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Flood forecasting model of Medjerda River in the context of Water Resources Management of Tunisia

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Tunisia

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Water resources

The use of conventional water resources in Tunisia reach its limits. Being fully aware of this situation, Tunisia has adopted a strategy to develop resources and secure a better control of demands in various socio-economic sectors. This strategy's main objectives consist to:

- Satisfy water supply for drinking all over the country.
- Extend irrigated areas and rationalize irrigation waters.
- Satisfy industrial, tourism and environmental water demands.
- The protection against floods and droughts.
- The sustainable and fair use of water resources and their preservation against all types of pollution.

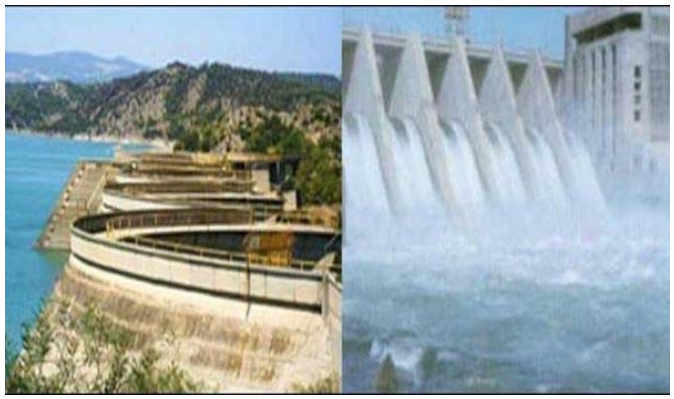
Water resources

In order to achieve these objectives, a set of measures was adopted :

- To mobilize all water resources which can mobilized ;
- To use the most of ground resources which can be used ;
- To identify new resources in areas where surface water is not yet well controlled and ground water not well evalued;
- To adopt a wide strategy of water economy and the use of non conventional water agriculture and industrial fields;
- To follow up the quantity and quality of water resources ;
- To develop the artificial recharge of groundwater with surface and reclaimed water.

Tunisia strategy

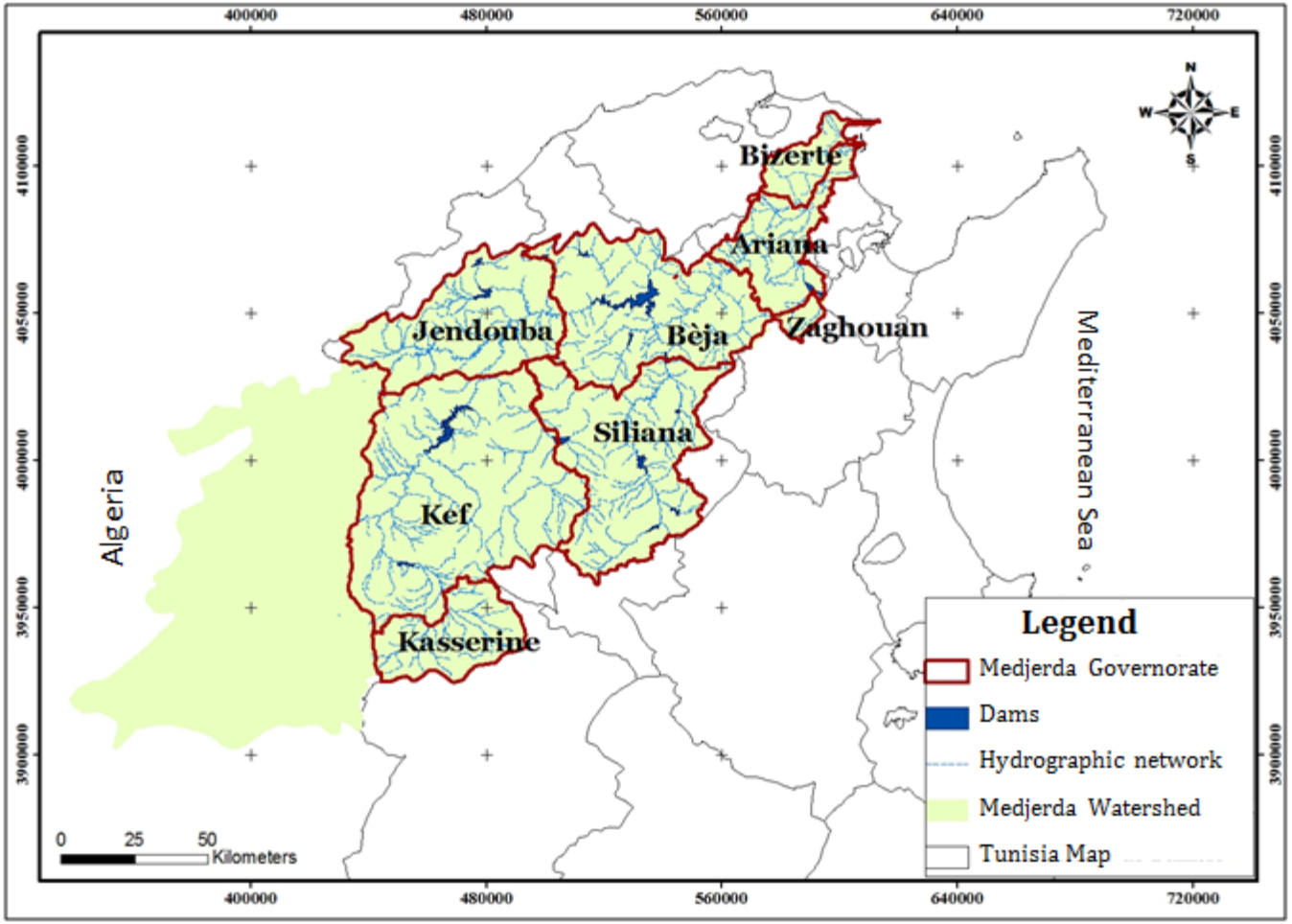
Water mobilization



Desalination of
Groundwater

Desalination of sea water

Mejerda River



- 75% length and 67% area in Tunisia,
- covers more 80% of Tn water resources,

Medjerda flooding

Solution

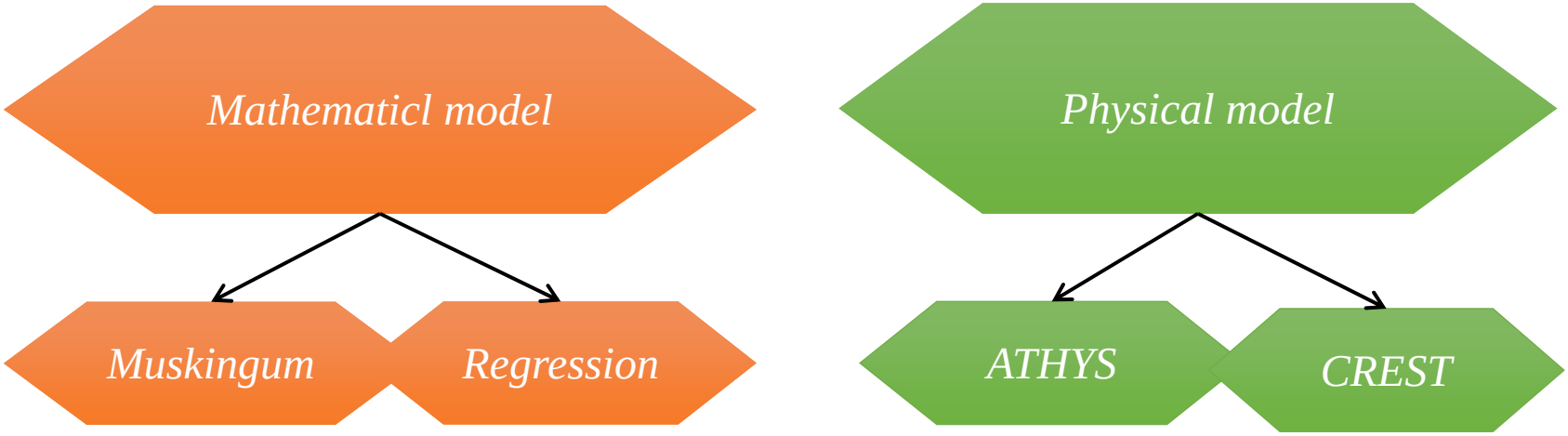
Problematic

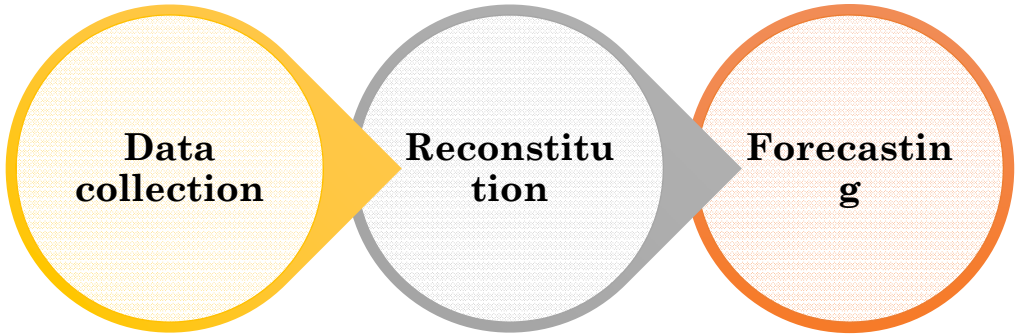
Management of Dams and River

Flood forecasting and announcement

- contribute to the management system and flood warning.

Methodology





Performance measures

Numerical criteria

Nash–Sutcliffe model coefficient : $$Nash\% = 1 - \frac{\sum_{i=1}^{n}(Qo - Qc)^2}{\sum_{n=1}^{n}(Qo - Qm)^2}$$

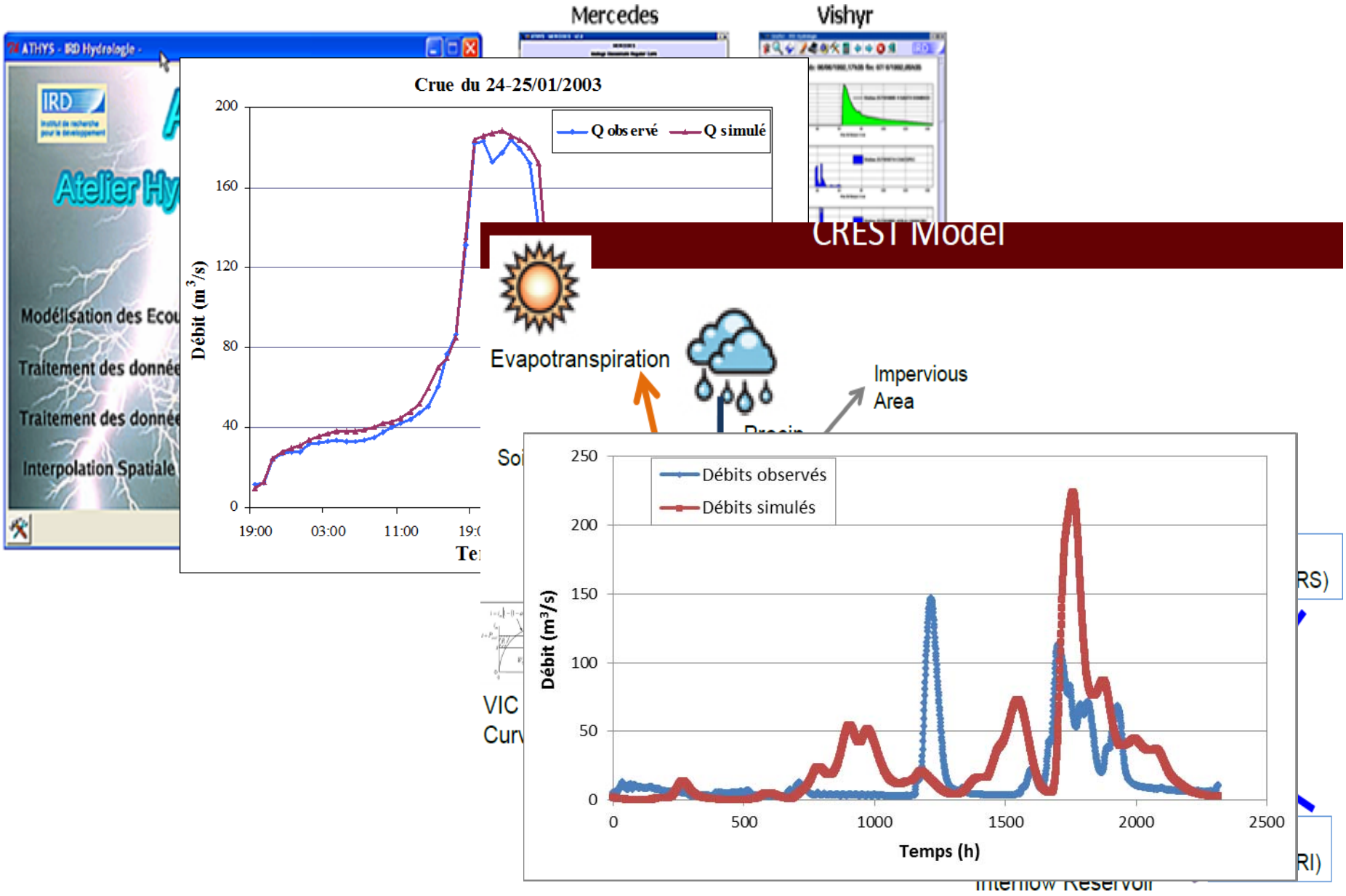
Peak relative error: $$PRE = \frac{Qc\ max - Qo\ max}{Qc\ max}$$

Peak time error: $$PTE = t_{Qc} - t_{Qo}$$

Graphical criteria

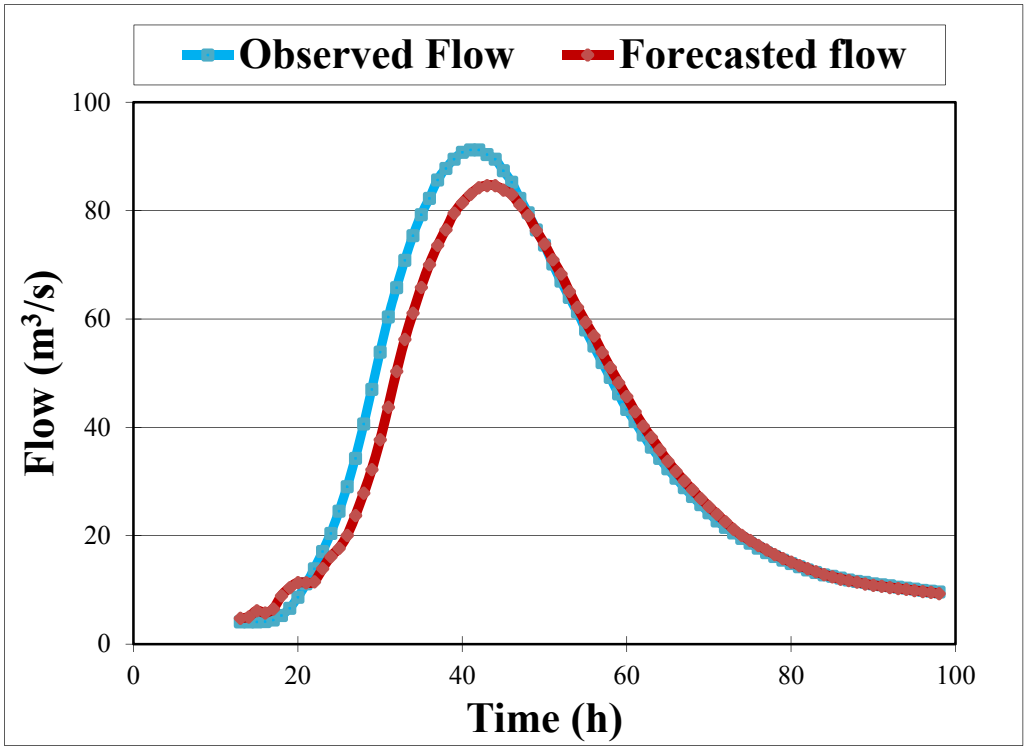
Error and the correlation between observed and forecasted flow,

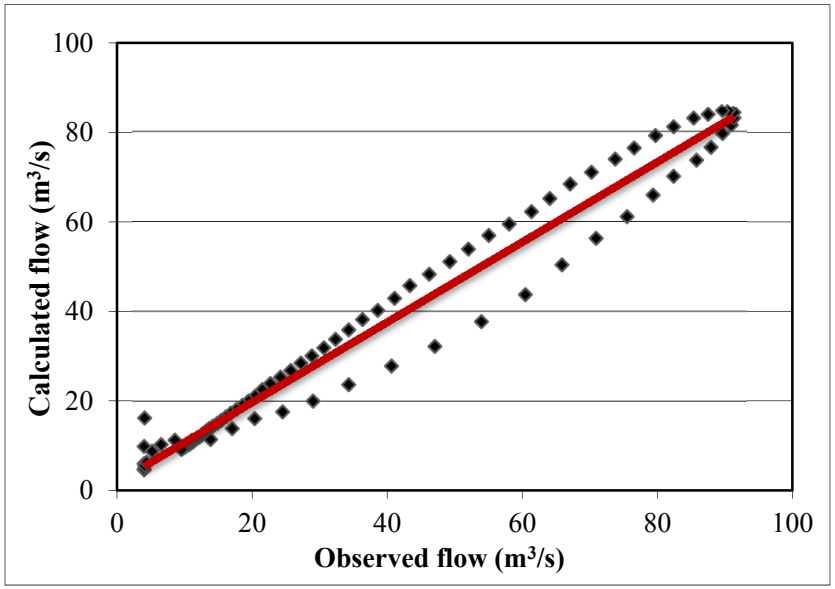
Results


Mercedes
Vishyr
ATHYS - IRD Hydrologie -
IRD
Atelier Hy
Modélisation des Ecou
Traitement des donnée
Traitement des donnée
Interpolation Spatiale
Crue du 24-25/01/2003
Q observé
Q simulé
Débit (m³/s)
200
160
120
80
40
0
19:00
03:00
11:00
CREST Model
Evapotranspiration
Impervious Area
Débits observés
Débits simulés
Débit (m³/s)
250
200
150
100
50
0
0
500
1000
1500
2000
2500
Temps (h)
VIC
RS)
RI)

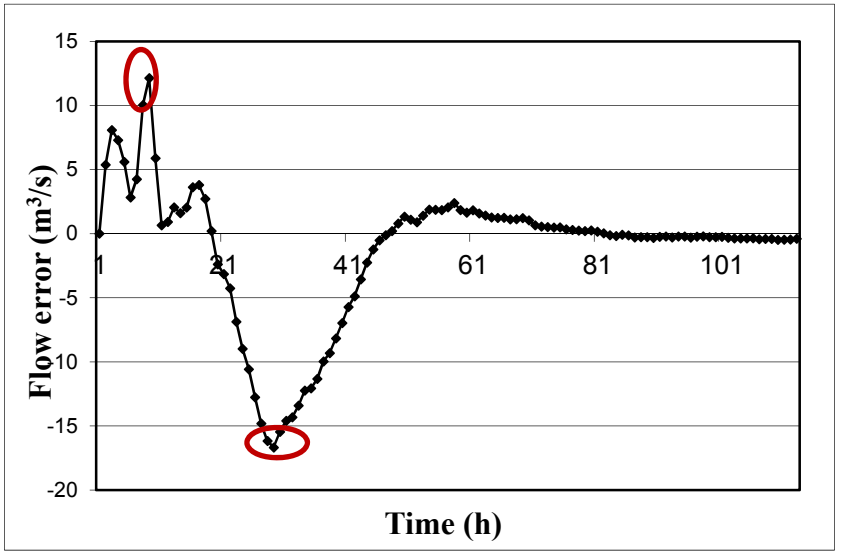
Flood forecasting

November 2010 (2h)



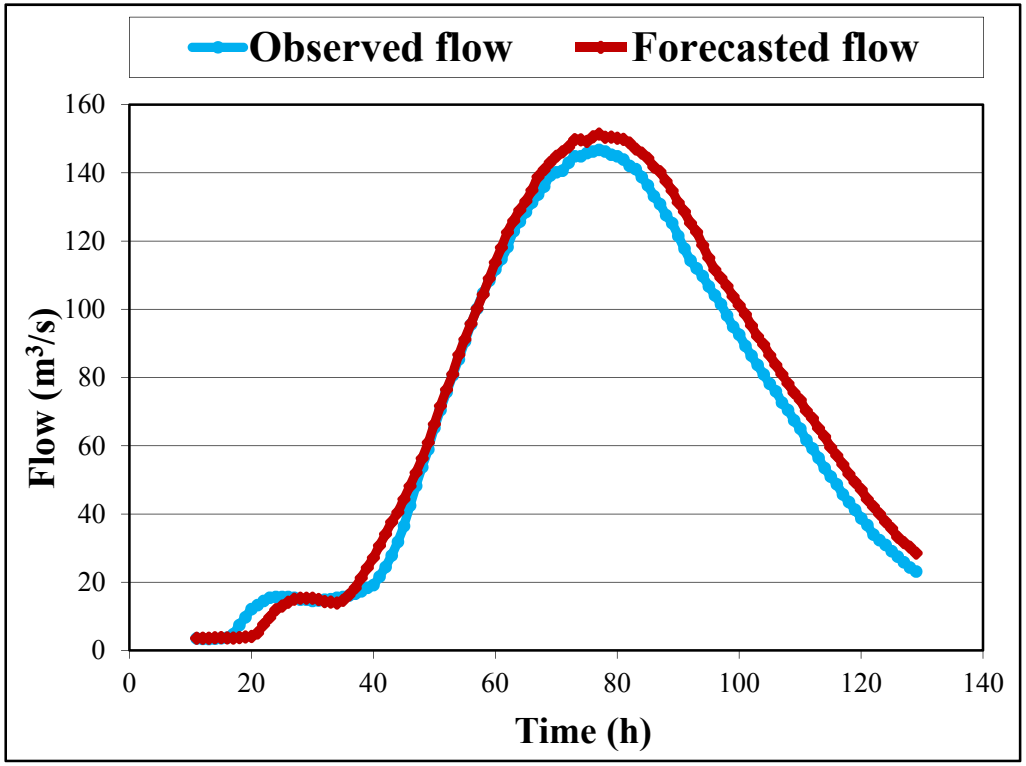


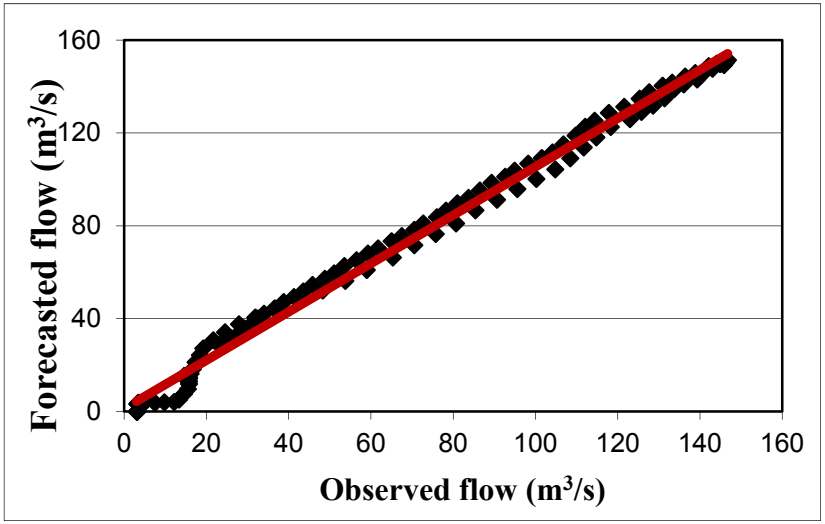
Nash=97%
PRE=-7%
PTE=2h



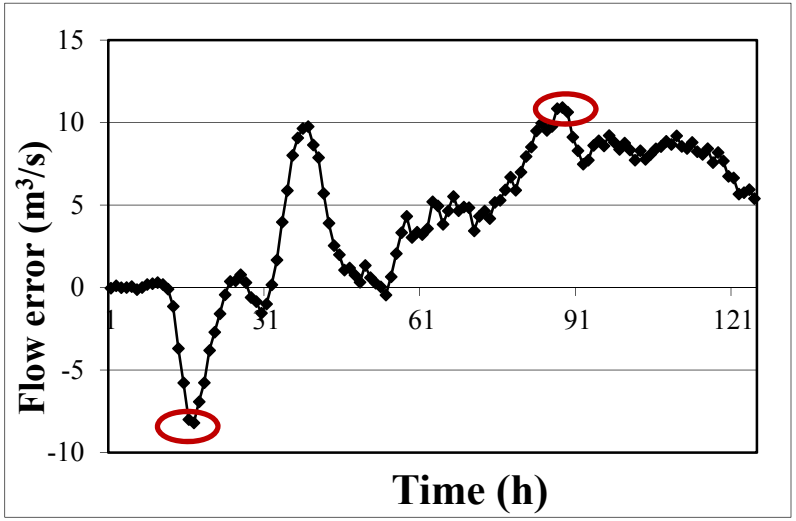
Flood forecasting

February 2011 (4 h)

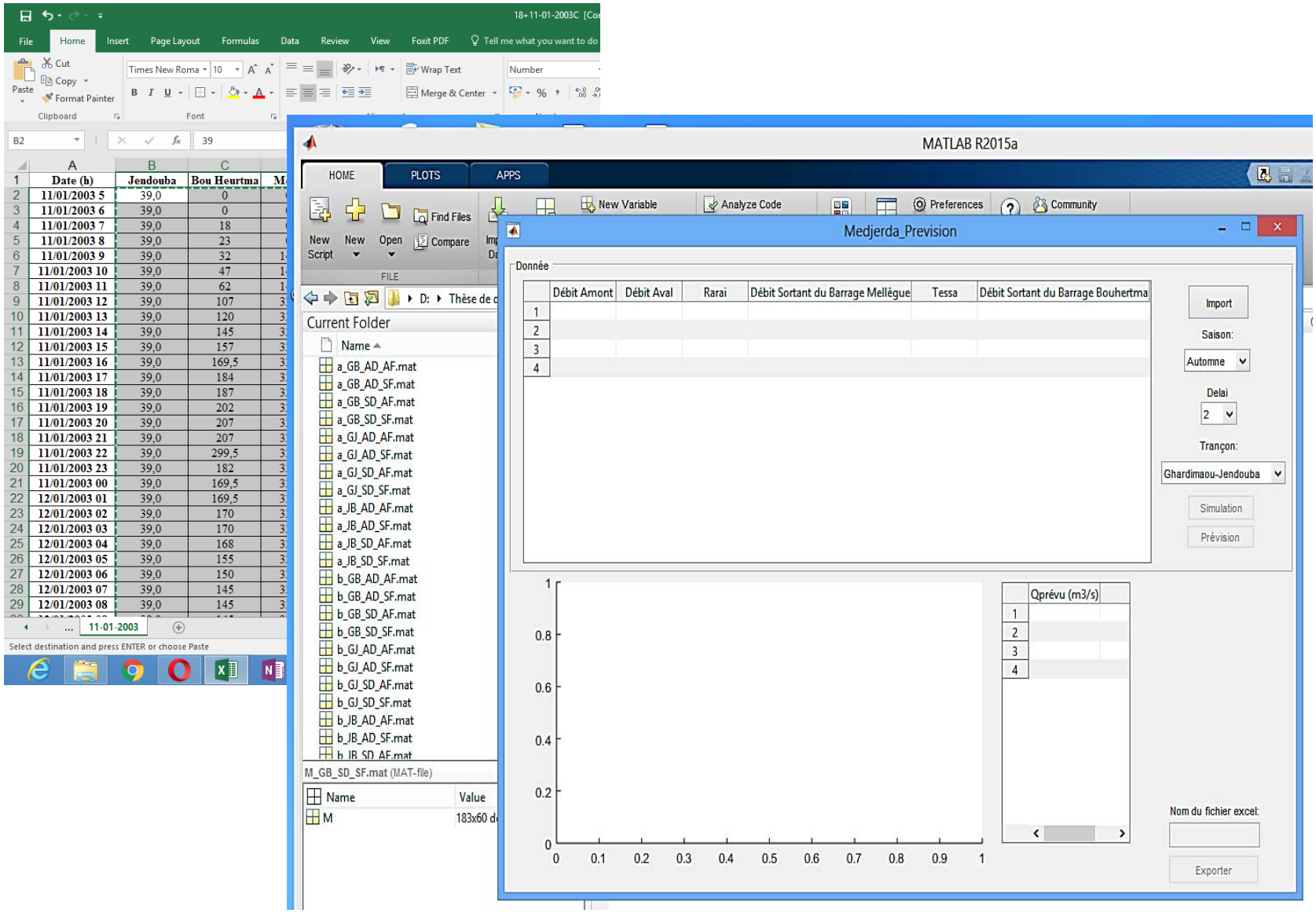




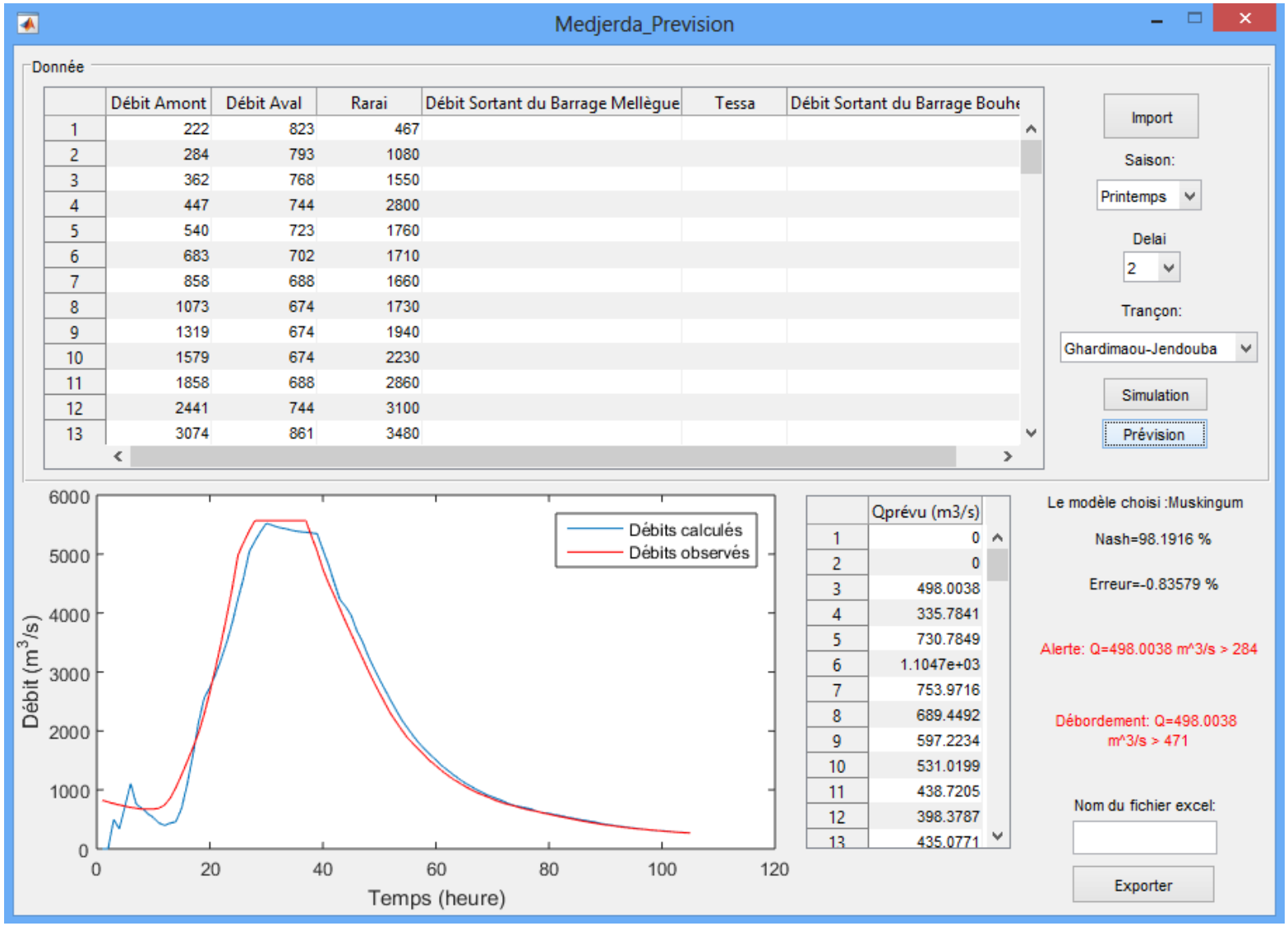
Nash = 99%
PRE=3%
PTE=2h



Flood management system



Flood management system



Thank you for your attention!