|  |  |  |
| --- | --- | --- |
| Table 3. Inputs and calculation steps for the SEBAL model (Bastiaanssen et al, 1998). | | |
|  | | |
| **Inputs** | **Description** | **Data Source a** |
|  | Instantaneous net radiation | Eq 1 |
|  | 24-hour mean net radiation | Eq 1 |
| 1. NDVI | Normalized Difference Vegetation Index | Imagery |
|  | Radiometric Land Surface Temperature (K) | Imagery |
| 1. U | Wind Speed (m/s) | Wind Speed from meteorological station or gridded data |
|  | Surface Roughness (dimensionless) | Land use map, VI (NDV, LAI), literature values, Equation (z0m=0.123 \* vegetation height in meters) a |
| 1. Elevation | Surface Elevation (m) | Digital Elevation Model (DEM) |
|  | | |
| **Derived variables** | **Description** | **Equation** |
| 1. G | Ground heat flux (W/m2) | where C1 is a correction coefficient (=1.1) b |
|  | Friction Velocity at meteorological station (s/m) |  |
|  | Wind Speed at blending height (200m) above the meteorological Station (m/s) |  |
|  | Initial value of Friction Velocity |  |
|  | Initial value of Aerodynamic resistance to heat transport |  |
| 1. DryPixel | The Dry Pixel is selected for calibration | Selected from the image manually by the user a, or automatically by selecting e.g. the pixel with the lowest NDVI from the subset of pixels with highest TR c |
| 1. WetPixel | The Wet Pixel is selected for calibration | Selected from the image manually by the user a, or automatically by selecting e.g. the pixel with the highest NDVI from the subset of pixels with lowest TR c |
| 1. TR Dry, TR Wet | Land Surface Temperature (K) at the DryPixel, and WetPixel | Imagery |
| *Iteration loop starts here:* | | |
| 1. T2 | Air temperature (K) at height z2 | Assume for the first iteration |
|  | Air Pressure (hPa) | where zis the elevation of the pixel (m) |
|  | Air Density (kg/m3) |  |
| 1. a | Calibration Coefficient a | where  where HDry = Rn – G |
| 1. b | Calibration Coefficient b |  |
| 1. dT | Temperature difference between z1 and z2 (K) |  |
| 1. H | Sensible Heat Flux (W/m2) | where Cp = 1004 J/kg/K |
| 1. L | Monin-Obhukov Length (dimensionless), used to define the atmospheric stability condition | where g = 9.81 m/s2 |
|  | Stability correction for heat transport under Unstable (L<0), Stable (L>0), and Neutral (L=0) atmospheric conditions d  *Note: Separate corrections for z1 and z2 can be computed but in practice, since z1 is so small, it is ignored.* | for Unstable, L<0:  where |
| for Stable, L>0: |
| for Neutral, L=0: |
|  | Stability correction for momentum transport under Unstable (L<0), Stable (L>0), and Neutral (L=0) atmospheric conditions d | for Unstable, L<0:    where |
| for Stable, L>0: |
| for Neutral, L=0: |
|  | Friction Velocity, corrected with ~~Monin-Obhukov~~ stability correction for momentum transport |  |
| 1. Rah | Aerodynamic resistance to heat transport, corrected with ~~Monin-Obhukov~~ stability correction for heat transport |  |
| *Iteration: Repeat steps 10-20 until changes in H are <5%* | | |
| 1. Ʌop | Evaporative Fraction at overpass (dimensionless) |  |
| 1. ET24 | 24 hour Evapotranspiration (mm/day) | where 86,400 is s/day, ρw is density of water (kg/m3), λ is latent heat of vaporization (J/kg). |

a (Morse, Tasumi, Allen, & Kramber, 2000)

b (Gieske, 2001)

c (Messina, 2012)

d (Paulson, 1970); (Webb, 1970)

**Table References:**

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