



## **An annual evapotranspiration model by combining Budyko curve and complementary relationship**

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The complementary relationship and Budyko curve together describe the tight connections and feedbacks between water–energy balances and the landscape (Yang et al., 2006). The evapotranspiration models based on Budyko curve and complementary relationship are two kinds of parsimonious approaches for predicting mean annual catchment-scale evapotranspiration. Under the Budyko framework, actual evapotranspiration is partitioned from the precipitation as a functional balance between the water availability and the evaporative demand, and modified by catchment property parameter. The catchment property parameter was thought to be related to catchment landscape properties such as vegetation, soil, geological features, and rainfall distribution, etc.. The catchment properties seem change over time, and are difficult to be quantified (Roderick and Farquhar, 2011). Under the complementary relationship framework, actual evapotranspiration is estimated using only the routinely measured climatological variables, and the catchment properties were thought to be indirectly reflected by the relative magnitude of the aerodynamic and radiation terms of potential evapotranspiration because of the climate-vegetation-soil interactions. A implicit combination of the two approaches was conducted with the aim to represent the changing catchment properties using the relative magnitude of the aerodynamic and radiation terms of potential evapotranspiration. Actual evapotranspiration estimation of 99 non-humid catchments in China under varying environments was improved by this method.