Universiti Malaysia PAHANG

UNIVERSITY OF MALAYA

Workshop on:

GIS−based River Discharge Modelling

Speaker:
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**Venue: Cube Room, Level 4, New IPS building,
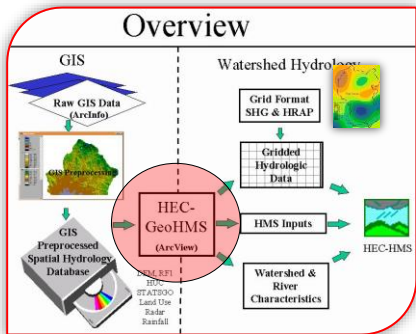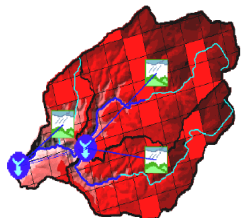University Malaya, Kuala Lumpur, Malaysia**

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HEC-GeoHMS
-GIS tool set supporting HEC-HMS modeling

- Developed by USACE
- ArcView 3.x extension v1.1 supported and widely used
- Version 4.2 for ArcGIS 9.X available through ESRI… not officially released by HEC
- Requires Spatial analyst

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About GeoHMS

HEC-GeoHMS – companion product to HMS
- ArcGIS version (ESRI for HEC under CRADA)
- I/O support through HMS (ASCII, XML)

History
- HEC-PrePro (UT, 1997), CRWR-PrePro, PrePro 2003, …
- Watershed Delineator (ESRI, 1997)
- ArcView 3.* versions (ESRI for HEC, 2001-04)

Development philosophy
- Build on top of Arc Hydro tools
- Automate GIS feasible functionality

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GeoHMS Functionality

HEC-GeoHMS
- DEM preprocessing – definition (main view)
- Watershed delineation – on models (project view)
- Topographic characteristics extraction
- Hydrologic parameter computations
- Model schematization
- Model input preparation (ASCII)

Other GIS processing
- Rainfall distribution/interpolation
- LU/soils :runoff coefficient mapping

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HEC-GeoHMS and Arc Hydro tools are tightly linked
- GeoHMS computes as many Arc Hydro attributes as possible (e.g. NextDownID, JunctionID, DrainID)
- DEM preprocessing (main view) is done using Arc Hydro tools
- Topographic characteristics extraction is based on Arc Hydro tools
- Arc Hydro tools operate on both main and project views

Option to change stream definition threshold when extracting the project view (one threshold for the main view and different thresholds for different project views)

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Function Processing

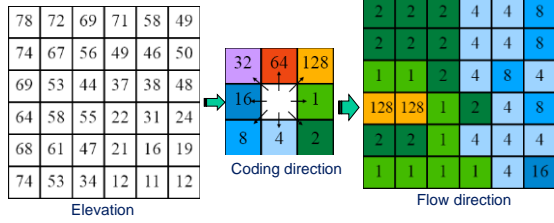DEM Preprocessing (parent definition)

Hydrologically correct DEM
Flow direction (D8 method)
Flow accumulation
Stream definition and segmentation
Watershed pre-delineation
Project data extraction

DEM Preprocessing (cont.)

Stream definition and segmentation
  • Threshold (performance)
Watershed pre-delineation
  • At stream confluences

Flow direction processing

Elevation

Coding direction

Flow direction

Flow accumulation processing

Flow direction

Coding direction

Flow accumulation
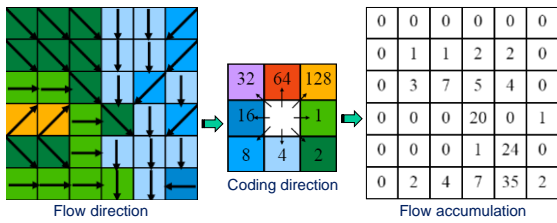
Watershed Delineation

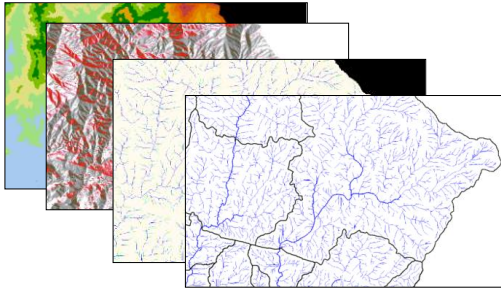**Flexible addition and removal of basin outlets**
- Merge existing basins
- Split basin anywhere on the stream
- Add an outlet anywhere (trace the outlet stream to an existing stream)
- Profile

Interactive or batch processing

Understanding of basin character

Watershed delineation
Delineate the contribution area to the cell or group of cell

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Batch Subbasin Delineation

Rule - The point should be located within the grid cell that has an existing stream.

Import Batch Points

- Places all selected points in the map into the batch point file. Id source feature classes have "Name" and "Description" attributes, they area assigned to the batch points

Delineate Batch Points

- Takes points from batch point feature class and uses them to do basin subdivision.
  - BatchDone and SnapOn attributes to control snapping

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Bach processing Topo-DEM

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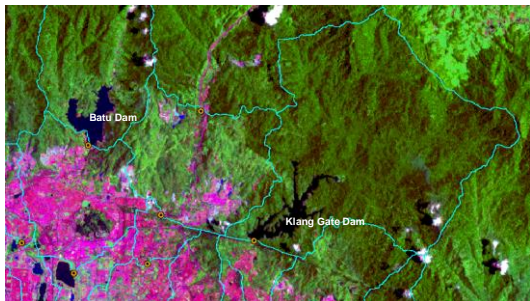
Bach processing SRTM-DEM
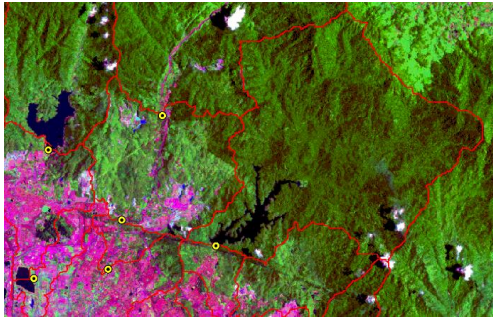
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Bach processing SRTM-DEM
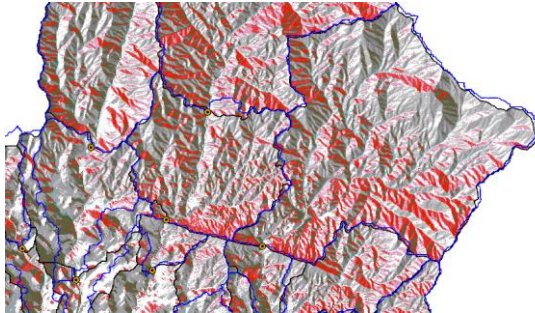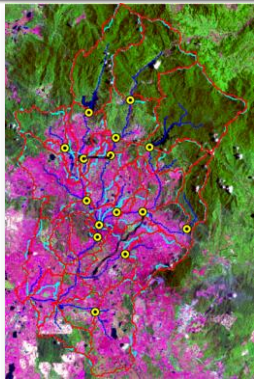

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Improvement of Derived basin binderies based on the Bach processing using two sources of DEMs

Delineated boundaries from SRTM-DEM

Delineated boundaries from Topo-DEM

---------- Main rivers

Diversions

VIPs

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Thank you
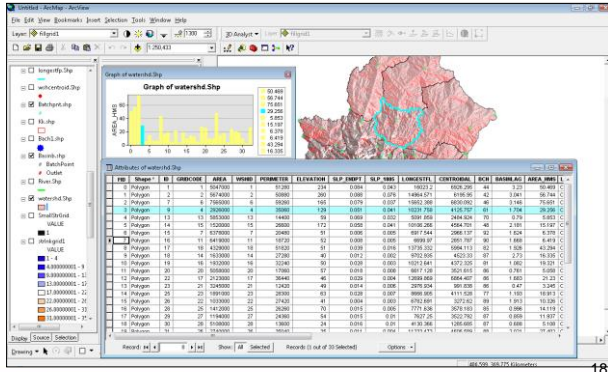
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