Modeling hydrological system of the Mono River basin (West Africa) using the distributed CHyM model

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IAEA

International Union of Geodesy and Geophysics
IUGG UGGI
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Outline

- Introduction
- Presentation of the study area
- Methodology
- Results
- Conclusion

Introduction

- Understanding and modeling hydrological systems of river basins is essential for sustainable water resources management

- Advantage of physically-based distributed hydrological models

- Few studies on hydrological modeling in West Africa

Objective: assess the performance of CHyM model in simulating the hydrological system of Mono River basin (West Africa)

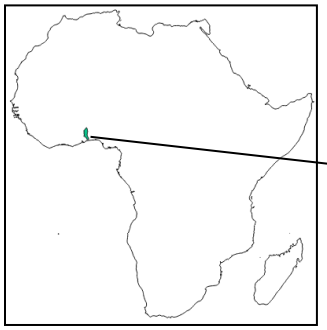
Presentation of the Mono River basin 1/2

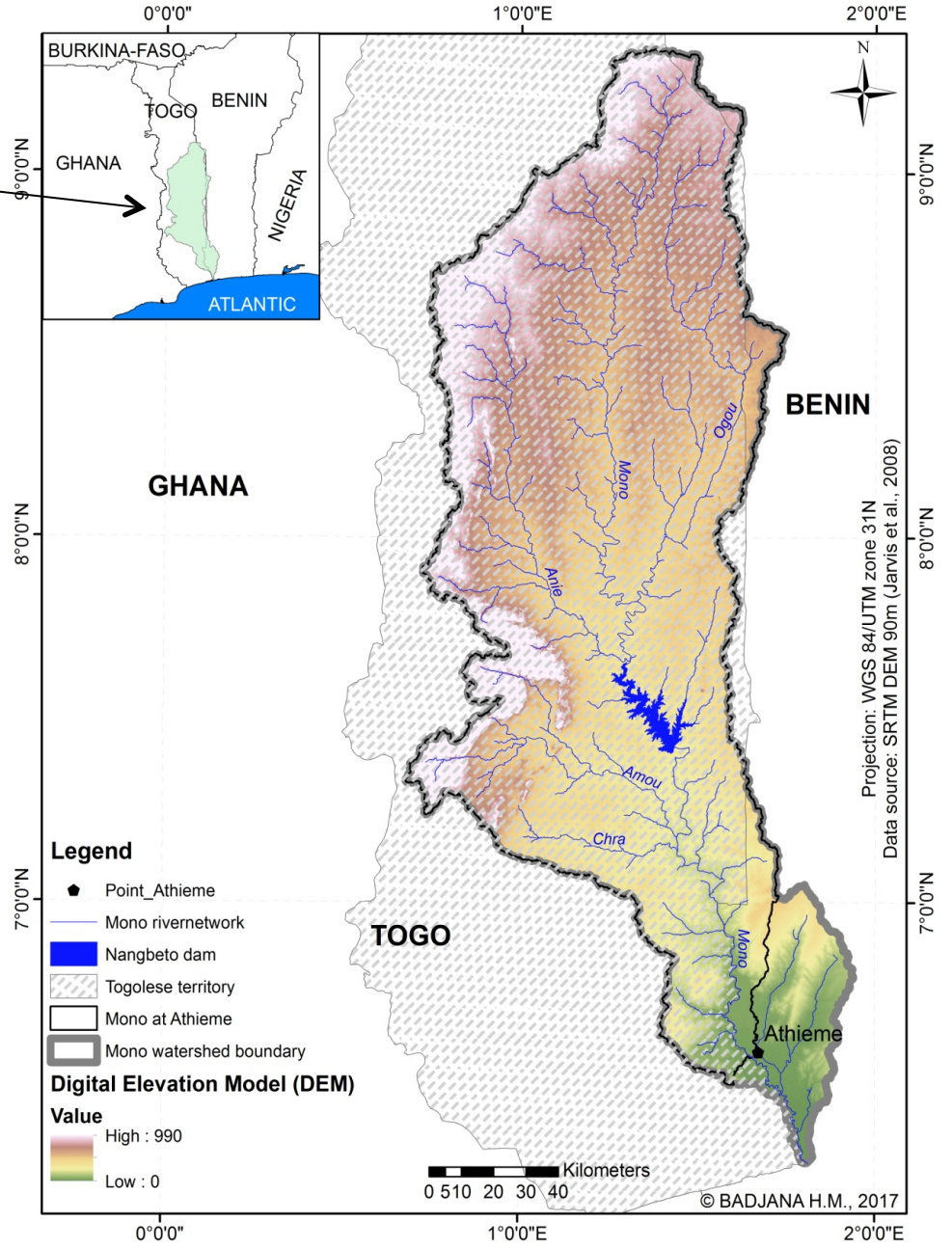
West Africa

Lat. : 6˚ 12'N et 9˚ 15' N
Long. : 00˚ 40' et 02˚E

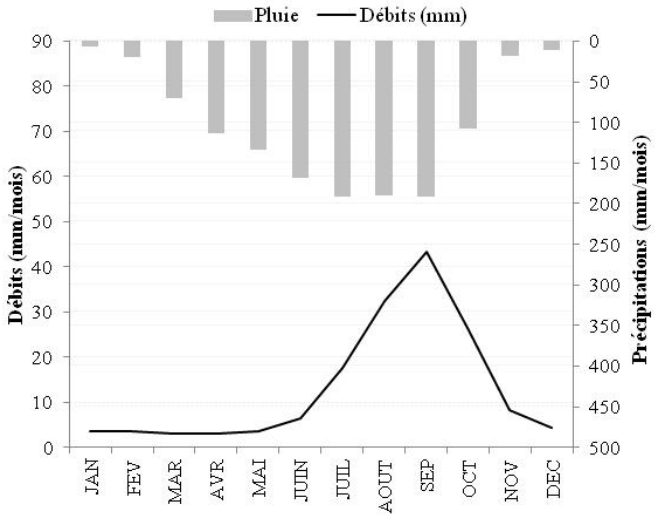
A = 23.800 km²
(More than 88% in Togo)

MMQ at Athiémé = 110 m^3/s

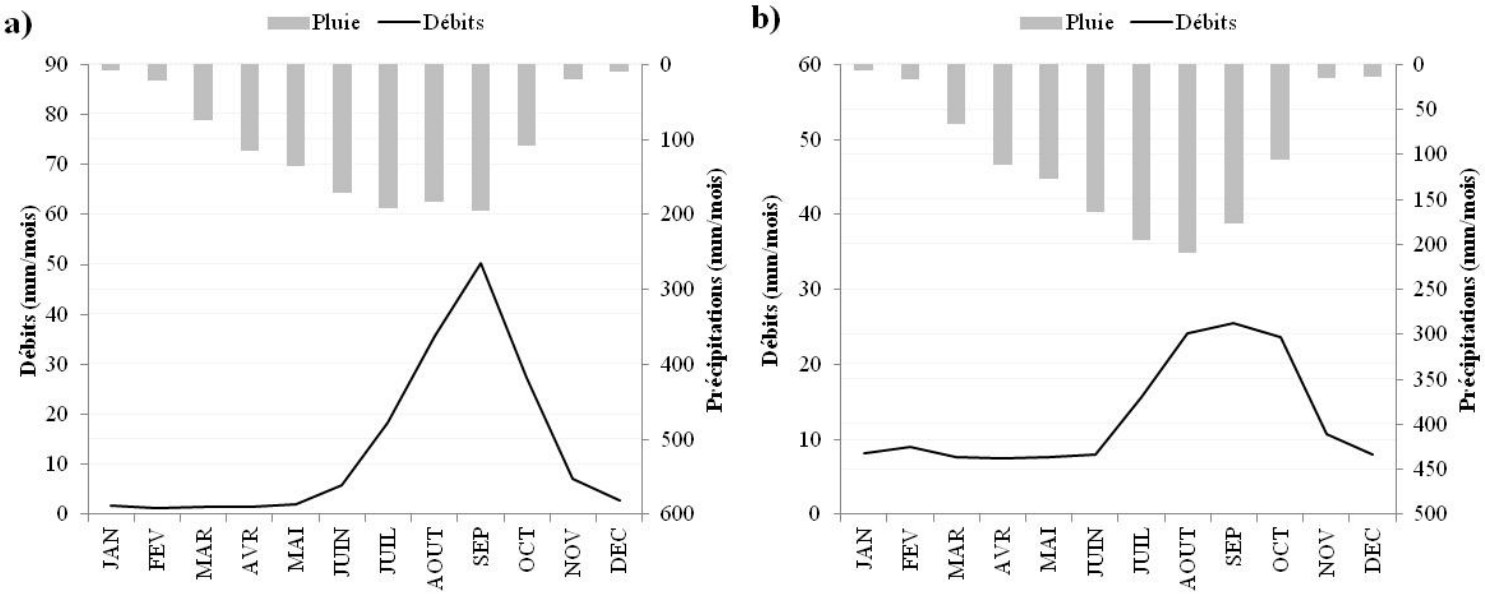




Presentation of the Mono River basin 2/2



Monthly flows at Athieme (1960-2000)



Monthly flows at Athiémé a) before (1960-1987) and after (1987-2000) the operationalization of the Nangbéto hydropower dam

Methodology

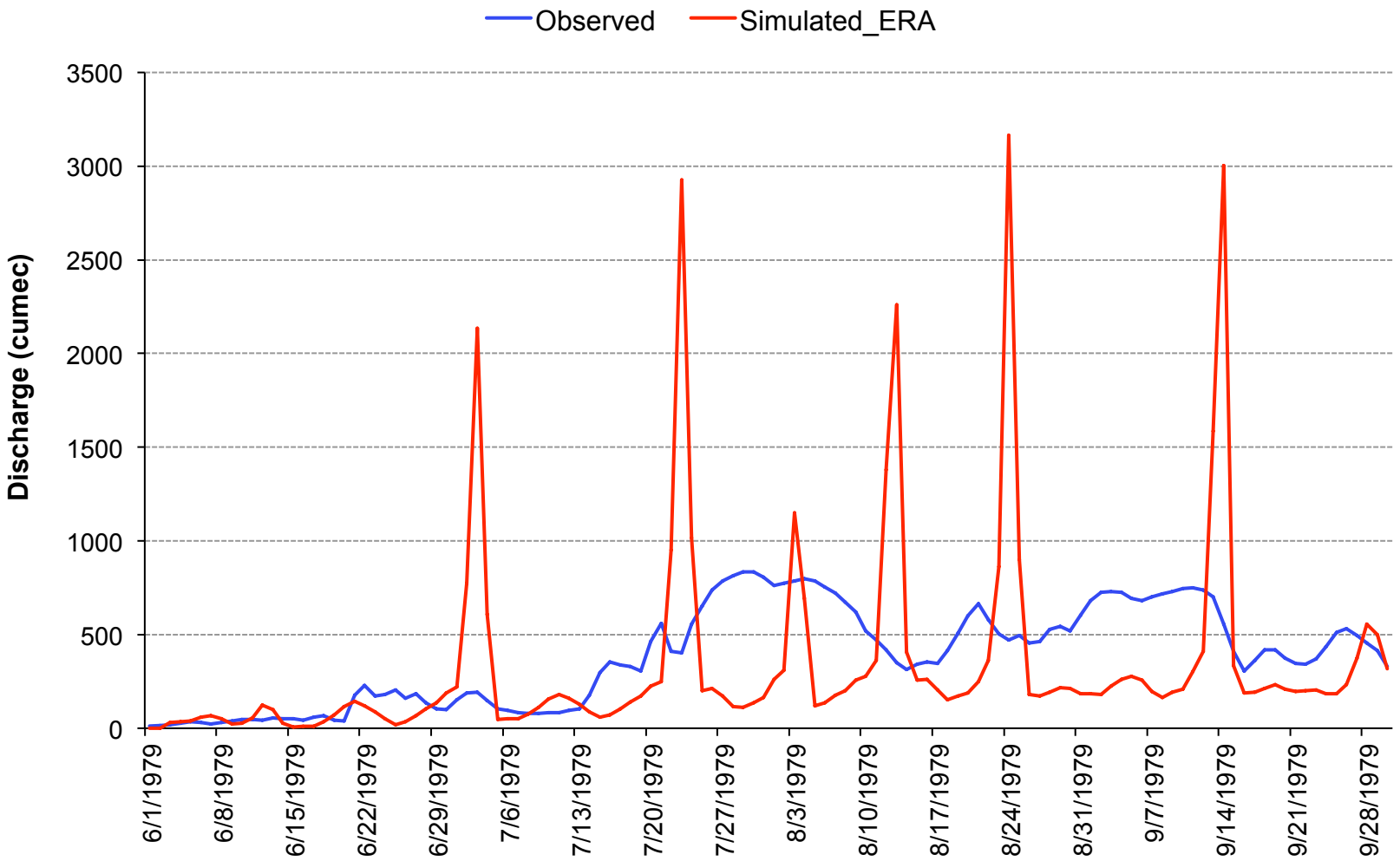
Data

- ✓ TRMM 3B42 (0.25^{o})
- ✓ PERSIANN (0.25^{o})
- ✓ ERA Interim (0.75^{o})

Methods

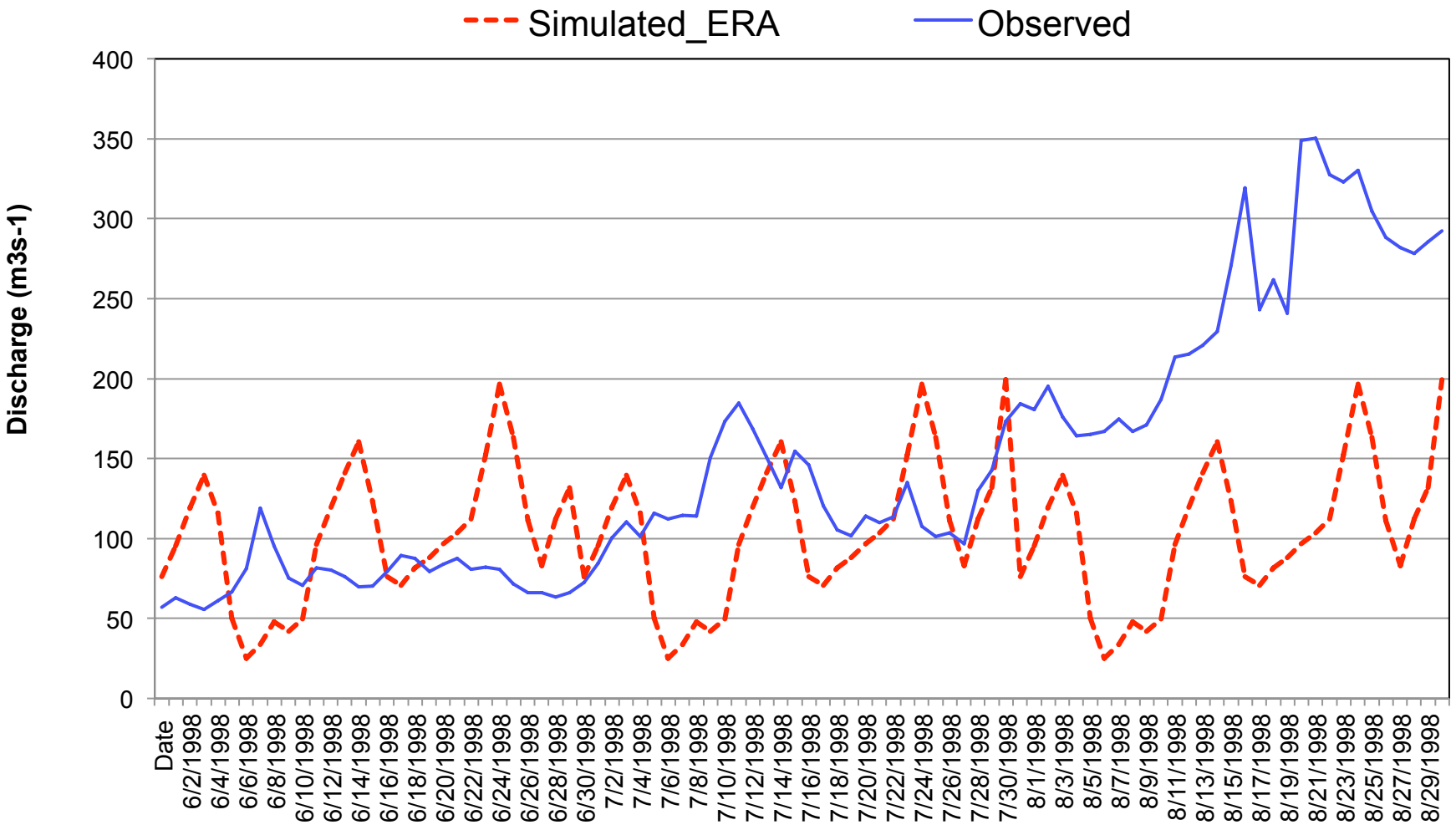
- ❖ Implementation of CHyM model
- ❖ Model running under different conditions and on different periods and with different datasets
- ❖ Visual assessment

Results 1/3



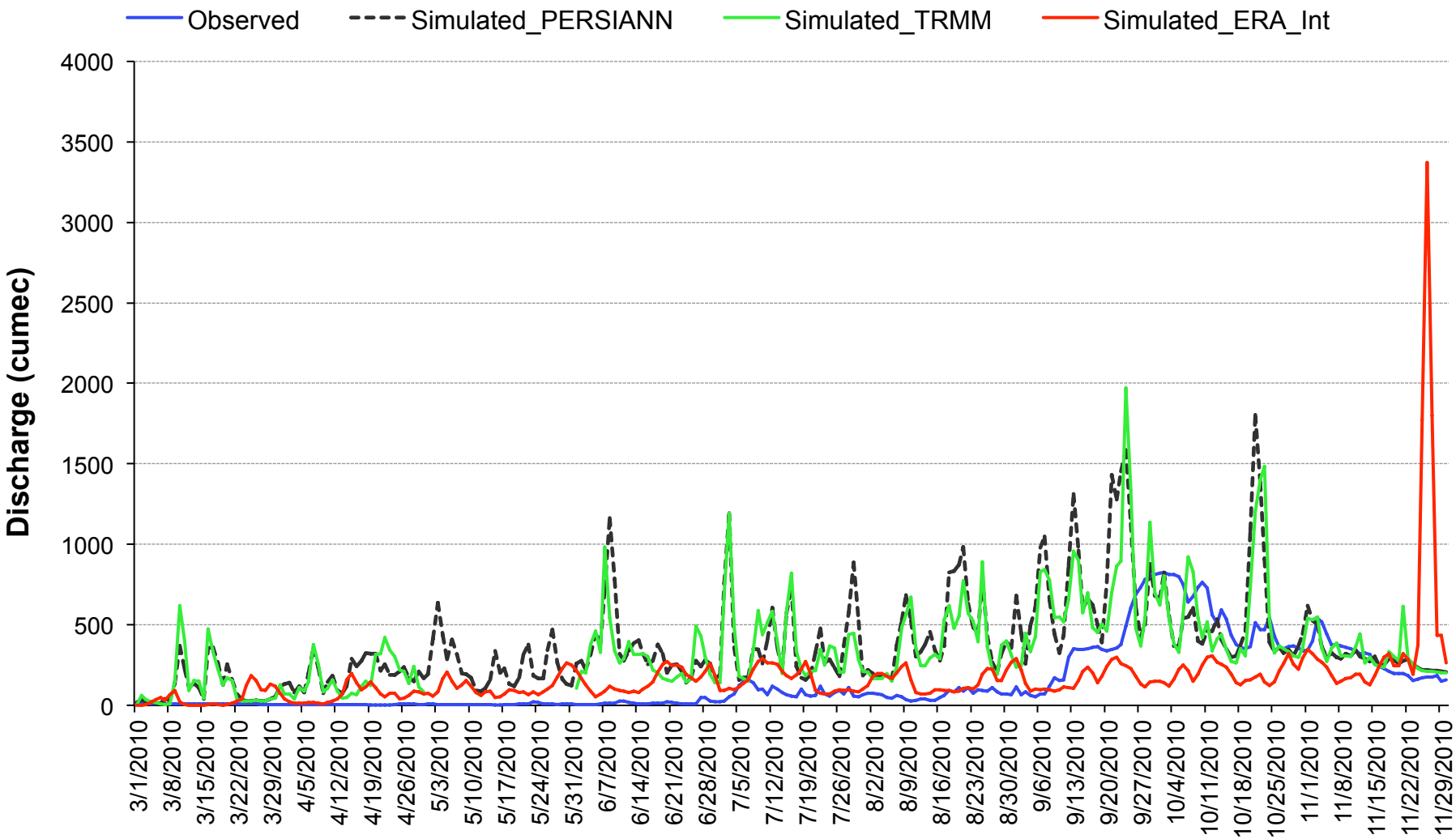
Observed and simulated discharge (June-September 1979)

Results 2/3



Observed and simulated discharge (June-August 1998)

Results 3/3



Observed and simulated discharge (March-November 2010)

Conclusion

- CHyM model performance in the Mono River basin is promising
- Objective conclusion on the performance of different datasets can not be made
- Further work on the model and its calibration is required

THANKS FOR YOUR ATTENTION