

VI.5.2A INTRODUCTION TO THE OPERATIONAL FORECAST PROGRAM (FCST) HYDROLOGIC COMMAND LANGUAGE (HCL)

Purpose

The Operational Forecast Program (FCST) consists of many routines and lines of computer code. The code is categorized as follows:

- o the Hydrologic Command Language
- o the Preprocessor Component
- o the Forecast Component
- o the Extended Streamflow Prediction Component
- o read/write routines for various data bases
- o utility routines

The Hydrologic Command Language (HCL) is how the user controls program FCST. The HCL reads the input commands and options and program FCST performs the specified actions.

The HCL allows much of the information needed to perform a desired computation to be stored in the Hydrologic Command Language Data Base. This information can be read at run time and changes can be made. If a run different from one stored in the HCL files is desired only the differences have to be entered.

Vocabulary

HCL has 4 nouns that make up the vocabulary:

- o Function
- o Technique
- o Argument
- o Procedure

Functions are processes that are linked to HCL. Some of the Functions included in program FCST are the computation of Mean Areal Precipitation (MAP), the computation of Mean Areal Temperature (MAT) and the forecast generation (FCEXEC).

Functions may use options which are set through HCL. Techniques and Arguments are the mechanisms used to set the options used by a Function.

Techniques are options that can be an integer value. Techniques can also use Arguments.

Arguments are options that can be integer, real, alphanumeric or date values.

Functions use Techniques to get the value for options and Techniques can have Arguments if the options are not integer values. For example the Forecast Function Technique SNOW determines whether or not to perform snow computations. If the value of SNOW is set to 1 then snow

computations are performed and if it is zero they are not. This is a case when a simple integer value of a Technique is sufficient so no Arguments are needed. Another Forecast Function Technique called NUMCOSAV is used to specify how many and for which dates carryover is to be saved. In this case NUMCOSAV is either zero or greater than zero specifying that carryover is not to be saved or is to be saved. If carryover is to be saved then Arguments are entered for Technique NUMCOSAV to specify the dates of carryover to be saved. In this case Arguments are needed because the integer value does not provide all of the information needed by the Function.

Before discussing the noun Procedure the following verbs need to be described:

- o define
- o set
- o compute
- o execute

Define:

Arguments, Techniques and Functions are initially 'defined' in the HCL files. When Techniques are defined their Arguments are given default values. When Functions are defined their Techniques are given default values.

Set:

At run time the default values of Techniques and Arguments may not be the ones the user wants. If the user wants to make changes to the default values, Technique and Argument values can be 'set' at run time. The run time input can be as simple as letting all the default values apply or can be as complex as resetting any or all of the Techniques and Arguments used by a Function.

Compute:

Once the desired Technique and Argument values have been set the Function can be 'computed'. HCL calls the appropriate routines to perform the Function using the values set for all of the Techniques and Arguments used by the Function.

The values of some Techniques and Arguments can change during the computation of a Function while others cannot. Some Techniques and Arguments can change by area (MAP area, MAT area, etc.) in the Preprocessor Component or by Segment in the Forecast Component. Techniques and Arguments that can change by area or Segment are called Nonuniversal. Techniques and Arguments that cannot change by area or Segment are called Universal. The Forecast Component Technique SNOW is a Nonuniversal Technique because snow computations can be done for some Segments and not for others. The Forecast Component Technique NUMCOSAV is a Universal Technique because the dates for which carryover is to be saved cannot change from Segment to Segment.

Execute:

Procedures are lists of HCL commands that will be performed in the specified order. For example a Procedure could set the values of several Techniques and compute a Function. It could compute several Functions and even call another Procedure. Procedures are 'executed'.

HCL Procedures allow an long series of steps to be stored and accessed with a simple execute statement. Procedures also allow symbolic replacement of parts of the Procedure. This means that generalized Procedures can be stored and adapted to a user's needs at run time.

In summary:

- o Techniques and Arguments (the options within HCL) are given default values when 'defined' and can be 'set' to new values at run time
- o Functions (the processes that perform work) are 'computed'
- o Procedures (ordered lists of HCL commands) are 'executed'

HCL File Structure

Techniques, Arguments, Functions and Procedures definitions are stored in the HCL data base. HCL files are organized into Global and Local files. There is one Global file in which Global definitions for Techniques, Arguments, Functions and Procedures are stored. All user's can access this Global file and use the Global definitions. In addition each user has a Local file in which Local Techniques, Arguments, Functions and Procedures can be stored. Each user can store delete or modify definitions in their Local file.

If a user wants to use a Global Function but the Global defaults for the Techniques used by the Function are not the default values wanted Local default values can be set that will be used whenever the Function is run. An example of a Technique for which this would apply is the output time zone for display from the Forecast Function. A user in the Eastern time zone would typically want output in Eastern time whereas a user in the Central time zone would want Central time displayed. Each user can set a Local default for this Technique and then compute the Global Forecast Function.

Passwords

The use of passwords has been included in HCL in order to help avoid unwanted changes to definitions on the HCL files.

All Global definitions are password protected for deletion and modification.

Passwords are optional for Local definitions. If passwords are specified when a definition is stored they are needed for any deletion or modification.

File Management Commands

Before any file management commands (such as defining, changing or deleting Techniques, Functions or Procedures) can be run a NONFCST command must be entered. Once a NONFCST command is entered no Functions can be computed or Procedures executed.