Supplement of

Attribution of global evapotranspiration trends based on the Budyko framework

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Table S1. Comparisons of landcover types data used by the four ET products

| ET product         | Landcover types data                      | Period  |
|--------------------|-------------------------------------------|---------|
| GLEAM3.0a          | MOD44B                                    | Static  |
| GLDAS2.0-Noah      | MCD12Q1                                   | Static  |
| MERRA-Land         | Global Land Cover Characterization        | Static  |
| W3RA               | MOD44B                                    | Static  |
| HTESSSEL-CaMa      |                                           | Static  |
| JULES              | Global Land Cover Characterization        | Static  |
| EartH2Observe-En   | PCR-GLOBWB                                 | Static  |
|                    | LISFLOOD                                   | Static  |
|                    | HBV-SIMREG                                 | Static  |
|                    | WaterGAP3                                  | Static  |

Note: However, regarding EartH2Observe-En, the LUC datasets used by seven (in this table) and two models (i.e., ORCHIDEE and SURFEX-TRIP) are available and unavailable, respectively; the LUC is not the necessary input for SWBM.
Figure S1. The pixel-wise scatterplots of PET in 1980s against multi-year average PET for GLEAM3.0a (a1), EartH2Observe-En (b1), GLDAS2.0-Noah (c1), and MERRA-Land (d1) and precipitation in 1980s against multi-year average precipitation for GLEAM3.0a (a2), EartH2Observe-En (b2), GLDAS2.0-Noah (c2), and MERRA-Land (d2).
Figure S2. Spatial distribution of annual linear trend in each driving factor during 1980-2010. Small letters (a-e) respectively indicate P, Rn, T, VPD, and u and numbers (1-4) represent GLEAM3.0a, Earth2Observe-En, GLDAS2.0-Noah, and MERRA-Land. Dotted area indicates the trend passes significance level (p<0.05).
Figure S3. Attributions of the global long-term annual ET linear trend during 1980-2010. Small letters (a-e) indicate P, Rn, T, VPD and u respectively; and numbers (1-4) indicate the ET products of GLEAM3.0a, Earth2Observe-En, GLDAS2.0-Noah and MERRA-Land respectively.
Figure S4. The pixel-wise scatterplots of the accumulative contributions of five selected driving factors against the control trend (trendCTL) in ET for GLEAM3.0a (a), Earth2Observe-En (b), GLDAS2.0-Noah (c), and MERRA-Land (d). The red line indicates a fitted line of the scatter points along with the 1:1 blue dotted line.
Figure S5. The pixel-wise scatterplots of multi-year average aridity index against actual ET annual values for GLEAM3.0a (a1), EartH2Observe-En (b1), GLDAS2.0-Noah (c1), and MERRA-Land (d1), the control ET trend (trendCTL) for GLEAM3.0a (a2), EartH2Observe-En (b2), GLDAS2.0-Noah (c2), and MERRA-Land (d2). Aridity index (PET/precipitation) in each product is calculated with respective precipitation and PET data.