

V.3.3-DHM-OP DISTRIBUTED HYDROLOGIC MODELING OPERATION

Identifier: DHM-OP

Application: Forecast programs only

Description: This Operation uses a gridded rainfall-runoff (SAC-SMA) and routing (hillslope and channel kinematic wave model) component to produce flows at a user defined outlet.

Developed by: HSEB, Office of Hydrologic Development

Allowable Data Time Intervals: 1 hour

Time Series Used: Time series used in this Operation are as follows:

Type	Dimension	Units	Use	Required	Time Interval(s)	Missing Values Allowed
Instantaneous Discharge	L <sup>3</sup> /T	CMS	OUTPUT	Yes	1	No
Instantaneous Discharge	L <sup>3</sup> /T	CMS	INPUT	No	1	No

Input Summary: The card input for this Operation is as follows.

**Note:** Each card uses fields (is free format), information is separated by a space-bar(s). There must be exactly 1 'OUTLET' card, 0-5 'INLET' card(s) and 0-1 'USE\_RAIN\_PLUS\_MELT' card.

If Card 1 was not an 'OUTLET:' card, Card 2-7 must contain exactly one 'OUTLET:' card

If Card 1 was an 'OUTLET:' card, Cards 2-7 are used to specify 'INFLOW:' or 'USE\_RAIN\_PLUS\_MELT:' card(s).

Card	Format	Field	Contents
OUTLET	A	1	Header code. Must be 'OUTLET:'
	2A4	2	Time series identifier
	A4	3	Time series data type code; Must be 'SQIN'
	I2	4	Time series data time interval; must be '1'
	2A4	5	Basin ID identifier

<u>CardFormat</u>	<u>Field</u>	<u>Contents</u>	
INFLOW	A	1	Header code. Must be 'INFLOW:'
	2A4	2	Time series identifier
		A4	3 Time series data type code; Must be 'SQIN' or 'QINE'
	I2	4	Time series data time interval; must be '1'
	2A4	5	Basin ID identifier

<u>CardFormat</u>	<u>Field</u>	<u>Contents</u>	
USE_RAIN_PLUS_MELT	A	1	Header code. Must be 'USE_RAIN_PLUS_MELT:'

Sample Input and Output: Sample input is shown in Figure 1a and 1b. Sample output from the parameter print routine is shown in Figure 2. There is no execution routine output. Below is an example of input decks:

Error and Warning Messages: The error and warning messages generated by this Operation and the corrective action to take when they occur are as follows:

1. **\*\*ERROR\*\*** THE TIME SERIES TO BE SET BY DHM-OP HAS NOT BEEN DEFINED. I.D.=XXXXXXXX TYPE=XXXX DT=XX HOURS  
THUS, THIS OPERATION CANNOT BE EXECUTED.  
  
Action: Check identifier, data type code and time interval specifications. Define the time series, if not already defined.
2. **\*\*ERROR\*\*** THE OUTLET TS LABEL MUST BE "OUTLET:" CHANGE XXXX TO OUTLET:  
  
Action: Check header code on card 1 or card 2
3. **\*\*ERROR\*\*** TIME SERIES DATA TYPE MUST BE SQIN OR QINE'  
FOR DHM-OP INFLOW TIME-SERIES CHANGE 'XXX' TO SQIN or QINE  
Action: Check inflow data type code
4. **\*\*ERROR\*\*** TIME SERIES DATA TYPE MUST BE SQIN  
FOR DHM-OP OUTLET TIME-SERIES CHANGE 'XXX' TO SQIN  
Action: Check outlet data type code
5. **\*\*ERROR\*\*** NUMBER OF INFOWS = 7  
MUST HAVE LESS THAN OR EQUAL 5 INFLOWS  
Action: Check for inflow data. Must be less than or equal 5

6. **\*\*ERROR\*\*** NUMBER OF OUTLETS = 0

MUST HAVE AT LEAST ONE OUTLET LABEL

Action: Check for outlet header input card. Must have 1 outlet

Carryover Transfer Rules: This Operation has no carryover transfer rules.

Punched Card Limitations: None

Figure 1a. Sample Card Input For Operation DHM-OP (only OUTLET)

```
OUTLET: ATIT2    SQIN  1    ATIT2
```

Figure 1b. Sample Card Input For Operation DHM-OP (INFLOW and OUTLET)

```
(1 Inflow and use Rain+Melt Precip Data)
INFLOW: ATIT2UP SQIN  1    ATIT2UP
OUTLET: ATIT2   SQIN  1    ATIT2
USE_RAIN_PLUS_MELT:
```

```
(2 Inflows)
OUTLET: ATIT2    SQIN  1    ATIT2
INFLOW: ATIT2UP SQIN  1    ATIT2UP
INFLOW: ATIT3    SQIN  1    ATIT3
```

```
(1 Inflow and use Rain+Melt Precip Data)
OUTLET: DHMTEST3 SQIN  1    DHMBAS1
USE_RAIN_PLUS_MELT:
INFLOW: DHMTEST2 SQIN  1    DHMBAS2
```

Figure 2. Sample Output From DHM-OP Print Parameter Routine

```
0*****
0DHM-OP OPERATION NAME=ATIT2 PREVIOUS NAME=
0*****
          DISTRIBUTED HYDROLOGIC MODELING

          PRECIP DATA TYPE: MPE

          TIME SERIES AND BASIN(S) USED BY THIS OPERATION

CONTENTS          ID          TYPE          TIME INTERVAL          BASIN ID
OUTLET FLOW       ATIT2      SQIN          1 HOUR                 ATIT2
INFLOW            ATIT2UP    SQIN          1 HOUR                 TESTUP
```

Output from Operation table in IFP program:



