



Jul 11th, 3:30 PM - 3:50 PM

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T. Alemayehu

*Vrije Universiteit Brussel (VUB), tabitew@vub.ac.be*

A. Griensven

*Vrije Universiteit Brussel (VUB), UNESCO-IHE*

Willy Bauwens

*Vrije Universiteit Brussel (VUB)*

Hoshin Gupta

*The University of Arizona*

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Alemayehu, T.; Griensven, A.; Bauwens, Willy; and Gupta, Hoshin, "Calibration of Hydrological Model in Data Scarce Tropical Basin" (2016). *International Congress on Environmental Modelling and Software*. 49.

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# Calibration of Hydrological Model in Data Scarce Tropical Basin

**Alemayehu T<sup>a</sup>, van Griensven A<sup>a,b</sup>, Willy Bauwens<sup>a</sup> and Hoshin Gupta<sup>c</sup>**

<sup>a</sup> *Vrije Universiteit Brussel (VUB), Department of Hydrology and Hydraulic Engineering, Brussel, Belgium (tabitew@vub.ac.be)*

<sup>b</sup> *UNESCO-IHE, Department of Water Science and Engineering, Delft, The Netherlands*

<sup>c</sup> *The University of Arizona, Department of Hydrology and Water resources, Tucson, Arizona, USA.*

**Abstract:** This study presents an innovative method for calibrating hydrological models in data limited basins using historical mean annual flow duration curves (FDC) and spatially distributed remote sensing evapotranspiration (ET). FDCs retrieved from historical observations could provide crucial information about river flow regime and hence could be considered as an option, particularly when observations are not available and /or intermittent, during model calibration and validation. Additionally, remote sensing ET offers a consistent spatially distributed and temporally varying information for model parameterization. Therefore, in this study, the Soil and Water Assessment Tool (SWAT) model for the Mara Basin (Kenya/Tanzania) has been calibrated using a multi-objective and multi-variable approach based on Borg multi-objective evolutionary algorithm (Borg MOEA). Two calibration experiments have been carried out – i) calibration to fit different portion of the mean annual FDC by minimizing the percent of bias for high flow volume, slope of the FDC and base flow volume and ii) including remote sensing ET to the calibration process in experiment i. The preliminary results revealed that calibrated model fairly reproduced the observed FDC indicating the promising potential of historical mean annual FDC for model calibration in poorly gauged and /or regulated basins. Furthermore, the use of remote sensing ET further improved the spatial pattern of the water balance components. The overall results show the potential of the method used in this study for hydrological model calibration in data scarce basins.

**Keywords:** hydrological model calibration; flow duration curve; remote sensing evapotranspiration; data scarce basin; SWAT