P03

# A Comparison of Simple Snowmelt Models for the Ane River Basin

○Pedro Luiz Borges CHAFFE, Yosuke YAMASHIKI, Kaoru TAKARA, Iwaki MAHO

The objective of the present work was to develop and compare simple snowmelt model formulations using data from the Ane River Basin. The model comparison was done using winter 2001-2002 data from the Surumi station, located in the Ane River Basin, Northeast part of Lake Biwa. A temperature-index and a enhanced temperature-index (including income shortwave radiation) models were applied to the data considering different time resolutions.

The basic temperature-index method is calculated according to the commonly used9) equation:

$$M = \begin{cases} TF * T & T > T_0 \\ 0 & T \le T_0 \end{cases} \qquad (3)$$

where M is the melt (mm [T]-1), TF is the temperature factor (mm [T]-1 °C-1), T is the mean temperature (°C) for the time step in consideration and T0 is the threshold temperature above which melt occurs (°C).

Some changes that include shortwave radiation in the simple temperature-index model have been proposed and seem to have a positive effect in the calculations. We call the enhanced temperature- index model the formulation which we included the incoming shortwave radiation Eq.(5).

$$M = \begin{cases} TF * T + SRF * Rad & T > T_0 \\ 0 & T \le T_0 \end{cases} \qquad (5)$$

where SRF is the shortwave radiation factor (mm [T]-1 W-1) and Rad is the incoming shortwave radiation (W m-2). It should be noticed that it differs from other formulations where usually shortwave radiation balance was used9),10). For simplicity and lack of data, we decided to use only the incoming shortwave radiation.

The results show that the empirically derived base model using hourly time steps had a good agreement with the data. Apparently, using hourly data to go to a finer resolution of 10 minutes data could be used without so much error arising from the simulation. The Enhanced Temperature-index compared to the other models showed little to no improvement.

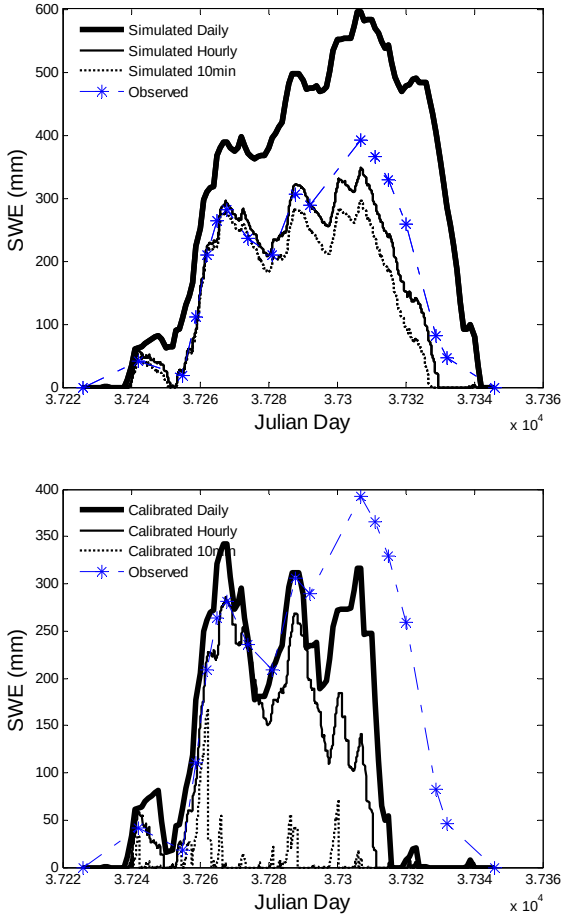


**Fig.2** Snow water equivalent (*SWE*) for the period of 1 December 2001 to 31 March 2002 calculated using the temperature-index method (top); calibrated enhanced temperature-index method (bottom)