-{\$VER

#runtime
#START_DATE 01Jan1999 #
START_DATE 01Jan2005 #0
QUAL_START_DATE 02Jan1999
QUAL_START_DATE 02Jan2005 #0
PTM_START_DATE {\$QUAL_START_
#END_DATE 31Dec2017
END_DATE 31Jan2005
START_TIME 0000
END TIME 0000
< >

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1 Difference Found NUM

Lines with differences shown in yellow

Temp Barrier

Run 3. Increased Temp. Barr. Width Study

Run hydro and qual

Enter the following commands into a separate command prompt window:

**Temp
Barrier**

```
cd D:\delta\DSM2v822\studies\historical_gate_mod\  
DSM2_batch.bat
```


Questions?

Please enter questions into the chat



Brad Tom (Bradley.Tom@water.ca.gov)