

***Retrieval of Global Hyperspectral Surface Emissivity Spectra
from Advanced Infrared Sounder Radiance Measurements***

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Global hyperspectral surface emissivity map has been generated using Atmospheric InfraRed Sounder (AIRS) radiance measurements. Single field-of-view physical retrieval algorithm (Li et al. 2007: Geophysical Research Letters) was used for retrieving the global hyperspectral IR emissivity product. Collocated operational MODIS (Moderate Resolution Imaging Spectroradiometer) cloud mask product with 1 km spatial resolution is used for AIRS sub-pixel cloud detection (Li et al. 2004: Journal of Applied Meteorology); only AIRS radiances from clear skies are used for the IR surface emissivity retrieval. The 8-day (01 – 08 January 2004) composite of AIRS emissivity retrievals agrees well with the operational MODIS emissivity product at a few broad spectral bands. The spatial and spectral features of the derived emissivity spectra over desert and other regions well reflect the surface property and ecosystem conditions. The method can also be applied to process IASI (Infrared Atmospheric Sounding Interferometer) radiances with full IR spectral coverage. The global hyperspectral IR emissivity map is very important for assimilating radiances over land, retrieving other products such as dust properties and cloud properties using IR radiances.

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