

## ***Interactive comment on “Evaluation of a complementary based model for mapping land surface evapotranspiration” by Z. Sun et al.***

**Anonymous Referee #1**

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Summary: A interesting modified Priestley Taylor equation is utilized to map actual ET using satellite thermal and optical data. The authors utilize a wetness index WI, from 0-1 to scale the wet environment Priestley Taylor (P-T) value of potential ET to estimate actual ET.

Comments: The authors state that this a complementary based model for mapping land surface ET in the title, and yet the background of complementary theory and why this model is indeed complementary is not mentioned anywhere in the paper. In fact, the word complementary is only mentioned in the title, and once in the text referencing Granger’s paper. I would suggest that this paper be called “Evaluation of a Priestley-Taylor model for mapping land surface evapotranspiration.” After all ET =

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$F * ET(P-T)$ , correct? What is complementary about the way F is computed? What is complementary about using the P-T equation by itself?

By using the P-T equation as the limit of ET the authors assume negligible impacts of advection on ET. ET in most irrigated environments surrounded by non-irrigated or non-well watered environments is well above the P-T value due to advection (i.e. drying power of air). The larger the scale for analysis (i.e. using MODIS 1km pixels), the impact of ignoring advection in prediction of ET is reduced. In this case the authors use high resolution ASTER data (90m thermal pixels) to estimate ET. At this field scale there is most certainly advection, and the P-T equation does not hold.

The authors state that the P-T coefficient for "all environments" was determined from the scatter plot of remotely sensed vegetation index and surface temperature. What was it, are there areas where alpha is above 1.26? The authors provide no details how this was determined, or what it means.

The authors do not detail how ET is estimated at a daily time step using ASTER. It is unclear if their ET comparisons using ASTER are in fact instantaneous estimates. With a title so broad and grand, details about complementary theory, scale, implications of using this approach in irrigated and natural vegetation environments, and issues about how ET is estimated at the instantaneous, daily, and seasonal time step should at least be discussed at a very minimum. At the current state, I recommend rejection until sufficient detail and background can be provided.

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