Information and Knowledge Management Programme

Regional Workshop on Discharge and Sediment Monitoring, and Geo-morphological Tool for the Lower-Mekong Basin

21st-22nd October08, Vientiane, Lao PDR

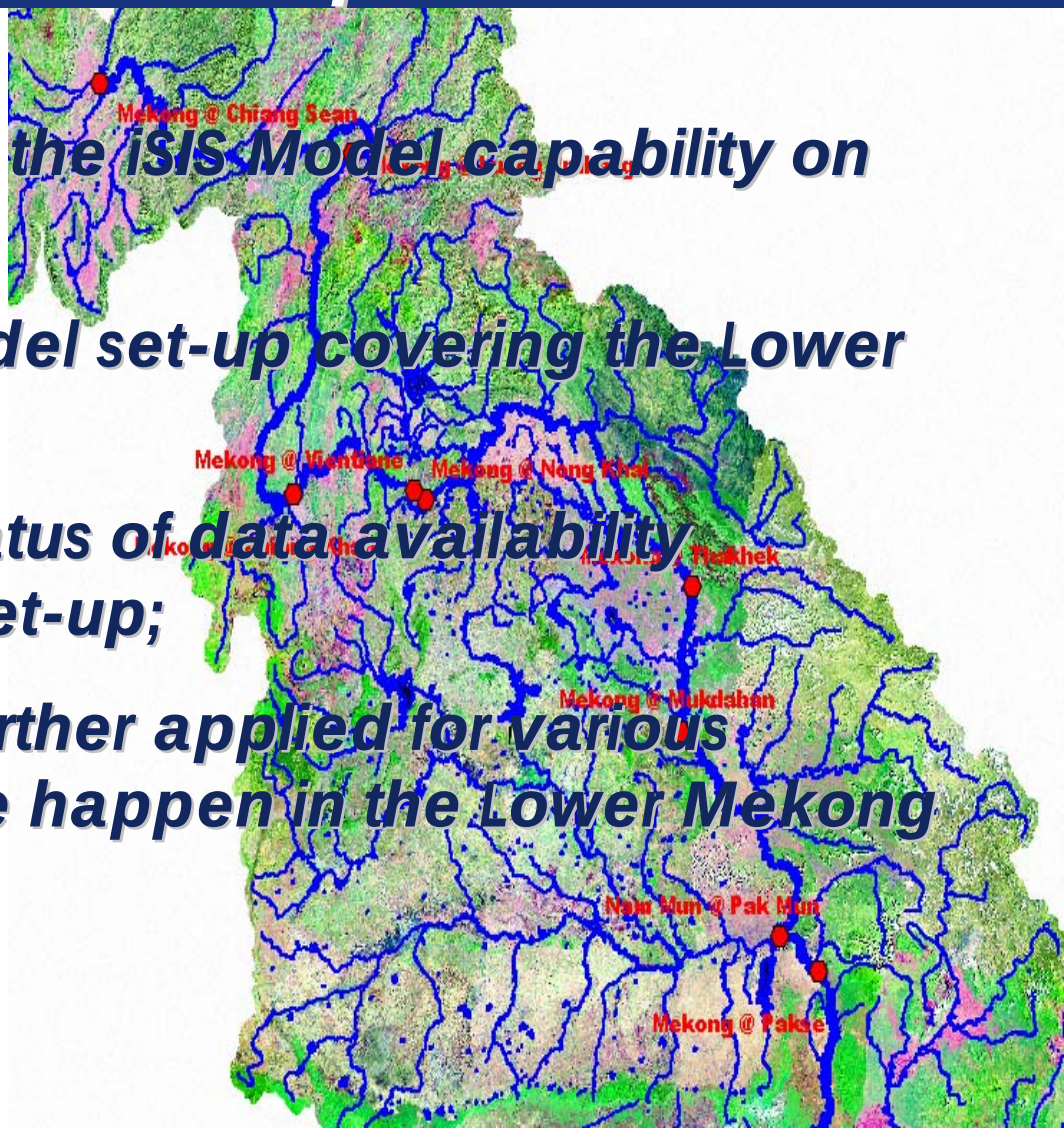
iSIS SEDIMENT

Technical Support Division
Modeling Team, MRCS

Contents

Objective of Model Set-Up

- To understand more the iSIS Model capability on sedimentation;
- To complete the model set-up covering the Lower Mekong River Basin;
- To investigate the status of data availability required for model set-up;
- The Model can be further applied for various scenarios likely to be happen in the Lower Mekong River Basin;



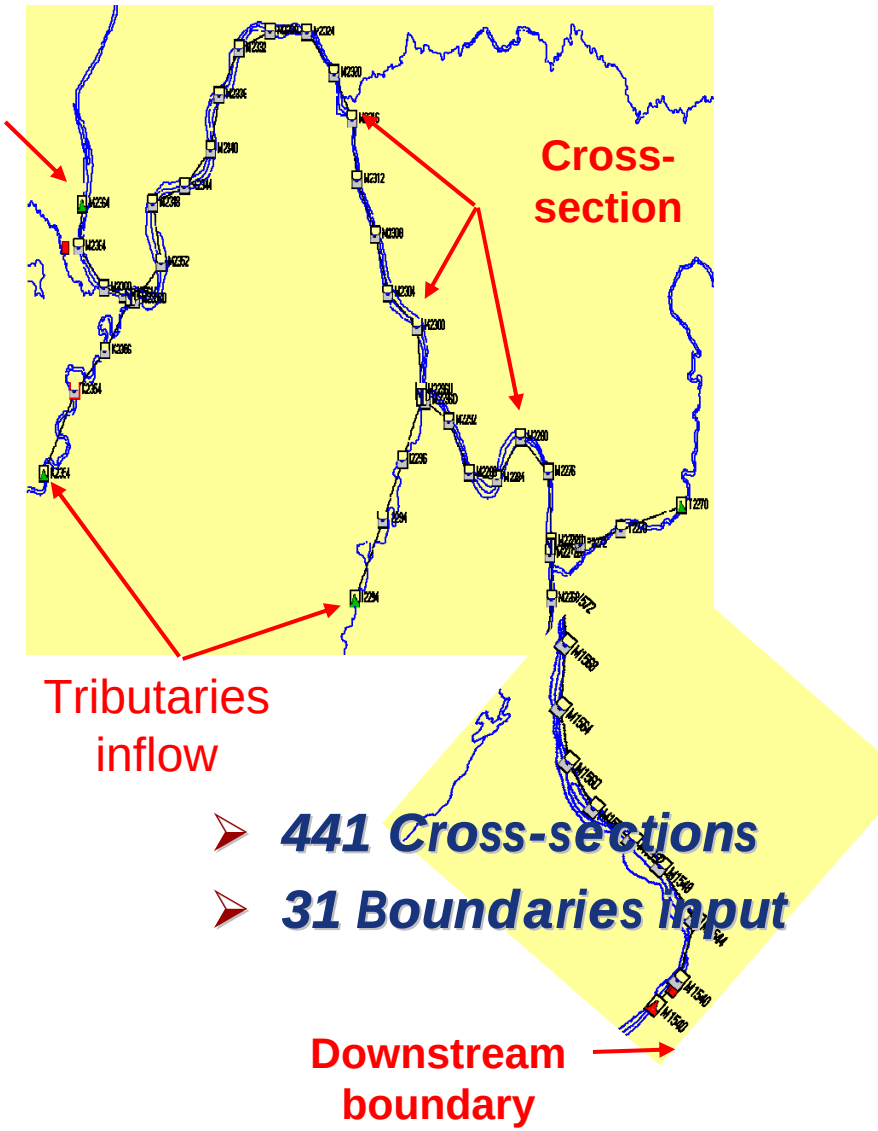
Data Availability

Spatial & Hydrological Data

- Hydrographic Atlas 1999
- DEM (digital Elevation Model)
- Only data for Chiang Saen to Pakse
- Flow and Water level
- Results from other model

Remarks

- Data is not sufficient for set-up the model, tributaries info;

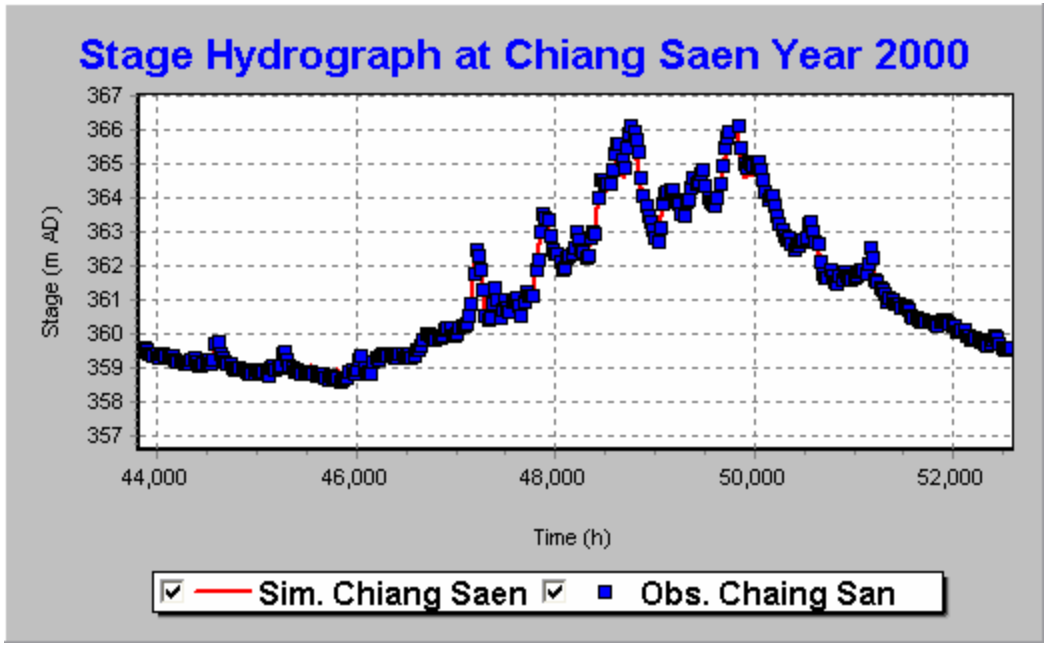


iSIS Flow and Results

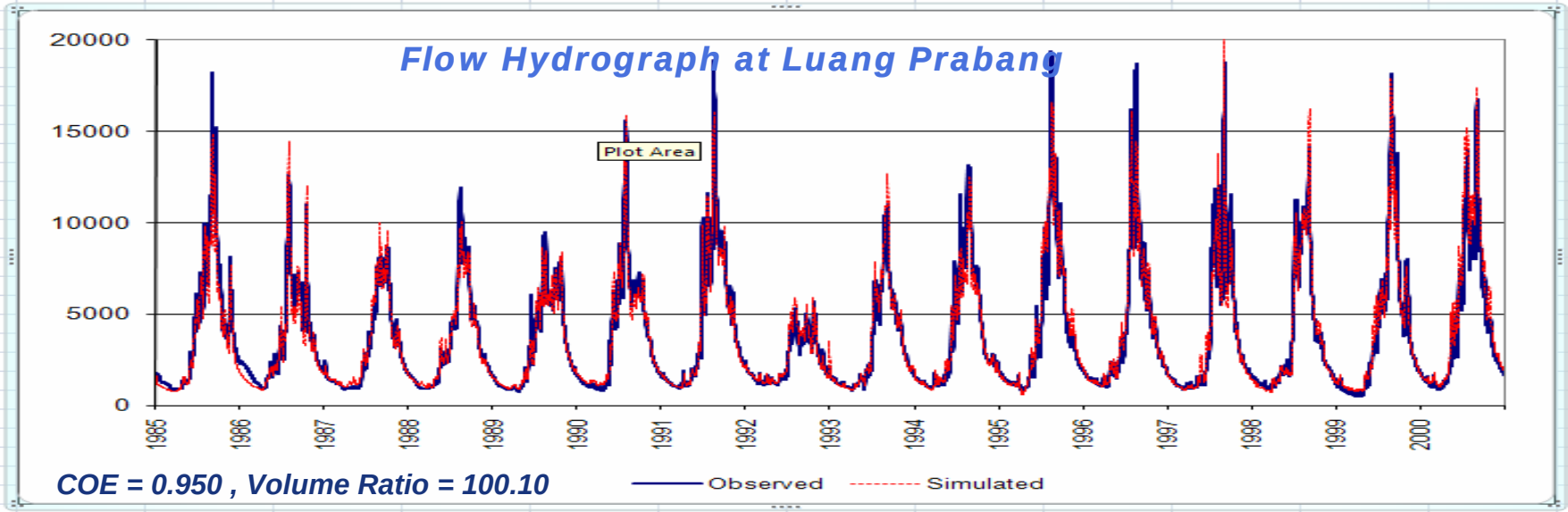
Model Calibration

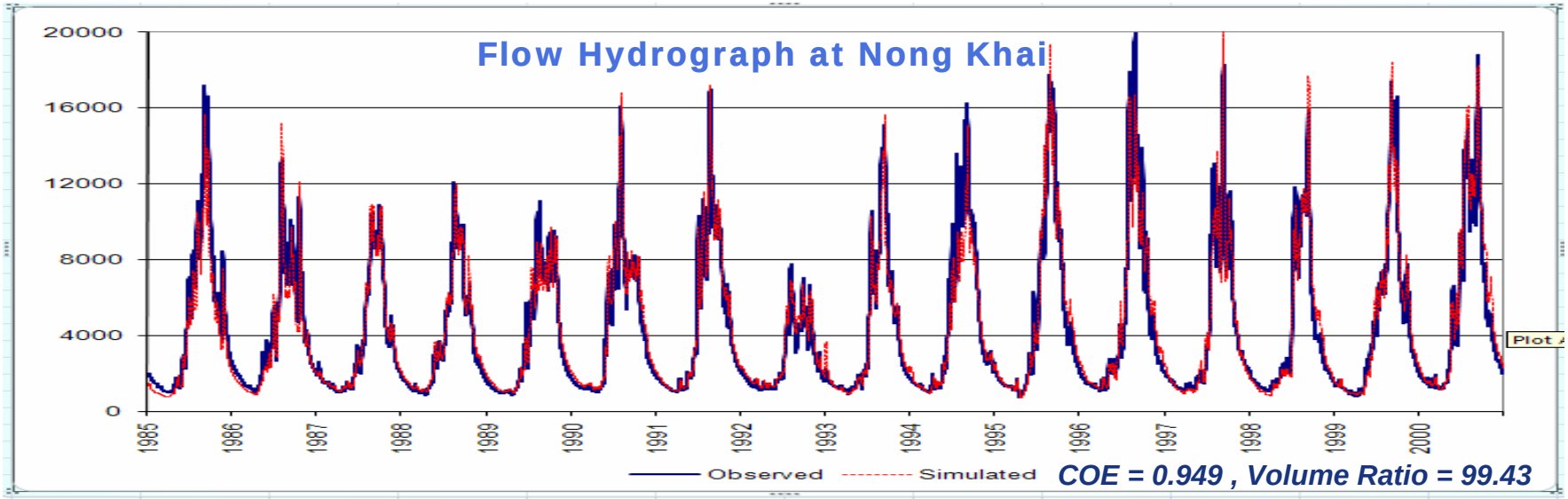
There are some hydrological stations where is checking point for model result on both water level and discharge.

1- Chiang Saen
2- Louang Prabang
3- Vientiane
4- Nong Khai
5- Thakhek
6- Mukdahan
7- Pakse



ISIS Flow Results



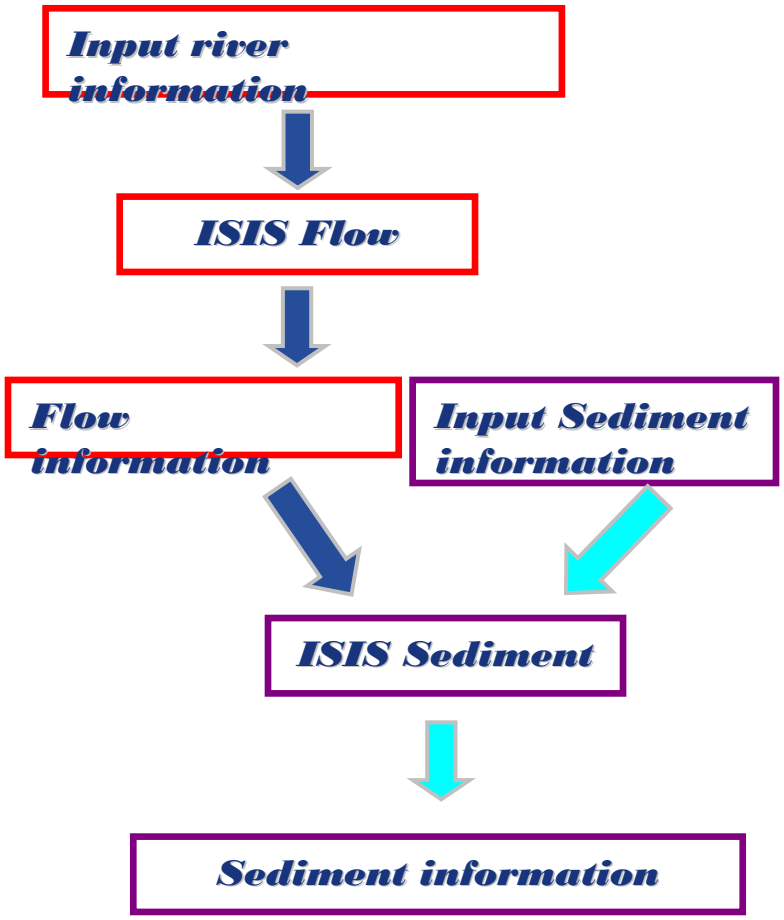


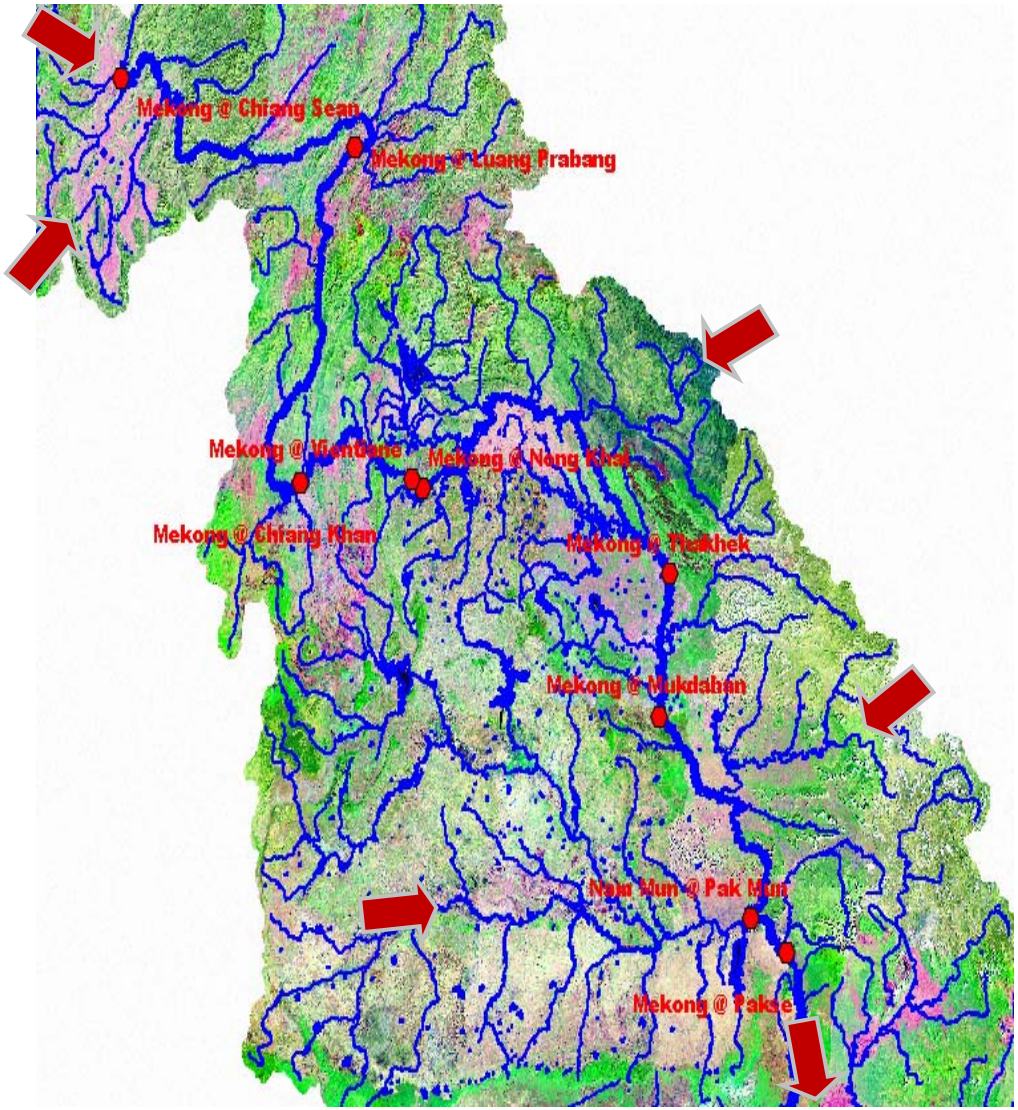
ISIS Sediment and Results

ISIS Sediment Overview

- Simulates water quality and cohesive sediment transport
- Simulates sediment transport (primarily sand size sediment) and changes in bed profile
- Simulation periods ranging from a few days to many years
- Range of sediment transport equations
- Graded sediments
- Additional module for use with ISIS Flow

ISIS Sediment Overview





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ISIS Sediment ability

- For the current iSIS version can calculate sediment only in channel (in-bank model), not permitted a mobile bed module run in: flood plain, reservoir, spill, interpolated river section
- iSIS can predict the change of sediment at:

  a- sediment transport rate (in m3/s)

  b- bed elevation (in mAD)

  c- change in bed elevation during the last time step (in m)

  d- sediment concentration (in ppm)

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Sediment data

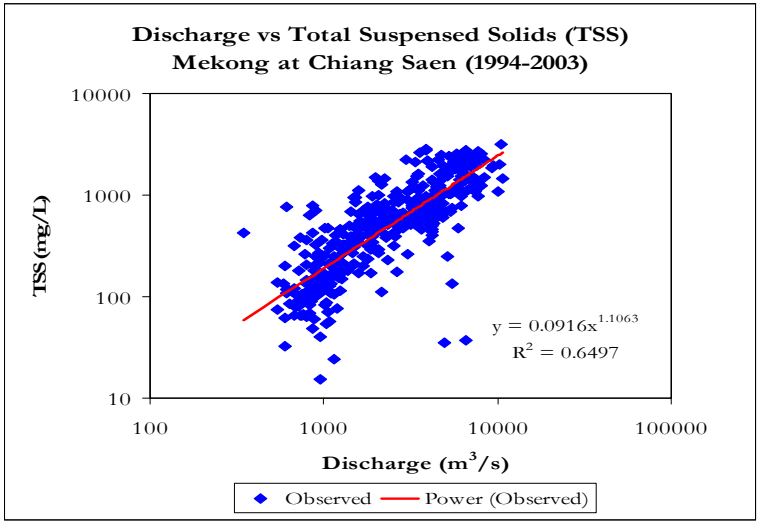
Sediment boundaries type:

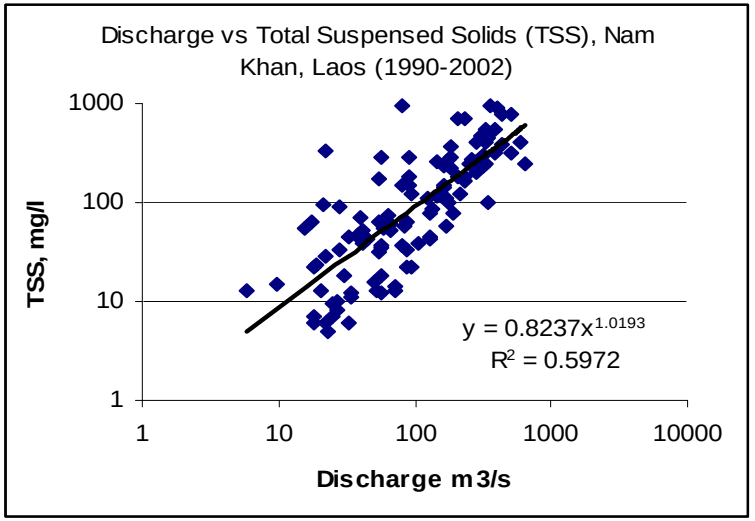
1. Sediment transport rate with time (GTBDY)
2. Sediment concentration with time (CTBDY)
3. Sediment rating curve (QCBDY)

Sediment Data used :

a. - Use Sediment rating curve at Chiang Saen as boundary input for mainstream

b. - Tributaries are estimated by using rating curve (Mae Kok [90-03], Nam Khan [90-02])





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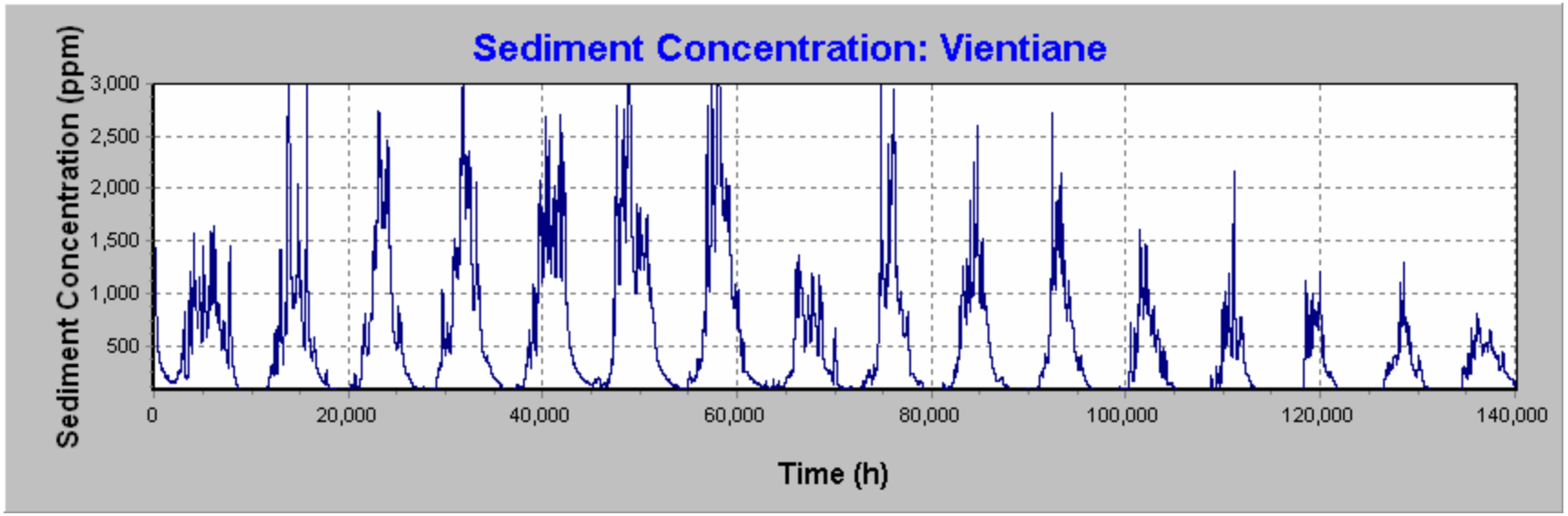
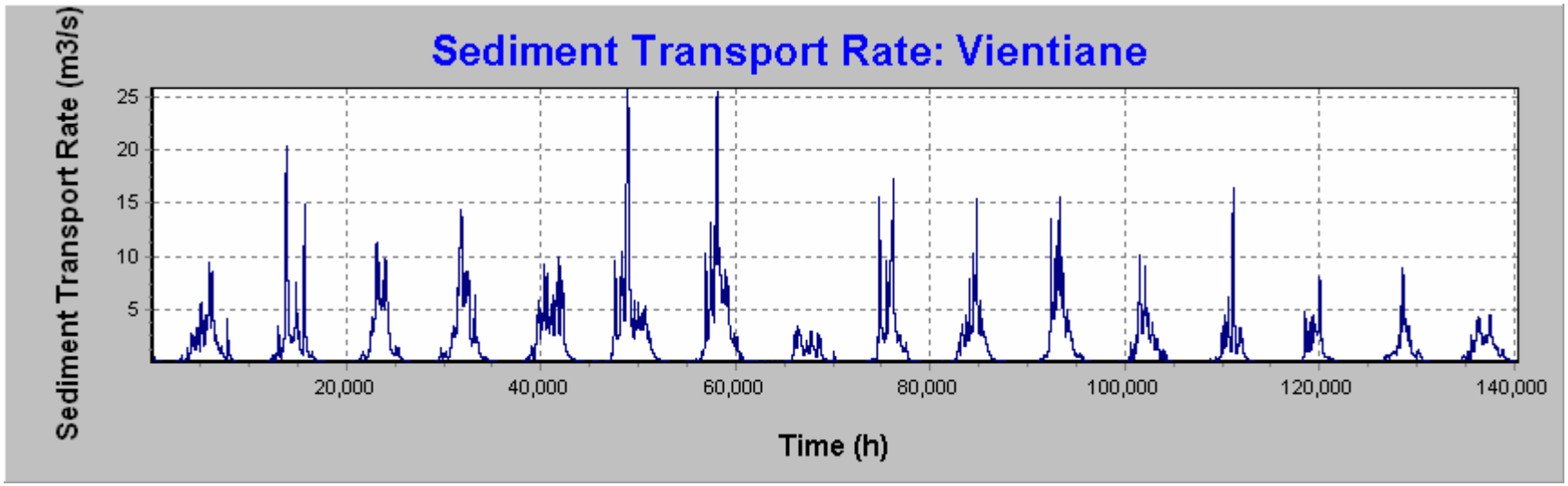
ISIS Sediment Results





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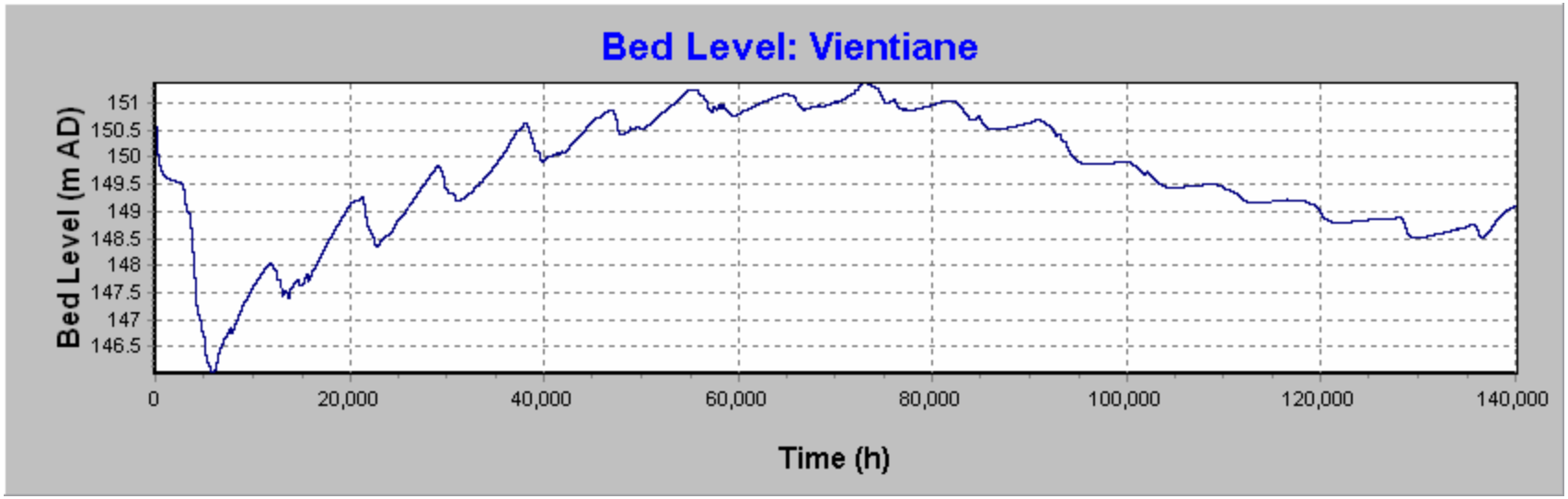

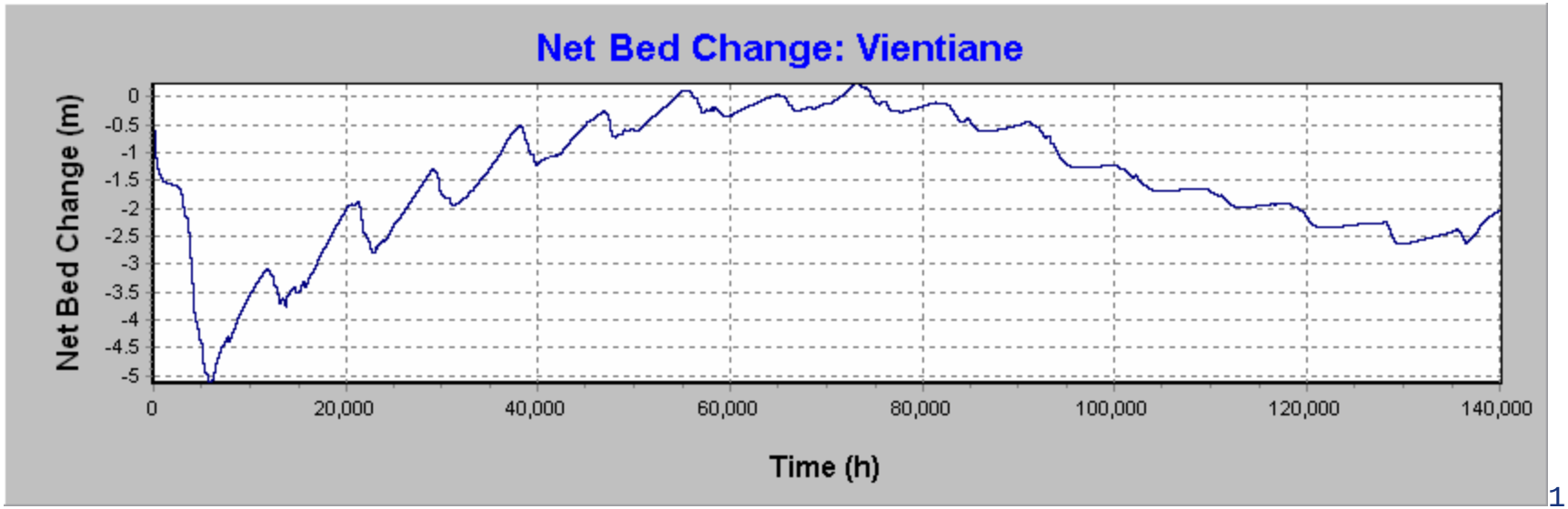

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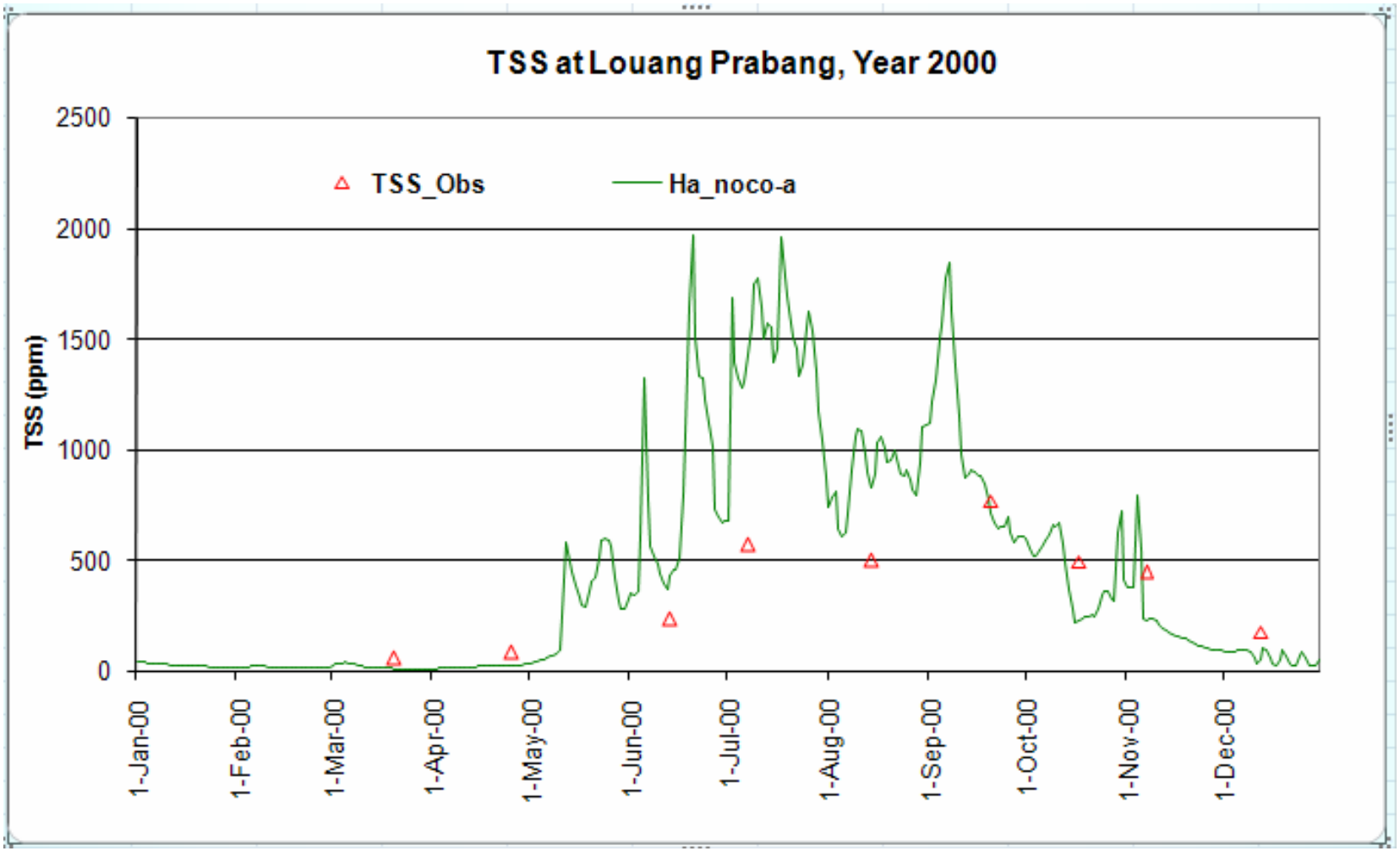
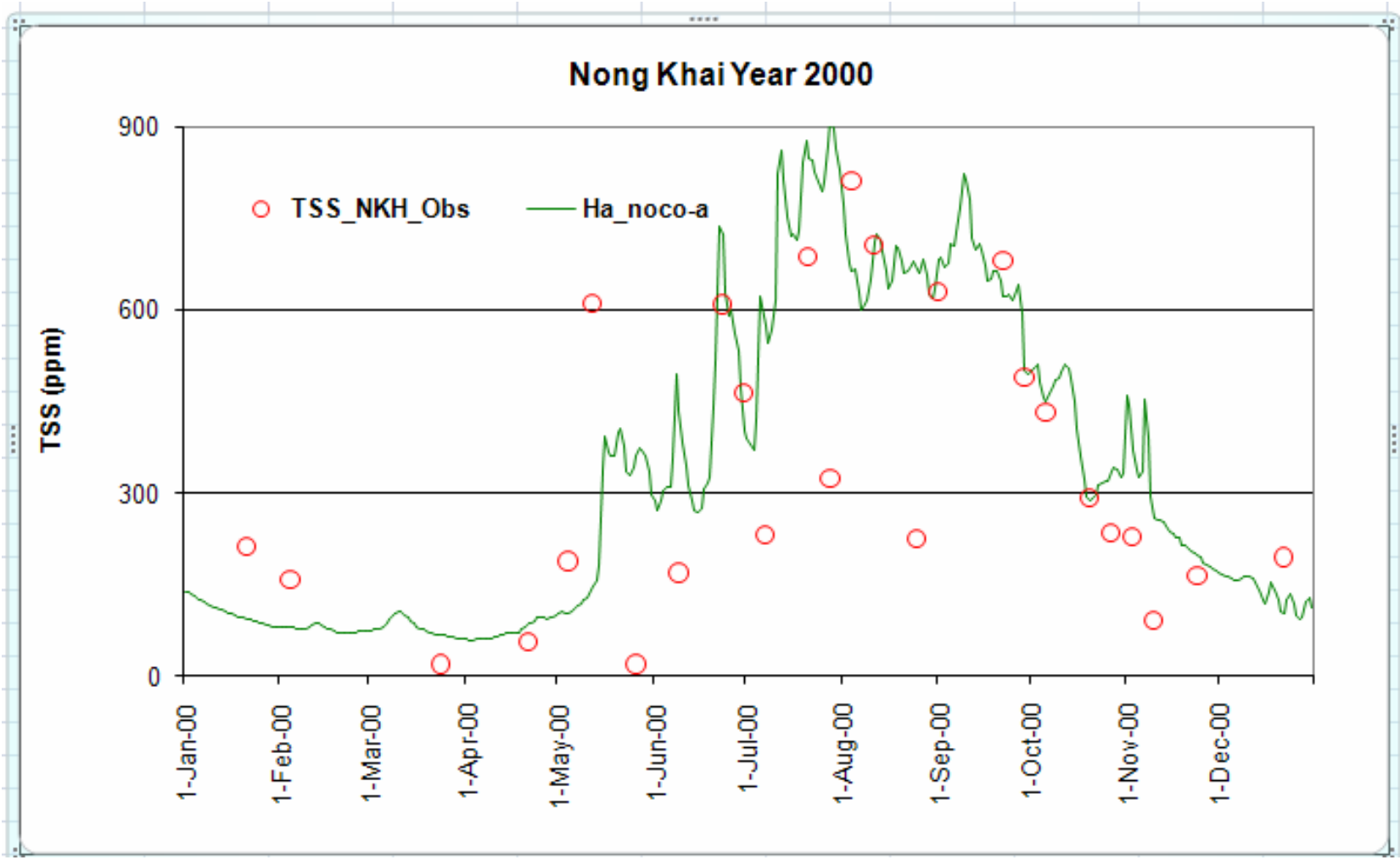


ISIS Sediment Results



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Conclusions

- ***Model testing exercise***
- ***Results depend on assumptions made***
  - Input grain size distribution, both for inflow and bed
  - Cohesive or non-cohesive bed (fall velocity, shear)
  - Some cross-sections show heavy erosion (due to input bed level are not correct?)
  - Armoring depends on active layer thickness
- **The ISIS model is suitable for setting up at the upstream part of Lower Mekong River.**

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Conclusions

- The results showed a good simulation for both water level and flow,
- The model has high potential in sediment simulation, however further data collection and analysis will be needed.
- Cross-section data used in the model should be revised and additional information could be added into the schematization.
- Collecting more sediment data & interacting with specialists on geomorphology and sedimentology for selecting suitable methods and parameters.

Thank You For Your Kind Attentions !