Mekong River Commission Secretariat

GIS - Applications for Watershed Classification

The WSC Data Users Guide

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III List of Abbreviations & Keywords

AAT	Arc Attribute Table.	**A**
Algorithm	A set of rules which specify a sequence of actions to be taken to solve a problem. Each action is precisely and unambiguously defined so that in principle it can be per-formed by machine	
Arc/Info	GIS software. The PC version of this software is used for demonstration in this manual. The UNIX version of it was used to create the WSCP data.	
Back coverage	Coverage used for display purposes but not activated for editing operations	**B**
Back environment	Feature(s) of the back coverage to be drawn Area from which water runs off to any given river valley or collecting reservoir.	
Catchment	Area from which water runs off to any given river valley or collecting reservoir	**C**
CDE	Centre for Development and Environment (Institute of Geography, University of Berne / Switzerland).	
Cells	Smallest map units with homogeneous information (also called Pixels).	
Contours	Lines at the same elevation above sea level.	
Co-ordinates	Systems of numerical indications used for georeferencing locations on maps and/or in the field.	
Digitalisation	Transformation of an analogue file into a digital file.	**D**
DOS	Disc Operating System. Operating System used on PC workstations	
DTM	Digital Terrain Model (equivalent to DEM = Digital Elevation Model). Computer stored map containing topographic information (elevation) over the entire map surface.	
DTM errors	The quality of a DTM depends on the quality of the input data (contours, points, etc.). Incorrect information in the input data produces wrong DTM features. Frequent types of input data errors are: wrong contour elevation, inter-section of contours with different elevations, mismatches between points and contours or between rivers and contours, double digitalisation of contours	
GIS	Abbreviation for Geographic Information System: Data base of spatial information	**G**

GIS software	Data base management system to store and process spatial information.	
Grid	A computerised representation of a raster file.	
Interpolation	Calculation of elevation values for the entire map surface from given contours and/or points, using an algorithm.	**I**
Label	Coverage element (point), also for polygon definition	**L**
Lineset	Arc/Info file defining the size, pattern and colour of the linear features of a coverage or map composition.	
MRC	Mekong River Commission Secretariat in Bangkok / Thailand.	**M**
PAT	Polygon Attribute Table or Point Attribute Table	**P**
PC	Personal Computer	
Projection	System of mathematical formulas used to transform geo-graphical information from one map to another or from the physical world to a map.	
Raster	Division of a (digital) map into the smallest map units with uniform/homogeneous information (cells). The size of raster cells is user-defined (resolution).	**R**
Resolution	Size of the cells in a raster map or a raster-based DTM as a function of the map or DTM scale.	
Resource	A component of the natural environment used in order to meet particular human needs. The act of exploitation converts the component into a resource	
River basin	Large river systems composed of numerous catchments and sub-catchments.	
SDC	Swiss Agency for Development and Cooperation	**S**
Spline	ARC/INFO function (algorithm) for interpolation. Constructs surface trends in order to calculate a continuous surface using given contour/point elevation.	
TIN	Triangulated irregular Network. Algorithm for calculating the smallest possible triangles between known elevation points (on contours and/or points). These triangles are the smallest map unit. The TIN algorithm produces a discontinuous surface.	**T**
Topography	Description of the surface features of a particular landscape.	
UNIX	Operating System. The UNIX Arc/Info version runs on this Operating System, while the PC Arc/Info version runs on the DOS Operating System	**U**
Watershed	Dividing line between two catchments. Used in practice as a synonym for catchment.	**W**
Workstation	In our context: UNIX based workstations (as opposed to DOS based PC workstations).	
WSC	Watershed Classification: classification of a landscape into different watershed classes, as a description of the potential topographic soil erosion risks to the landscape based on its physical and/or environmental features.	
WSCP	Watershed Classification Project for the Lower Mekong Basin started in June 1990, and co-ordinated by the Mekong River Commission Secretariat	

IV List of Commands

Command	Software	Description
&run	Arc modules	Starting a SML macro.
Add	Arcedit	Adding edit features to an edit coverage.
	Tables	Adding entries to the items of an attribute
Additem	Tables	Adding an item to an attribute table. (AAT / PAT) or a lookup table (LUT).
Altitude	SEM	Selecting the vertical viewing angle (observer's position) for a three-dimensional view.
Arcedit	Arc	Accessing the Amplot module
Arcidris	Idrisi	Importing a Generate file to Idrisi.
Arcplot	Arc	Accessing the Arcedit module
Arcs	Arcplot	Drawing the arcs of a coverage into a map composition.
Arcsem	SEM	Transforming a PC Arc/Info coverage into a SEM (Structured Elevation Model).
Aselect	Arcedit	Selecting an additional set of edit features while preserving the first selection.
	Tables	Selecting all items of an attribute table.
Azimuth	SEM	Selecting the horizontal viewing angle for a three dimensional view.
Back	Arcedit	Choosing a back coverage, i.e. a coverage which is drawn on the graphic device, but which can't be edited.
Backe	Arcedit	Choosing the back environment, i.e. those features of the back coverage to be drawn onto the graphic device.
Build	Arc	Calculating a correct topology for a coverage (options = polygon / line / point).
Calculate	Tables	Calculating items or item entries of an attribute table using logical expressions.
Clean	Arc	Calculating a correct topology for a coverage (options = dangle length and fuzzy tolerance).
Color rgb	Arcplot	Redefining the colour-index for the current Arcplot session.
Coordinate	Arcedit	Choosing the digitising device (coordinate digi to choose the digitiser).
Define	Tables	Creating a new attribute or lookup table.
Describe	Arc	Describing the general characteristics of a coverage.
	Idrisi	Showing the characteristics of a raster file.
Display	Arc/Info	Definition of the display device used in Arcedit and Arcplot. Display 4 defines the monitor as graphic display.
	Idrisi	Deploying a spatial data on the monitor.
Dissolve	Arc	Joining together polygons having the same value for one or several of their items.
Distance	Arceditv	Showing the distance between 2 points

	SEM	Selecting the viewing distance to a three-dimensional view.
Document	Idrisi	Documenting spatial data.
Draw	Arcedit	Drawing the edit coverage and the back coverage onto the graphic device.
Drawe	Arcedit	Choosing the draw environment, i.e. the features of the editcoverage to be drawn on the graphic device after using the draw command.
Drawselect	Arcedit	Drawing the selected features with the chosen draw symbol (Sds).
Drawsem	SEM	Displaying a SEM - plotfile (three dimensional view, drape) onto the graphic device.
Editcoverage	Arcedit	Choosing the edit coverage, i.e. the coverage to be edited (manipulated).
Editfeature	Arcedit	Choosing the feature (arc, polygon, label, annotation, tics) to be edited (manipulated). Only one at the time.
Erdidris	Idrisi	Importing an erdas file (raster) into Idrisi.
Gridascii	Idrisi	Importing raster files into Idrisi.
Import	Arc/Info	Importing data into PC Arc/Info.
	Idrisi	Importing data into Idrisi.
Initial	Idrisi	Initialising a new raster file.
Intercon	Idrisi	Computing a DTM
Items	Tables	Listing the items of an attribute table.
Labelerrors	Arc	Getting information on the label errors of a coverage.
Linecolor	Arcplot	Attributing a colour symbol to a line feature.
Lineras	Idrisi	Transforming a vector file into a raster file
List	Tables	Listing the entries of an attribute table
Map	Arcplot	Naming and initiating a map composition.
Mape	Arcplot	Setting the extent of a map composition.
	Arcedit	Zooming in a coverage.
Mkdir	DOS	DOS command to create a new directory.
Move	Arcedit	Moving one or several edit features.
Nodeerrors	Arc	Getting information on the node errors of a coverage.
Ortho	Idrisi	Computing and displaying a three dimensional view.
Polygonshade	Arcplot	Drawing a polygon coverage with different shades / colours, depending on the reference item, the selected shadeset and the selected lookup table (LUT).
Q stop	Tables	Exiting Tables while saving changes made in the current session.
Removeback	Arcedit	Removing the back coverage.
Renode	Arc	Updating the arc-node topology of a coverage.

Reselect	Tables	Selecting an item or specific entries of an attribute table.
Reshape	Arcedit	Redrawing an arc.
Resolut	SEM	Defining the resolution of a three dimensional view.
Save	Arcedit	Saving an edit coverage.
	SEM	Saving a plot file as an Arc/Info coverage.
Select	Arcedit	Selecting one edit feature.
	Tables	Selecting an attribute table.
Select many	Arcedit	Selecting several edit features.
Select Sid = ...	Arcedit	Selecting all edit features having a common identity.
Sds	Arcedit	(= Setdrawsymbol) Choosing the symbol (colour) with which selected features are drawn.
Semarc	SEM	Saving a DTM as an Arc/Info polygon coverage.
Shadeset	Arcplot	Selecting a shadeset for the polygonshade operation.
Surface	Idrisi	Calculating different surface options (aspect, analytical hillshading, etc.)
Tables	Arc	Accessing the Tables module.
Undelete all	Arcedit	Undoing edit changes.
Union	Arc	Computing the geometric intersection of two polygon coverages.
View3d	SEM	Generating a three-dimensional view of a DTM.
Window	Idrisi	Creating a new raster file using an extract from an existing raster file.
Zfactor	SEM	Defining the vertical exaggeration of a three-dimensional view.

FOREWORD

Planning for natural resources is a complex multidisciplinary task. It typically involves the generation, storage, processing and integration of large amounts of spatial information. The Watershed Classification Project which was designed to provide an analytical tool for land use planning and watershed management in the Lower Mekong Basin was challenged by this condition from the very beginning. In its early stages the Project relied on more conventional technologies for data generation and processing. However, soon it turned out that these technologies could not live up to the requirements of an advanced planning instrument in particular in terms of analytical capability, flexibility and versatility. While searching for technologies meeting these requirements, the Project selected the Geographical Information System (GIS) as the obvious choice. After careful consideration the project was redesigned for GIS application.

Geographical Information System is a recent and still very dynamic technology. Most professionals of the riparian countries involved in natural resource management have not been exposed to training in this field during their formal studies. The present WSC Data Users Guide intends to compensate to some extent for this shortcoming by providing the background and skills required to generate, process and store digital data for watershed classification. As the term ‘Guide’ indicates, it is a hands-on reference for staff directly involved in watershed classification activities. It complements the WSC Map Users. Guide, which addresses the methodological aspects of the Project, with technical information and practical instructions. I am confident that the present Guide is well suited to promote the skilful and responsible application of Watershed Classification in the Lower Mekong Basin.

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