Suggestion of a rating curve considering hydrologic factors in tidal river

MYUNGJIN LEE[*2], JONGSUNG KIM[1], YOUNGHOON YOO[1], WOOHYUN TAK[1], HUNG SOO KIM[1], SOOJUN KIM[1]

[1]*Inha Univ.,* [2]*Inha University*

(a) Purpose of study or research hypothesis

This study suggests a methodology to develop the rating curve that reflects rainfall effect in a tidal river under the influence of sea-level.

(b) Key issue(s) or problem(s) addressed

More than 90% of the world population live in the northern latitudes, while more than 50% in coastal areas which are relatively more vulnerable to flooding than inland areas. In South Korea, Ulsan experienced the influence of tide from the typhoon "Chaba" of 2016. In 2018, during the typhoon "Jebi," the Kansai International Airport in Japan was submerged due to the poor drainage affected by the tide, with the highest tidal water-level having been reported since records began.

(c) Methodology or approach used

Wavelet analysis, curve fitting and high pass filter are used to decompose the water level into four components (tide, wave, rainfall-runoff, noise) and Grid-based Rainfall-runoff Model(GRM) is applied to simulate the runoff. The simulated runoff and decomposed rainfall-runoff component are used to develop the rating curve.

(d) Results or conclusions derived from the project

Two events are used to develop and validate the rating curve. Both of the events had about 10.97%, 9.58% of the NRMSE(Nomalized Root Mean Square Error), about 0.21 m, 0.16m of the RMSE (Root Mean Square Error) indicating the high accuracy of simulating the observed water level.

(e) Implications of the project relevant to congress themes

This result will be efficiently used to estimate discharge to predict the water level caused by the runoff based on rainfall forecasting data and the rating curve and used to propose management plans for flooding forecasting and warning in tidal rivers.

Keywords : Tidal River, Rating Curve, GRM Model, Wavelet