Comment on hess-2022-192
Anonymous Referee #1


The authors suggest an alternative model to the Saint-Venant equation to simulate flood routing. This model, called Translation Wave Model (TWM) consists in neglecting two terms in the Saint-Venant momentum balance equation: the gravity term linked to the river bed slope and the term due to friction forces.

From a physical point of view, it means that the river bed is close to horizontal and that the energy loss due to friction can be neglected. Therefore, the parameters involved in TWM are related to the geometry of the cross sections only through equation 8.

These simplifications limit the use of TWM especially under field conditions. Moreover, it contradicts the statement ‘TWM can be suitable for mild slopes’ (L199), statement which is not demonstrated in the paper.

The authors compared TWM with a more common simplification of the Saint-Venant equation, the kinematic wave model (KWM). Applied to a real test case, both models provide same simulated outflow (Fig. 8). For the synthetic test case, TWM show some instabilities in the results (Fig. 9 around time 1400 s and 1900 s, KWM does not. Therefore, the authors do not demonstrate the interest of TWM

Due to its limited interest in field case modelling, the paper is not suitable for HESS.