Introducing ideas
Sect. 1

The partitioning of precipitation (Eq. 1) and the non-parametric and one-parameter versions of the Budyko curve (Eqs. 2 and 3, respectively).

Applying the Budyko framework

20th-century historical changes
Sects. 2.1.1, 2.2.1 and 3.1

1) Use Eq. (5) to calibrate ω, using observed P, E_p and E (E is calculated using observed P and Q; Eq. 1).

2) Calculate Q_a using Eq. (6).

3) Estimate Q_h using time series of water consumption derived from time series of Chinese irrigated area.

4) Separate the measured runoff changes into Q_a, Q_h and a residual term using Eq. (7).

5) Use Q as simulated by a LSM, to test the calculation of Q_a.

21st-century projected changes
Sects. 2.1.2, 2.2.2 and 3.2

1) Estimate E_p in CMIP5 models from net surface radiation (Eq. 4).

2) Use Eq. (5) to calibrate ω, using observed P, E_p and E (E is calculated using observed P and Q; Eq. 1).

3) Bias-correct P and E_p using Eq. (10).

4) Use bias-corrected P and E_p, together with the calculated ω values to calculate Q^*, a Budyko corrected runoff. This uses Eq. (8).

Agreement of 20th-century changes with existing literature will validate the use of the Budyko framework in refining 21st-century projections