

An estimation of soil moisture conditions using thermal inertia and its application

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Thermal inertia is a parameter of thermal physics which is the square root of the product of volumetric heat capacity and thermal conductivity. Both volumetric heat capacity and thermal conductivity of soil increase as the soil moisture increases. Hence, thermal inertia is also a function of soil moisture. One can estimate soil moisture employing thermal inertia due to this physical character. On the other hand, thermal inertia is a parameter of the force-restore method which can estimate land surface temperature. Hence, thermal inertia can be theoretically retrieved from the force-restore method incorporating land surface temperatures. From the above discussion, subsurface soil moisture conditions can be estimated using satellite data of land surface temperature over a wide area. In this presentation, Methods and potential of the thermal inertia method for estimating soil moisture conditions are demonstrated. Some potential applications of the thermal inertia method, which are estimating conditions of dust emission and a downscaling method of soil moisture estimates by satellite microwave radiometers, are also shown.

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