Supplementary Material

We analyzed the sensitivity analysis of the outflow hydrograph from the BREACH model to the main input parameters of the model. The results of the internal friction angle, cohesion and inflow rate to the barrier lake are shown in Fig.S1-3. The outflow hydrograph is more sensitive to the cohesion than to the friction angle, especially when the cohesion value is low. The inflow rate is quite sensitive: higher inflow to the lake will lead to a rapid increase of the flood magnitude and a shortening of the peak of the outflow hydrograph (Fig.S3).

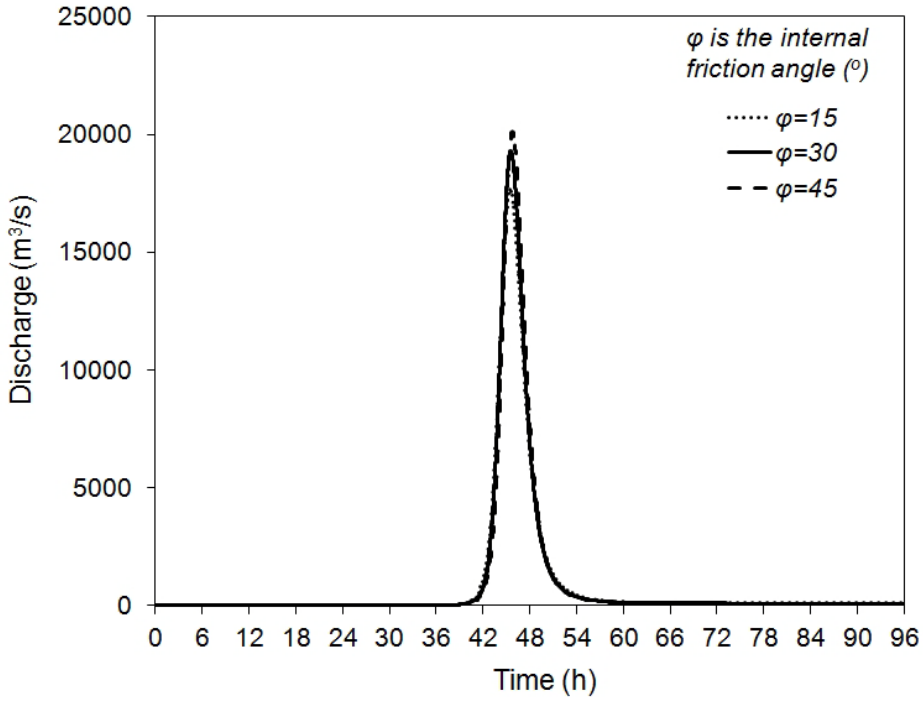

Figure S1. Sensitivity analysis of the BREACH model outflow hydrograph to the internal friction angle

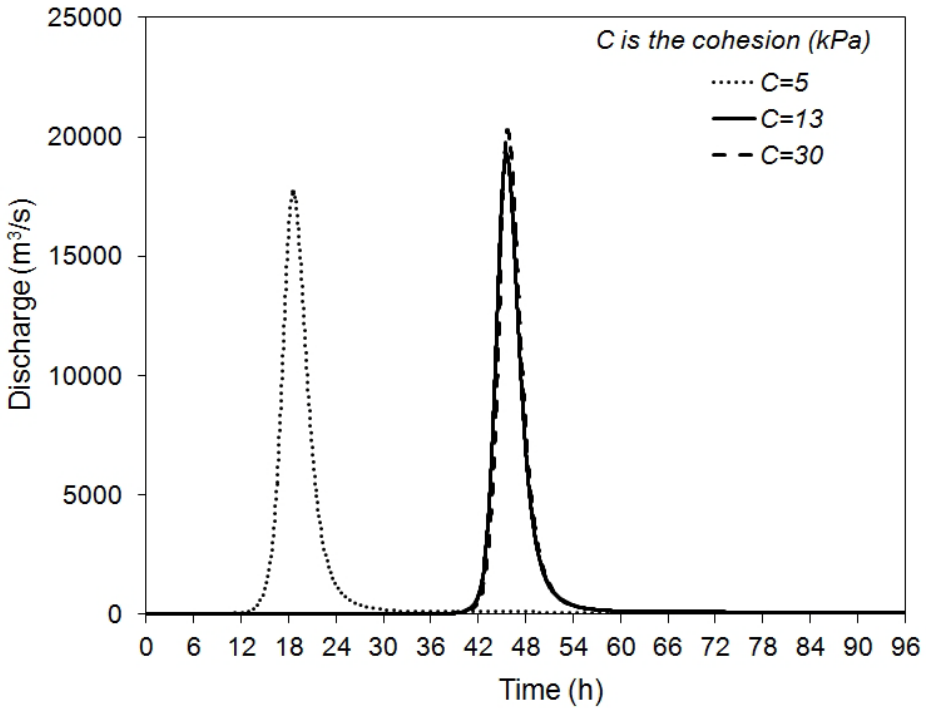

Figure S2. Sensitivity analysis of the BREACH model outflow hydrograph to the cohesion

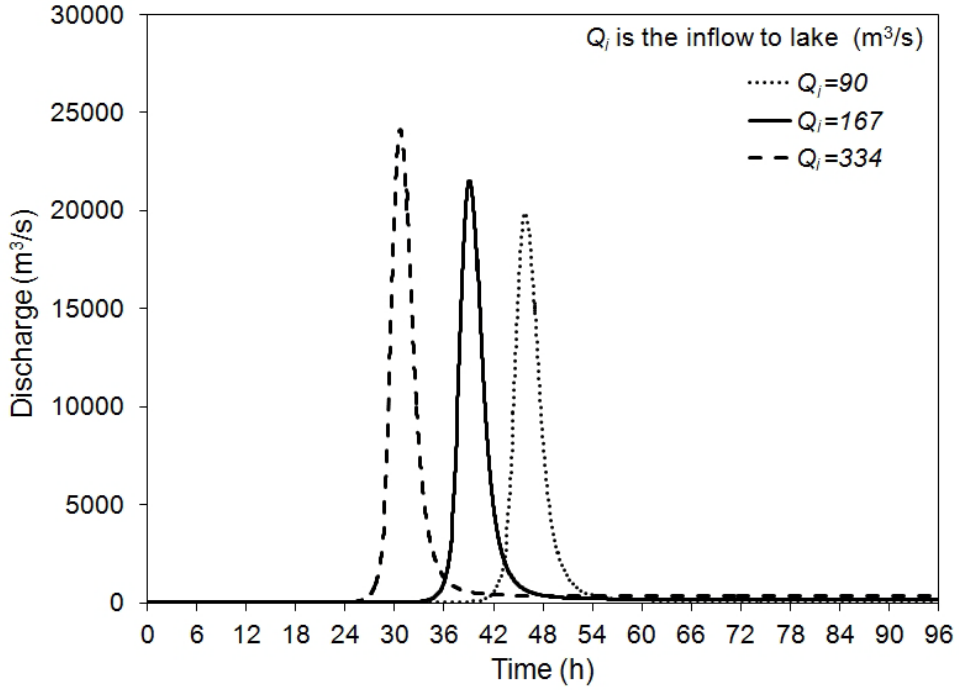

Figure S3. Sensitivity analysis of the BREACH model outflow hydrograph to the inflow rate to the barrier lake

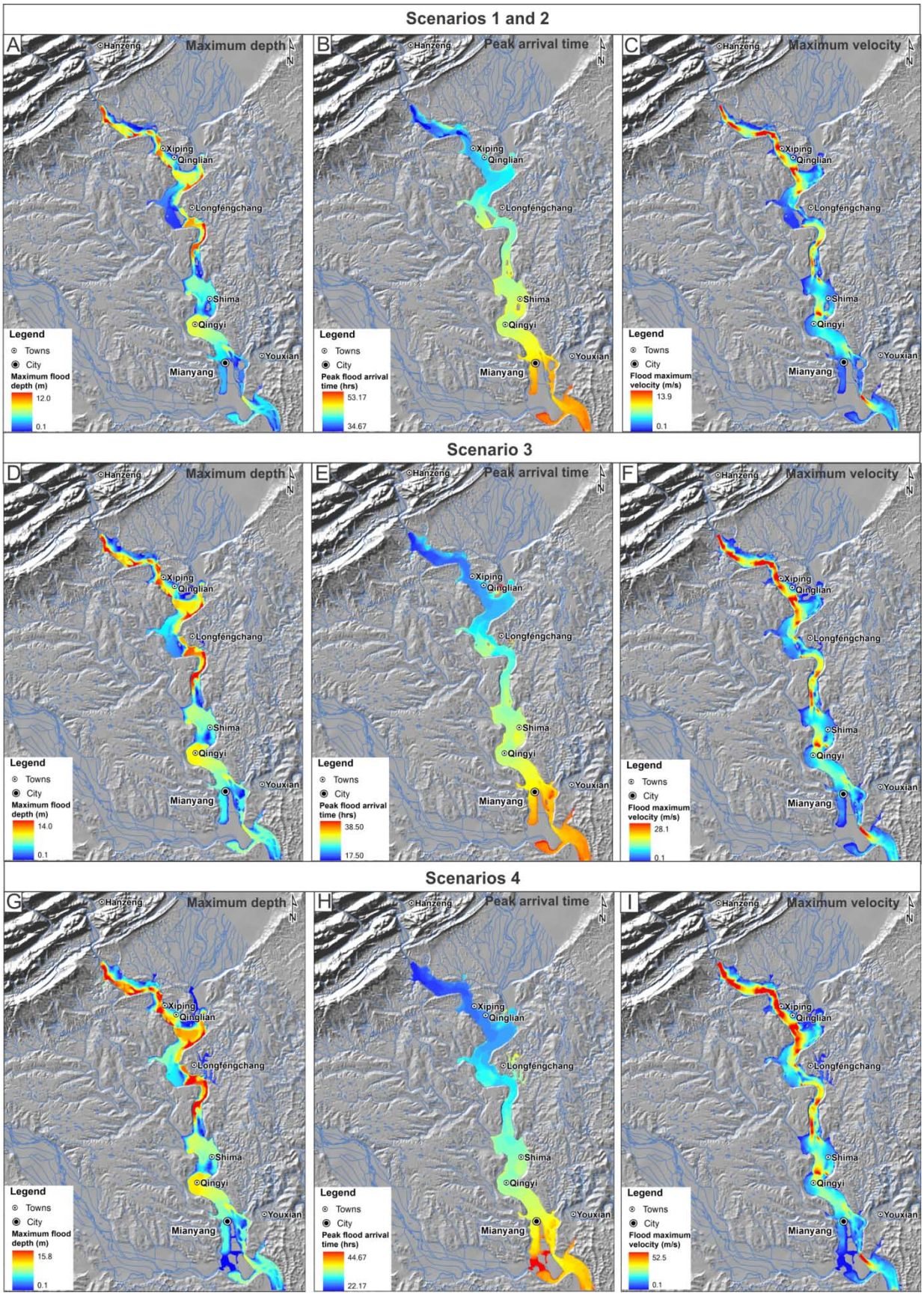
Scenarios 1 and 2
A
Maximum depth
B
Peak arrival time
C
Maximum velocity
Hanzeng
Xiping
Qinglian
Longfengchang
Shima
Qingyi
Youxian
Mianyang
Legend
Towns
City
Maximum flood depth (m)
12.0
0.1
Peak flood arrival time (hrs)
53.17
34.67
Flood maximum velocity (m/s)
13.9
0.1
Scenario 3
D
Maximum depth
E
Peak arrival time
F
Maximum velocity
Maximum flood depth (m)
14.0
0.1
Peak flood arrival time (hrs)
38.50
17.50
Flood maximum velocity (m/s)
28.1
0.1
Scenarios 4
G
Maximum depth
H
Peak arrival time
I
Maximum velocity
Maximum flood depth (m)
15.8
0.1
Peak flood arrival time (hrs)
44.67
22.17
Flood maximum velocity (m/s)
52.5
0.1

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Figure S4. SOBEK 2D model outputs: spatial variation of flood parameters (maximum flood depth, peak flood arrival time, maximum flood velocity) in Scenarios 1 and 2 (A-C), Scenarios 3 (D-F) and Scenario 4 (G-I).