A Big Earth Data Platform for Three Poles

**HiWATER: Dataset of thermal infrared spectrum observed by BOMEM MR304 in the middle reaches of the Heihe River Basin**

1、Description

This dataset includes the emissivity spectrum (8-14 µm) of typical ground objects in Zhangye City, Zhangye airport, desert and farmland at Wuxing experiment area. The data was measured by the BOMEM MR304 FTIR (Fourier Transform Infrared Spectrometer).
A. Objective
The objective of the thermal infrared (TIR) spectrum measurement lies in: Radiometric calibration for the airborne TIR sensor, land surface emissivity products validation and collecting typical surface spectrum working as priori knowledge in land surface temperature inversion and ecological and hydrological models.
B. Instruments and theory
Instruments: BOMEM MR304 FTIR, Mikron M340 blackbody, BODACH BDB blackbody, diffused golden plate, Fluke 50-series II thermometer
Measurement theory: The target radiance is directly measured by the MR304 FTIR under clear-sky condition while the atmospheric downward radiance is obtained through a diffused golden plate, and emissivity is retrieved by the Iterative Spectrally Smooth Temperature and Emissivity Separation (ISSTES) algorithm
C. Experiment site and targets
29-5-2012: Stone bricks, grassland and asphalt, etc at square of Zhangye.
20-6-2012: Roof of the building in Zhangye, water and sand sample collected from the desert, etc.
30-6-2012: Cement road at Zhangye airport, desert around the Zhangye airport.
3-7-2012: Corn leaves, soil and road in the farmland at Wuxing village, Zhangye City.
4-7-2012: Corn leaves, wheat canopy at Xiaoman town, Zhangye City.
10-7-2012: Bricks of Runquanhu park, Zhangye City.
13-7-2012: Corn leaves and other plants at Wuxing village, Zhangye City.
D. Data processing
The original data collected by BOMEM FTIR is firstly calibrated using the calibration data and get the radiance spectrum of the targets and sky (\*.rad), then, the radiance data is converted to the easy readably text file (ASCII format). The time used in this dataset is in UTC+8 Time.

2、Keywords

Theme：Radiation,Infrared spectrometer,Remote Sensing Technology,Emissivity
Discipline：Atmosphere,Remote Sensing Technology
Places：Heihe River Basin, the artificial oasis experimental area in the middle reaches, Zhanye Airport, Daman Superstation
Time：2012-07-10, 2012, 2012-07-13, 2012-07-04, 2012-06-30, 2012-07-03, 2012-05-29, 2012-06-20

3、Data details

1.Scale：None

2.Projection：4326

3.Filesize：0.0MB

4.Data format：文本, \*.IGM, \*.Rad后缀

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：38.95 | - |
| west：100.35 | - | east：100.7 |
| - | south：38.77 | - |

5、Time frame:2012-06-11 10:22:00+00:00--2012-07-26 10:22:00+00:00

6、Reference method

References to data:

MA Mingguo, XIAO Qing. HiWATER: Dataset of thermal infrared spectrum observed by BOMEM MR304 in the middle reaches of the Heihe River Basin. A Big Earth Data Platform for Three Poles, doi:10.3972/hiwater.041.2013.db2017

References to articles:

Li, X., Liu, S.M., Xiao, Q., Ma, M.G., Jin, R., Che, T., Wang, W.Z., Hu, X.L., Xu, Z.W., Wen, J.G., Wang, L.X. (2017). A multiscale dataset for understanding complex eco-hydrological processes in a heterogeneous oasis system. Scientific Data, 4, 170083. doi:10.1038/sdata.2017.83.

7、Supporting project information

Heihe Watershed Allied Telemetry Experimental Research (HiWATER)
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8、Data resource provider

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