

## Surface Kinetic Temperature

**Product ID:** AST08

**Product Level:** 2

**Absolute Accuracy:** 1-4 K

**Horizontal Resolution:** 90 m

**Product Size (MB):** 3

**Lead Invest:** Gillespie/Rokugawa

**Production Mode:** on-request

**Relative Accuracy:** 0.3 K

**Units:** degrees K

### Product Description

The Level-2 land surface kinetic temperature product contains surface temperatures at 90-m resolution generated only over the land from ASTER's five thermal infrared channels. Land surface temperatures are determined from Planck's Law, using the emissivities from AST05 to scale the measured radiances after correction for atmospheric effects. Surface temperatures are important in studies of surface energy and water balance. They are also useful in studies of volcanism and thermal pollution.

Current sensors provide only limited information useful for deriving surface emissivity, and therefore land surface temperature estimates can be inaccurate. The five thermal infrared channels of the ASTER instrument enable direct surface emissivity estimates, and accurate temperature estimation.

### Algorithm Description

See AST05, Surface Emissivity.

### Applications

The derived land surface temperature has applications in studies of surface energy and water balance. Temperature data will be used in the monitoring and analysis of volcanic processes, day and night temperature data will be used to estimate thermal inertia, and thermal data will be used for high-resolution mapping of fires as a complement to MODIS global fire data. Thermal data are especially useful in fire studies because they can "see through" smoke to the burning terrain below.

### Constraints

See AST05, Surface Emissivity. For cold surfaces viewed through a warm or humid atmosphere correction for reflected skylight can be inaccurate, leading to inaccurate emissivity estimates. The error increases as the emissivity decreases. Therefore, even if some emissivities are erroneous, surface temperatures may be accurate, provided some of the emissivities are near unity.