



## **A Preliminary Study on Estimating the Impact of Plastic Mulched Landcover on Evapotranspiration Using SEBAL Model**

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**Abstract:** As one of planting technologies, in recent years significant area of cropland has been covered by thin plastic film as the mulch to increase the crop yield. It is expected that the large-scale plastic mulched landcover (PML) have impacts on evapotranspiration (ET), surface energy balance (SEB), weather, and climate at local, regional or even continental scale. However, such impacts have been poorly understood so far. In order to understand the impacts, this study used a surface energy balance algorithm for land (SEBAL) model to compute the latent heat flux for the plastic mulched cotton area in northern Xinjiang, with Landsat 8 imagery as the main data source. Based on the latent heat flux with the assumption that evapotranspirative fraction remains constant in 24h, this study derived daily ET for each pixel in the study area. The experimental results showed that daily ET of PML is about 40% of that of the non-PML vegetated land and in between that of the non-PML vegetated land and the bare land. Comparing the model derived daily ET with field measure, the relative deviation indicated SEBAL model, to a certain extent, can be used to estimate ET in the PML area. The high relative deviation is most likely caused by: 1) the assumption of homogeneous surface landcover in SEBAL model, which is not true since PML is the combination of plastic mulched land, bare land, and/or even vegetation; 2) the uncertainty in “cold” and “hot” pixel selection; and 3) deviation of model values and true values of surface roughness and other parameters.

**Keywords:** plastic mulched landcover (PML); evapotranspiration (ET); surface energy balance (SEB); remote sensing-based estimation; Landsat 8 imagery; Xinjiang