This paper evaluates the representation of the decoupling coefficient in an ESM model. This is an important observational based study with a lot of discussion on the model processes and it will contribute to the model development of evapotranspiration process. The study also uses a machine learning approach to rank the controlling factors, which is a new alternative of regression coefficients. The article structure is clear but there are quite a few grammar errors in the writing, please fix them for readability.

Title: coupling strength is used in the title. However, coupling strength is the reverse of Omega, the main concept of the paper. It could be confusing to readers when both coupling strength and decoupling strength are used. I suggest use “decoupling strength” consistently. You can still say “coupling”.

Paragraph 1-2: Lack of literature support. Please add more references for each statement.

L44: improve the simulation **of** transpiration

L59: total evapotranspiration (e.g., Peng et al. 2019)

Equation 6: how is the Ga estimated when calculating the empirical Omega? Not clear whether this study is following Thom et al. 1975, equation 3, or taking from the De Kauwe dataset? I am afraid the selection of this formula will greatly affect your results of Gs, Omega, and the following analysis.

Figure 3a shows a systematic large gap of Ga between Flux and Ctrl. There are uncertainties in both data and the parameterization. When you compare it with ORCHIDEE, have you validated if the modelled Ga is consistent the empirical Ga when you use the same ORCHIDEE formula?

Also the equations (4)-(5) are highly dependent on vegetation structure. I am afraid this is not going to work very well across biomes. Can you do a sensitivity test of the formula across biomes?

L140: The Gs in the equation has the “s” as subscript, but the text is different. Similar in other places.

Fig 6 – the scales of yaxis are different and difficult to compare.

L255: the response of Omega to temperature is nonlinear because VPD also depends on temperature. Does this RF reflect such nonlinear relationship?