Package 'landsat8'

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Type Package

Title Landsat 8 Imagery Rescaled to Reflectance, Radiance and/or Temperature

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Description Functions for converted Landsat 8 multispectral satellite imagery rescaled to the top of atmosphere (TOA) reflectance, radiance and/or at satellite brightness temperature using radiometric rescaling coefficients provided in the metadata file (MTL file).

Imports rgdal, sp

Depends R (>= 3.1.2)

License GPL-2

LazyData TRUE

RoxygenNote 5.0.1

NeedsCompilation no

Repository CRAN

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R topics documented:

band11 *Sample Landsat 8 TIRS data*

Description

GeoTIFF File Format containing a 300 x 300 pixel subset (1500 x 1500 m) of the Landsat 8 TIRS band 10 for path 228, row 71, obtained on 7 January 201.

Usage

```
data(band5)
```

Format

GeoTIFF File Format format in 16 bits.

Source

Landsat images can be obtained from the United States Geological Survey at http://landsat.usgs.gov

References

U.S. Geological Survey. 2015. Landsat 8 (L8) data users handbook. Version 1.0. 97p.

Examples

```
data(band11)
image(band11)
```

band5 *Sample Landsat 8 OLI data*

Description

GeoTIFF File Format containing a 300 x 300 pixel subset (1500 x 1500 m) of the Landsat 8 OLI band 5 for path 228, row 71, obtained on 7 January 2014.

Usage

```
data(band5)
```

Format

GeoTIFF File Format format in 16 bits.

Source

Landsat images can be obtained from the United States Geological Survey at http://landsat.usgs.gov

References

U.S. Geological Survey. 2015. Landsat 8 (L8) data users handbook. Version 1.0. 97p.

Examples

```
data(band5)
image(band5)
```

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radconv *Conversion to TOA Radiance*

Description

Conversion to TOA radiance of satellite data.

Usage

```
radconv(x, Ml, Al)
```

Arguments

x	Image to be converted, in matrix, data frame, or SpatialGridDataFrame format.
Ml	band specific multiplicative rescaling factor from the metadata (MTL file) (RADIANCE_MULT_BAND_x, where x is the band number).
Al	Mp band specific additive rescaling factor from the metadata (MTL file) (RADIANCE_ADD_BAND_x, where x is the band number).

Value

TOA spectral radiance (Watts/(m2*srad*micro-m)).

Author(s)

Alexandre dos Santos

References

U.S. Geological Survey. 2015. Landsat 8 (L8) data users handbook. Version 1.0. 97p.

Examples

```
data(band5)
band5.dn<- as(band5, 'SpatialGridDataFrame')
band5.rad<-radconv(band5.dn,5.9150E-03,-29.57525)
```

reflconv *Conversion to TOA Reflectance*

Description

Conversion to TOA reflectance of satellite data.

Usage

```
reflconv(x, Mp, Ap)
```

Arguments

x	Image to be converted, in matrix, data frame, or SpatialGridDataFrame format.
Mp	Band specific multiplicative rescaling factor from the metadata (MTL file) (REFLECTANCE_MULT_BAND_x, where x is the band number).
Ap	Band specific additive rescaling factor from the metadata (MTL file) (REFLECTANCE_ADD_BAND_x, where x is the band number).

Value

TOA spectral radiance.

Author(s)

Alexandre dos Santos

References

U.S. Geological Survey. 2015. Landsat 8 (L8) data users handbook. Version 1.0. 97p.

Examples

```
data(band5)
band5.dn<- as(band5, 'SpatialGridDataFrame')
band5.refl<-reflconv(band5.dn,2.0000E-05,-0.100000)
```

reflconvS *Conversion to TOA Reflectance with a Correction for the Sun Angle*

Description

Conversion to TOA reflectance with a correction for the sun angle of satellite data.

Usage

```
reflconvS(x, Mp, Ap, sunelev)
```

Arguments

x	Image to be converted, in matrix, data frame, or SpatialGridDataFrame format.
Mp	band specific multiplicative rescaling factor from the metadata (MTL file) (REFLECTANCE_MULT_BAND_x, where x is the band number).
Ap	band specific additive rescaling factor from the metadata (MTL file) (REFLECTANCE_ADD_BAND_x, where x is the band number).
sunelev	Sun elevation in degrees is provided in the metadata (MTL file) (SUN_ELEVATION).

Value

TOA spectral radiance with a correction for the sun angle.

Author(s)

Alexandre dos Santos

References

U.S. Geological Survey. 2015. Landsat 8 (L8) data users handbook. Version 1.0. 97p.

Examples

```
data(band5)
band5.dn<- as(band5, 'SpatialGridDataFrame')
band5.reflS<-reflconvS(band5.dn,2.0000E-05,-0.100000,41.12846745)
```

tempconv *Conversion to At Satellite Brightness Temperature*

Description

Conversion to At satellite brightness temperature of satellite data.

Usage

```
tempconv(x, Ml, Al, K1, K2)
```

Arguments

x	Image to be converted, in matrix, data frame, or SpatialGridDataFrame format.
Ml	band specific multiplicative rescaling factor from the metadata (MTL file) (RADIANCE_MULT_BAND_x, where x is the band number).
Al	Mp band specific additive rescaling factor from the metadata (MTL file) (RADIANCE_ADD_BAND_x, where x is the band number).
K1	band specific thermal conversion constant from the metadata (MTL file) (K1_CONSTANT_BAND_x, where x is the band number, 10 or 11).
K2	band specific thermal conversion constant from the metadata (MTL file) (K2_CONSTANT_BAND_x, where x is the band number, 10 or 11).

Value

At satellite brightness temperature in Kelvin (K).

Author(s)

Alexandre dos Santos

References

U.S. Geological Survey. 2015. Landsat 8 (L8) data users handbook. Version 1.0. 97p.

Examples

```
data(band11)
band11.dn<- as(band11, 'SpatialGridDataFrame')
band11.tempK<-tempconv(band11.dn,3.3420E-04,0.10000, 480.89, 1201.14)
```

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