# Daily SSEBop Evapotranspiration Products
**(Version 1.0, October 2019)**

Evapotranspiration (ET) is the combination of transpiration from vegetation and evaporation from soil and one of the important components in the water cycle. Actual ET (ETa) from remote sensing data is produced using the operational Simplified Surface Energy Balance (SSEBop) model (Senay et al., 2013) for the period 2000 to Present at 1-kilometer (km) spatial resolution. The operational Simplified Surface Energy Balance (SSEBop) approach created by Senay et al. (2013) is developed with a unique parameterization for operational applications. The model uses pre-defined, seasonally dynamic, boundary conditions that are specific to each pixel for "hot/dry" and "cold/wet" reference points (Senay et al. 2018, Ji et al. 2019) to estimate the ET fraction (ETf). More details on the SSEBop model can be found in Senay et al. (2013) and Senay (2018).

Daily ETa raster images are generated Known matters with daily ETa estimates, such as missing values due to cloud cover, require an approximation of those values. Hence, the 8-day ET fraction (see 8-day ET product page) product was used to compute daily ETa values by multiplying the ETf by a daily reference ET (ETr) provided by Gridmet (http://www.climatologylab.org/gridmet.html). The daily ETa data products (2001 – 2018) are available at: https://earlywarning.usgs.gov/ssebop/modis/daily.

Listed below are all ET products offered:

**Daily ET products:**
The Daily ET data product is provided in a zipped folder including a .tif file a metadata file. Images have a scale factor of 1000 (value/1000 = mm).

**Yearly collection:**
The yearly ET collection is provided in a zipped folder for each day of the year as a single, combined file for a simplified download option to users. Images have a scale factor of 1000 (value/1000 = mm).

References:


Senay, G. B., S. Bohms, R. K. Singh, P. H. Gowda, N. M. Velpuri, H. Alemu, and J. P. Verdin. 2013. *Operational Evapotranspiration Mapping Using Remote Sensing and Weather Datasets: A New Parameterization for the SSEB Approach*. Journal of the American Water Resources Association 49 (3):577-591. https://doi.org/10.1111/jawr.12057

Senay, G. 2018. *Satellite Psychrometric Formulation of the Operational Simplified Surface Energy Balance (SSEBop) Model for Quantifying and Mapping Evapotranspiration*. Applied Engineering in Agriculture 34 (3):555-566. https://doi.org/10.13031/aea.12614

Senay, G. B., M. Schauer, N. M. Velpuri, R. K. Singh, S. Kagone, M. Friedrichs, M. E. Litvak, and K. R. Douglas-Mankin. 2019. *Long-term (1986–2015) crop water use characterization over the upper Rio Grande Basin of United States and Mexico using landsat-based evapotranspiration*. Remote Sensing 11 (13):1587. https://doi.org/10.3390/rs11131587

Ji, L., G. B. Senay, N. M. Velpuri, and S. Kagone. 2019. *Evaluating the Temperature Difference Parameter in the SSEBop Model with Satellite-Observed Land Surface Temperature Data*. Remote Sensing 11 (16):1947. https://doi.org/10.3390/rs11161947