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*Supplement of*

## **A simple topography-driven and calibration-free runoff generation module**

**Hongkai Gao et al.**

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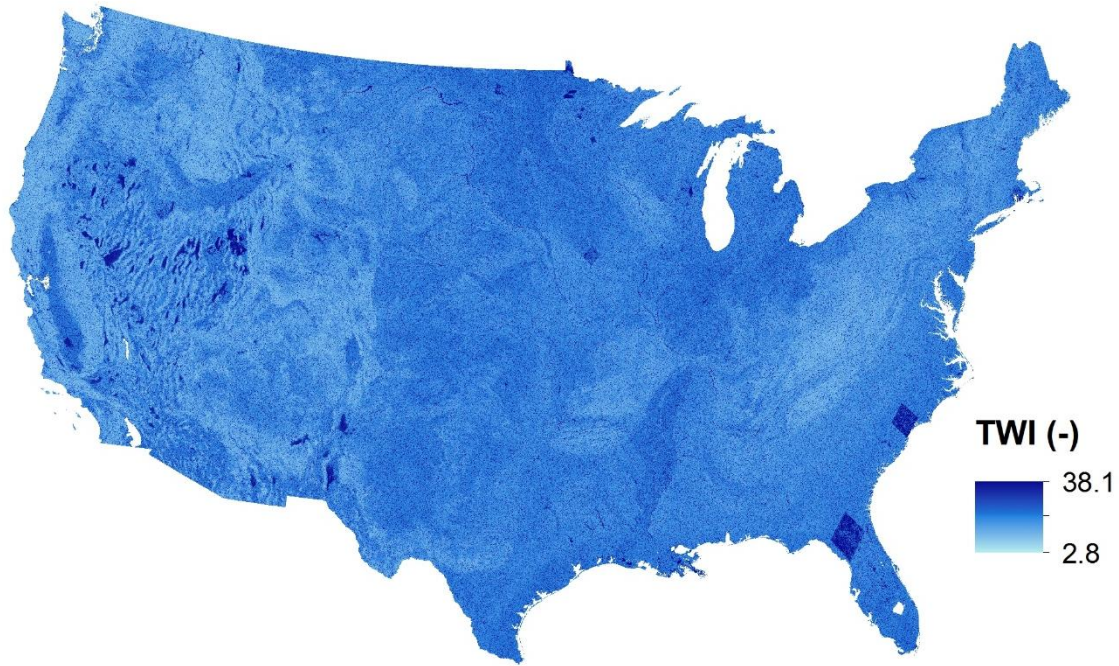


Figure S1. The Topographic Wetness Index (TWI) of the CONUS.

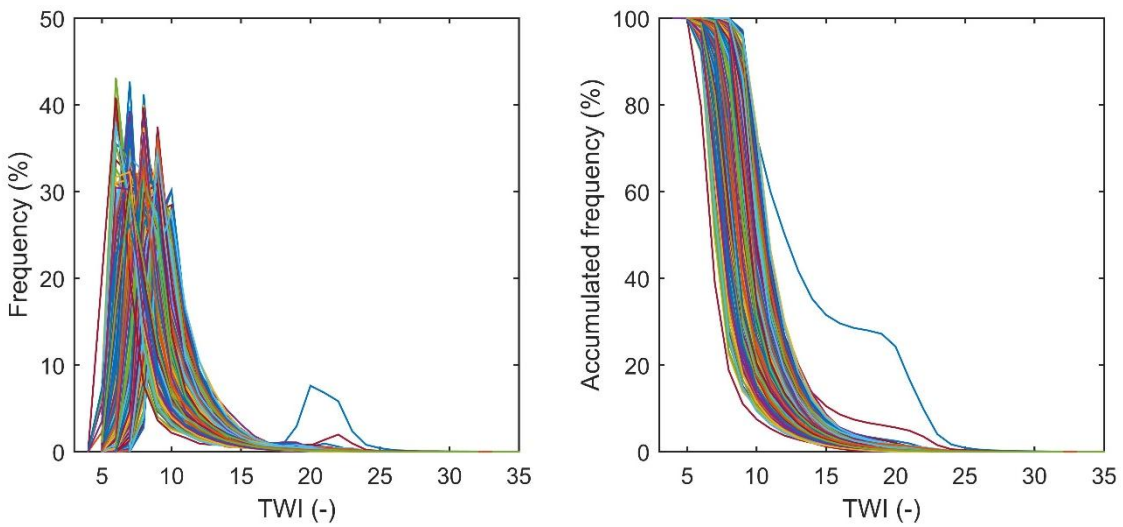


Figure S2. a) The frequency distribution of the TWI of the 323 MOPEX catchments; b) the accumulated frequency distribution of TWI of the 323 MOPEX catchments.

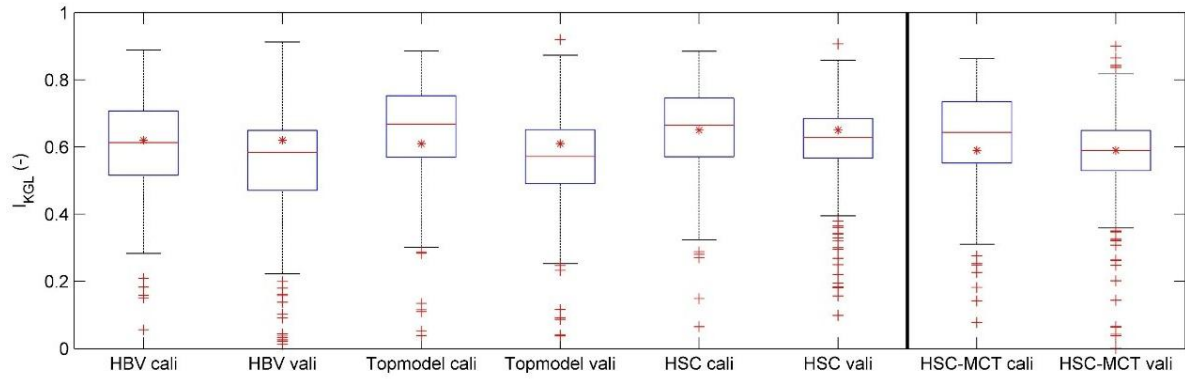


Figure S3. The comparison of  $I_{KGL}$  between the HBV, the TOPMODEL, the HSC, and the HSC-MCT models

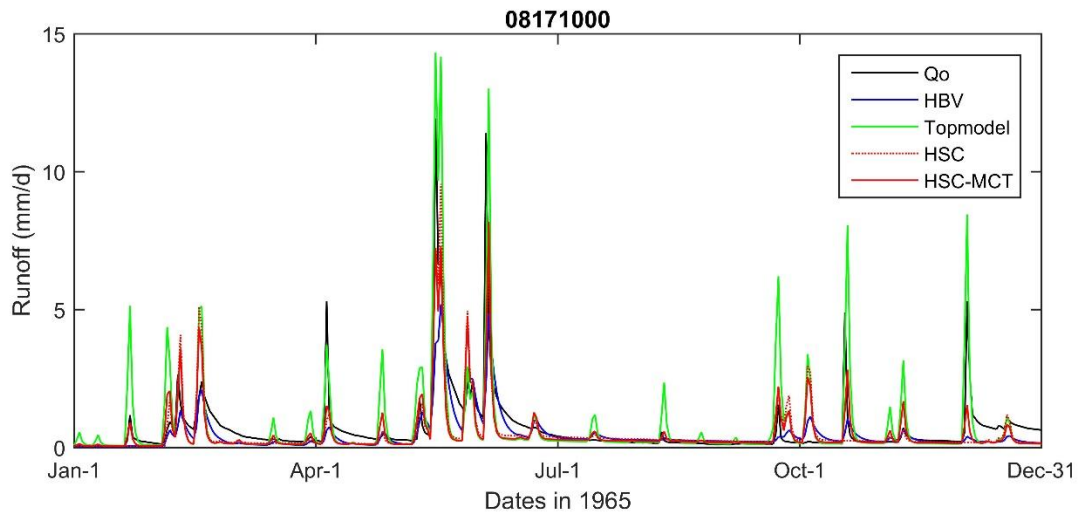


Figure S4. The observed and simulated hydrographs of four models in the 08171000 catchment.

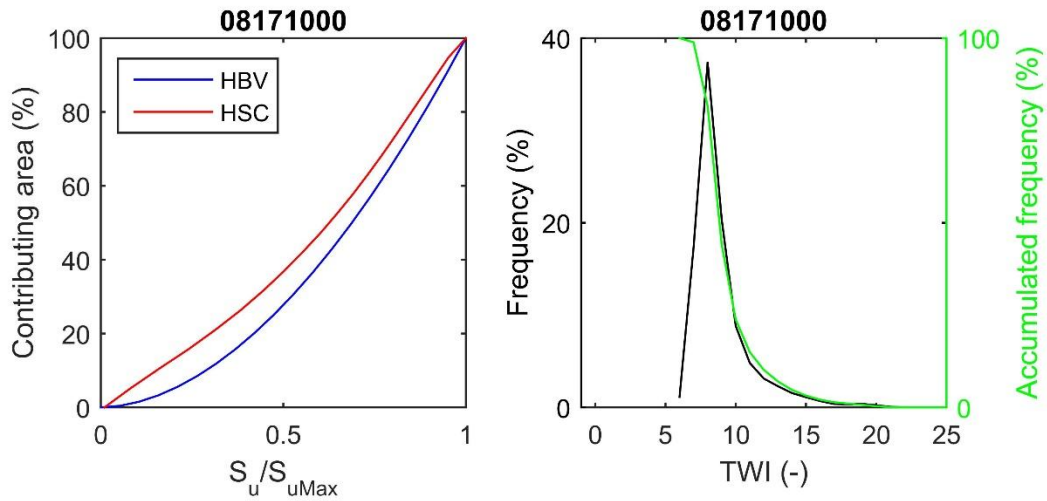


Figure S5. The curves of the beta function of HBV model, and the  $S_u$ - $A_s$  curve generated by HSC model (the left figure). The frequency of TWI and accumulated frequency of the TWI in 08171000 catchment (the right figure).

The number of the selected 323 MOPEX catchments:

- 01127000
- 01200000
- 01371500
- 01372500
- 01445500
- 01518000
- 01520000
- 01520500
- 01531000
- 01534000
- 01541000
- 01541500
- 01543500
- 01556000
- 01558000
- 01559000

01560000

01562000

01567000

01574000

01606500

01608500

01610000

01611500

01628500

01631000

01634000

01643000

01649500

01663500

01664000

01667500

01668000

01672500

01674500

02016000

02018000

02030500

02055000

02058400

02083500

02102000

02116500

02118000

02126000

02135000

02138500

02143000

02143040

02143500

02156500

02165000

02192000

02202500

02217500

02218500

02219500

02228000

02273000

02296750

02329000

02339500

02347500

02349500

02365500

02375500

02383500

02387000

02387500

02414500

02448000

02456500

02472000

02475000

02475500

02478500

02479300

02482000

02486000

02492000

03010500

03020500

03024000

03032500

03050500

03051000

03054500

03069500

03075500

03079000

03109500

03111500

03114500

03136000

03155500

03159500

03161000

03164000

03165500

03167000

03168000

03173000

03175500

03179000

03180500

03182500

03183500

03184000

03186500

03198500

03199000

03213000

03214000

03237500

03238500

03251500

03252500

03253500

03265000

03266000

03269500

03274000

03281500

03289500

03301500

03303000

03308500

03324300

03326500

03328500

03331500

03339500



03345500

03346000

03348000

03349000

03361500

03361650

03362500

03363000

03364000

03365500

03381500

03410500

03438000

03443000

03448000

03451500

03455000

03465500

03470000

03473000

03490000

03504000

03512000

03521500

03524000

03528000

03531500

03532000

03540500

03550000

03567500

03574500

03603000

04073500

04079000

04100500

04113000

04115000

04144000

04165500

04176500

04178000

04183500

04185000

04191500

04198000

04201500

04221000

04223000

05244000

05280000

05320500

05408000

05410490

05418500

05422000

05430500

05435500

05440000

05447500

05451500

05452000

05454500

05455500

05457700

05458500

05462000

05471500

05472500

05476500

05479000

05481000

05482500

05484500

05502040

05507500

05508000

05514500

05515500

05517000

05517500

05518000

05520500

05526000

05542000

05546500

05552500

05554500

05555300

05569500

05570000

05582000

05584500

05585000

05592500

05593000

05594000

06334500

06340500

06441500

06480000

06600500

06606600

06607200

06609500

06799500

06808500

06810000

06811500

06813000

06815000

06817000

06817500

06820500

06869500

06883000

06884400

06885500

06888500

06892000

06894000

06897500

06898000

06899500

06908000

06913500

06914000

06928000

06933500

07019000

07029500

07049000

07052500

07056000

07057500

07058000

07067000

07068000

07069500

07072000

07074000

07144200

07144780

07147070

07147800

07152000

07163000

07172000

07177500

07183000

07186000

07196500

07197000

07243500

07252000

07261000

07288500

07290000

07340000

07346000

07346050

07346070

07348000

07363500

07375500

07378000

07378500

08013500

08015500

08032000

08033500

08095000

08103800

08167500

08171000

08171300

08172000

08189500

11080500

11281000

11342000

11413000

11427000

11530000

11532500

12027500

12149000

13351000

14308000

14321000

14359000