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GIS Applications in Water-Resource Engineering



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Outlines

Introduction

Why GIS ?

Term Paper

GIS and Water-Resources Engineering

Advantages.

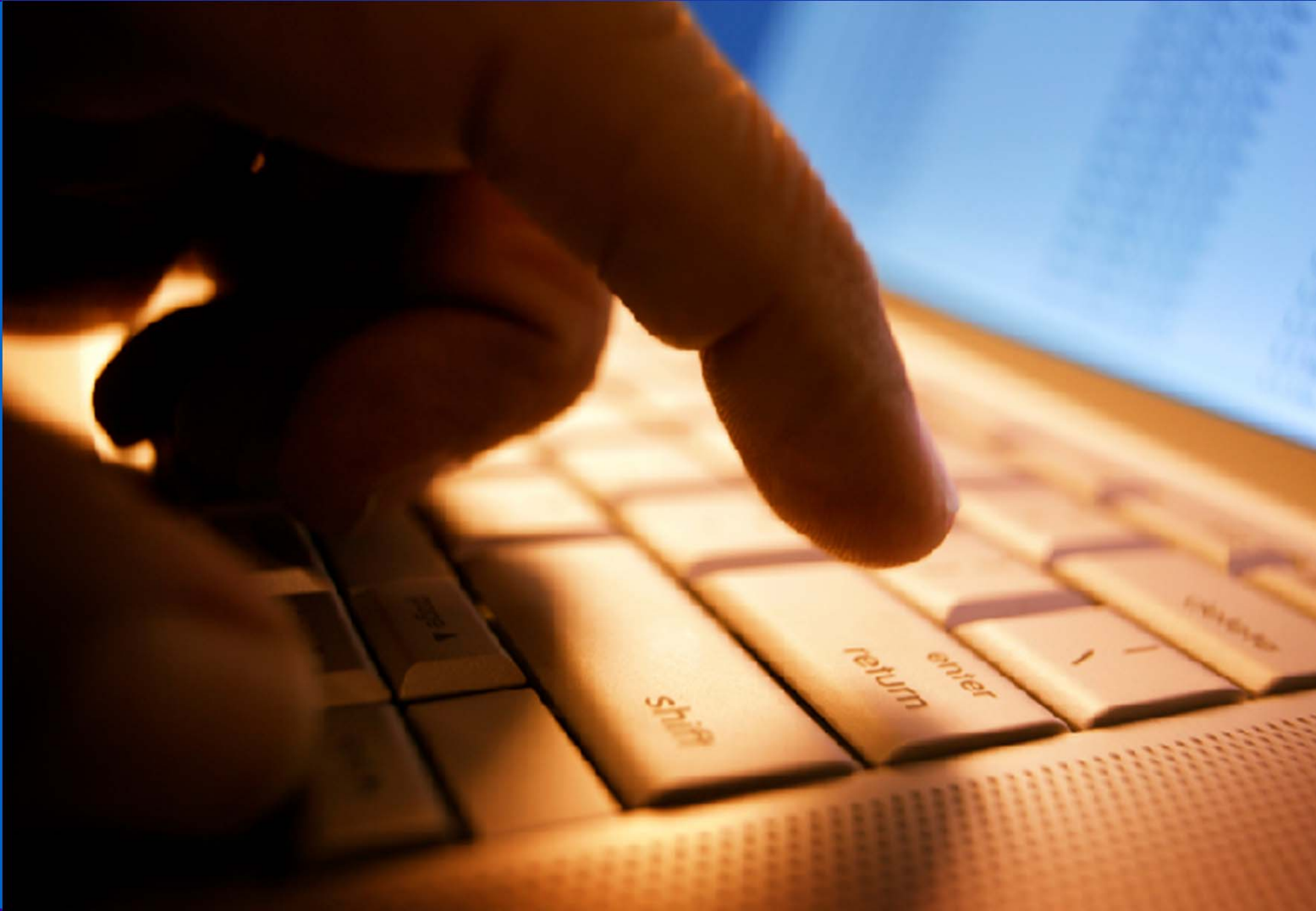
Disadvantages



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Introduction



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Why GIS ?

In general a hydrologic simulation model is composed of three basic elements:

- Equations governing hydrologic processes
- Maps that define the study area
- Database tables



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2- Management Decisions

- Land cover,
- Vegetation,
- Soil type,
- Topography,
- Geology,
- Water quality,
- and other factors



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3- Powerful Features

- The ability to be updated (in maps, equations and database)
- The ability of adding data from various sources
- The ability of producing an accurate model



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Term Paper



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Objectives of Term Paper

- Displaying applications of GIS in WRE.
- Study its applicability in KSA.



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Limitations and Constraints

- 1- Applications of GIS in Water resources are relatively new.
- 2- Papers published are not ALWAYS accessible.
- 3- Difficulties of understanding some of GIS technical terms



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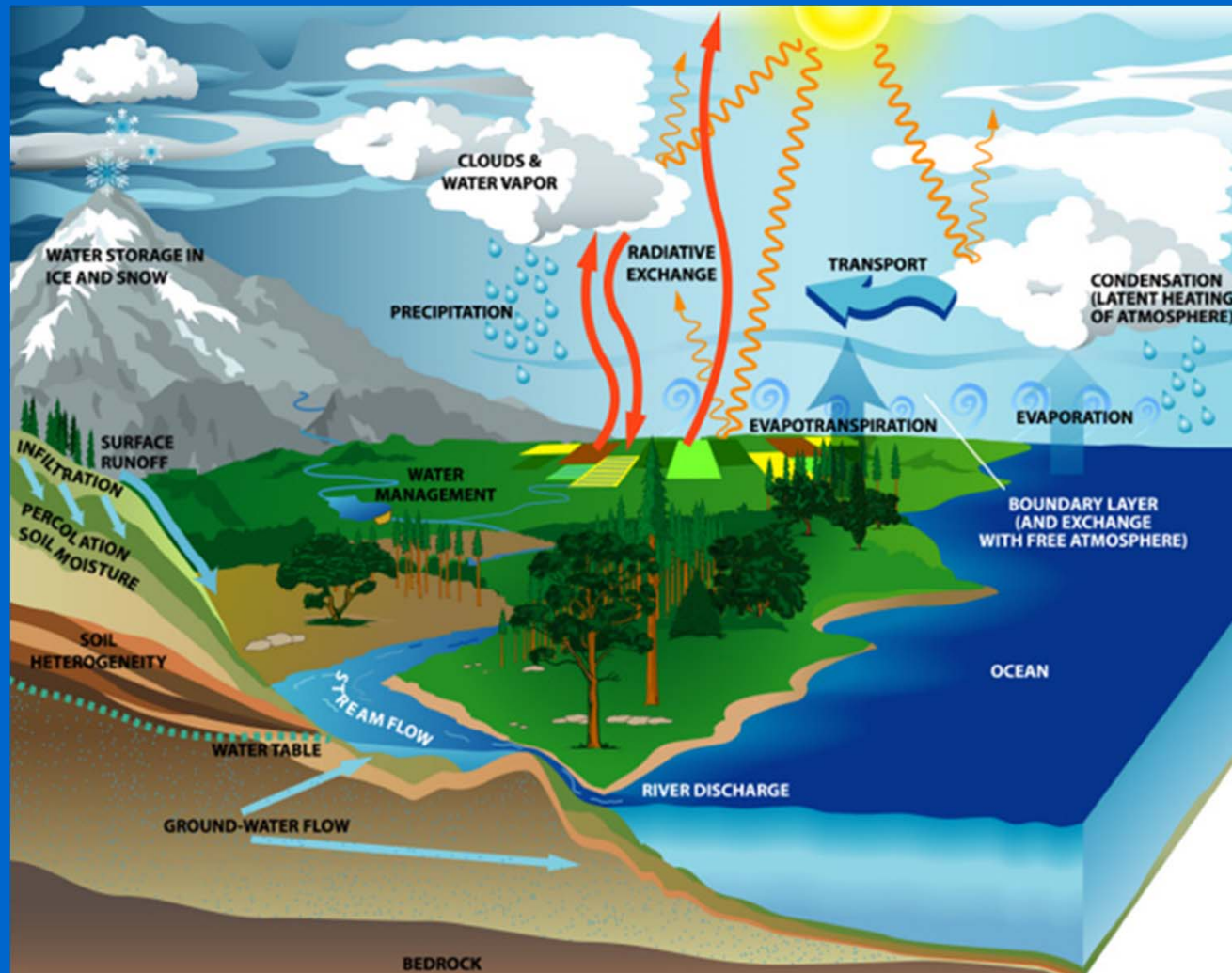
Literature review and Case Studies

- 4 Master Thesis.
- 4 Case Studies.
- More than 16 reference (Published papers)



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GIS and Water-Resources Engineering



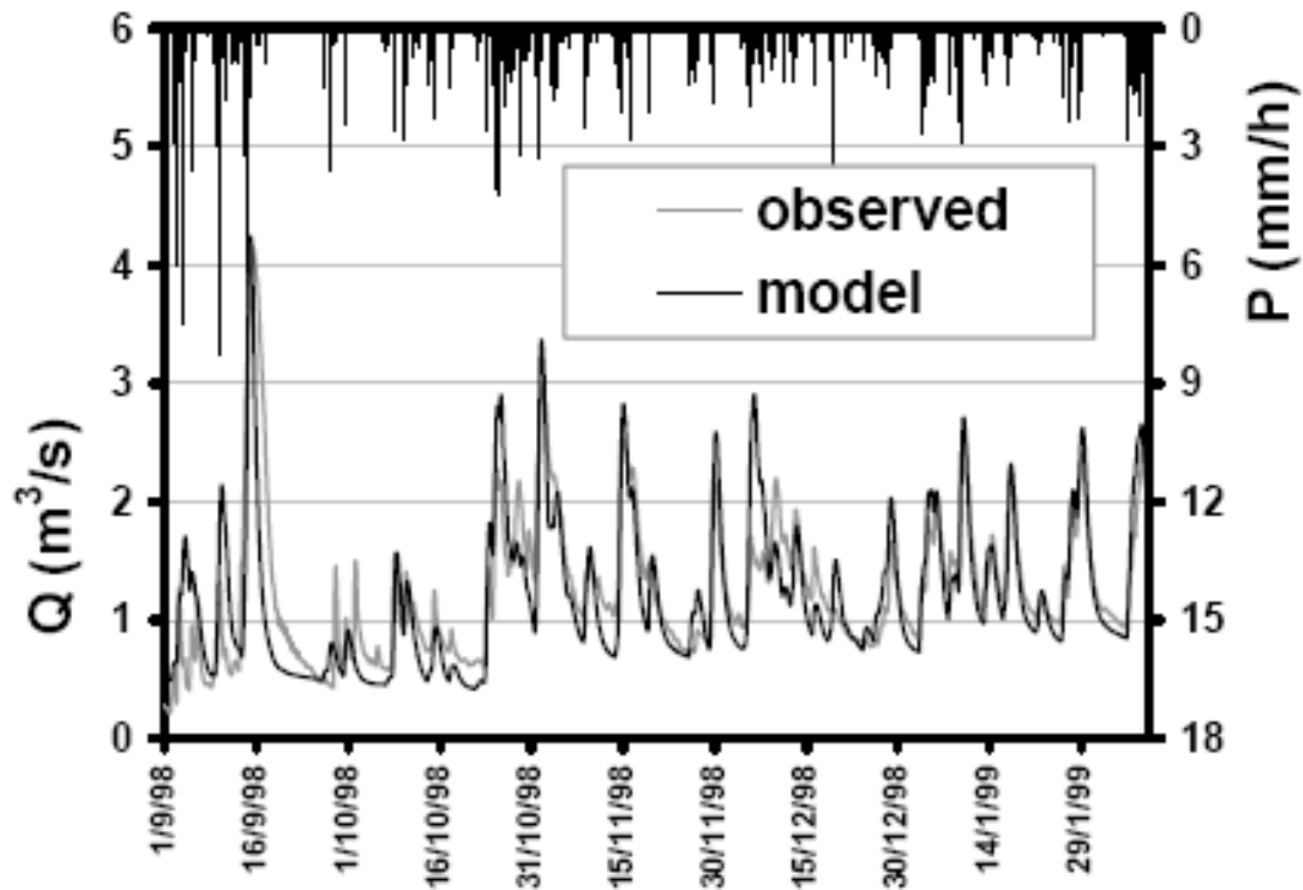
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Applications of GIS in Water Resources

- Hydrologic and Water Quality Data
- Watershed Delineation
- Hydrologic Modeling
- Floodplain Management
- Closed Basin Hydrology



Applications of GIS in Water Resources



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Advantages



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Advantages:

- 1- Computer modeling VS. hand-drawn predecessors.
- 2- Relatively low cost since every simulation is repeatable.
- 3- New ways to visualize the movement of water through landscapes (3D).
- 4- The averaged values of landscape characteristics used in the watershed models have been replaced by their distributed representation.

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Advantages Cont.

5- Effective and efficient delineation of watersheds and streams.

6- Quick extraction of watershed and stream parameters.

7- Digital Elevation Models (DEM) can define the drainage basin boundaries.

8- Combining different data with different coordinate systems

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Disadvantages



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Disadvantages:

- 1- The effort and cost outweigh the benefits.
- 2- Cost of using GIS applications in water resources still slows the acceptance of this new technology.
- 3- Hydrologists have to become GIS experts to solve problems.
- 4- If Data is not available its USELESS

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