

Package ‘okmesonet’

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Type Package

Title Retrieve Oklahoma Mesonet climatological data

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Description okmesonet retrieves and summarizes Oklahoma (USA) Mesonet climatological data provided by the Oklahoma Climatological Survey. Measurements are recorded every five minutes at approximately 120 stations throughout Oklahoma and are available in near real-time.

Depends R (>= 2.14.0), utils

Imports plyr

License GPL (>= 2)

LazyData true

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okmesonet-package	<i>Oklahoma Mesonet climatological data</i>
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Description

The **Oklahoma Mesonet** is a network of automated climate monitoring stations throughout Oklahoma, USA. Data collection began January 01, 1994; as of February 2012, there are 120 active stations. Measurements are recorded every five minutes and sent to a central facility for verification and quality control by the Oklahoma Climatological Survey.

Details

Data access may be restricted by organization and/or location. Please refer to and follow policies found within the **Oklahoma Mesonet Data Access Policy**. The authors and maintainers of okmesonet assume no responsibility for the use or misuse of okmesonet.

avgokmts	<i>Average an Oklahoma Mesonet time series data frame</i>
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Description

Summarize an Oklahoma Mesonet time series (MTS) data frame returned by `okmts`. Summary can be by hour, day, month, or year. Precipitation (variable RAIN) is returned as totals within the given time period.

Usage

```
avgokmts(mts, by, metric = "mean")
```

Arguments

<code>mts</code>	data frame returned by <code>okmts</code> .
<code>by</code>	character string indicating time period to average over. May include "hour", "day", "month", or "year".
<code>metric</code>	function to summarize with. Default is "mean" (average), but may also include "min", "max", and "sd" for minimum, maximum, and standard deviation, respectively.

Value

A data frame summarizing Mesonet measurements by station and given time period.

Examples

```
## Not run:
## Retrieve Bessie station MTS files for 00:00 Jun 01, 1997
## through 23:55 Oct 31, 1997
bess.mts <- okmts(beginTime="1997-06-01 00:00:00",
  endTime="1997-10-31 23:55", station="bess")

## Average MTS data by day.
bess.mts.avg <- avgokmts(bess.mts, by="day")

## End(Not run)
```

bison	<i>Bison locations</i>
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Description

Location information for one American bison (*Bison bison*) at The Nature Conservancy Tallgrass Prairie Preserve, Jan 31 - Feb 5, 2011. Information includes time, latitude, and longitude.

Format

Data frame

data.checkgeoinfo	<i>Check geomeso.csv</i>
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Description

Internal function to check access to geomeso.csv

data.downloadstn	<i>Download Oklahoma Mesonet station list</i>
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Description

Internal function to download Oklahoma Mesonet station list

okcurobs

Retrieve Oklahoma Mesonet current observations

Description

Retrieve current observations from all **Oklahoma Mesonet** stations.

Usage

```
okcurobs(SI = TRUE, localtime = TRUE)
```

Arguments

SI	logical; if TRUE, convert observations to SI units. See 'Details'.
localtime	logical; if TRUE output time is local to Oklahoma. If FALSE, output time is Coordinated Universal Time (UTC).

Details

See **Current Observations** for variable and unit description. Current observations are stored in 'American' units. SI=TRUE converts to the 'International System of Units' (though Celsius is used instead of Kelvin for temperature).

A TIME variable of class POSIXct is added. localtime=TRUE returns TIME as local Oklahoma time; localtime=FALSE returns TIME as UTC.

Value

A data frame with current observations.

See Also

[okmts](#)

Examples

```
## Not run:  
## Retrieve current observations.  
curobs <- okcurobs()  
  
## End(Not run)
```

okmts *Retrieve Oklahoma Mesonet climatological data*

Description

Retrieve **Oklahoma Mesonet** time series (MTS) data for a given time period and station. Alternatively, if station is omitted and latitude and longitude are given, retrieve MTS data for the closest operating station during the given time period.

Usage

```
okmts(begintime, endtime, station = NULL, lat = NULL,
      lon = NULL, variables = "ALL", localtime = TRUE,
      missingNA = TRUE, mcores = FALSE)
```

Arguments

begintime	character string or POSIXct object. Start time of time period. Character strings must be formatted as 'YYYY-MM-DD HH:MM:SS'.
endtime	character string or POSIXct object. End time of time period. Character strings must be formatted as 'YYYY-MM-DD HH:MM:SS'.
station	character string. Four letter Mesonet station identifier. See 'Details'.
lat	numeric. latitude of point of interest in decimal degrees.
lon	numeric. longitude of point of interest in decimal degrees.
variables	character string. Mesonet variables to retrieve. See 'Details'.
localtime	logical; if TRUE, input and output time is local to Oklahoma. If FALSE, input and output time is Coordinated Universal Time (UTC or GMT). See 'Details'.
missingNA	logical; if TRUE, missing values are replaced with NA. See 'Details'.
mcores	integer or logical; use <i>n</i> cores for file retrieval. See 'Details'.

Details

The Oklahoma Mesonet is a network of automated climate monitoring stations throughout Oklahoma, USA. Data collection began January 01, 1994; as of February 2012, there are 120 active stations. Measurements are recorded every five minutes and sent to a central facility for verification and quality control by the Oklahoma Climatological Survey.

Data access may be restricted by organization and/or location. Please refer to and follow policies found within the **Oklahoma Mesonet Data Access Policy**. The authors and maintainers of okmesonet assume no responsibility for the use or misuse of okmesonet.

The objects used to define the time period for okmts can be either character strings or POSIXct objects. Character strings should be in the format "2009-09-08 09:05" or "2005-12-13 00:00:00". POSIXct objects need to have a time zone specified; okmts converts time zones appropriately to download correct MTS data.

Four letter Mesonet station identifier can be found in [okstations](#) or on the [Oklahoma Mesonet](#) website.

Available Mesonet variables and units are described in the [MDF/MTS Files](#) webpage, 'Parameter Description' [readme](#) file, or [MTS specification](#). Multiple variables can be retrieved by combining values into a vector, e.g. `c("TAIR", "RELH")`. "ALL" indicates all available variables.

Time records of Oklahoma MTS data are stored in Coordinated Universal Time (UTC or GMT). To easily convert to local Oklahoma time, `localtime=TRUE` indicates that times used to define the time period (`begintime` and `endtime`) are local Oklahoma time. Time zone conversion is done internally, and accounts for Daylight Savings Time (as reliably as R can; see [timezone](#)). `localtime=TRUE` will also direct `okmts` to output in local Oklahoma time. `localtime=FALSE` indicates that UTC is used for both `begintime` and `endtime`; output is also UTC. If time inputs are of POSIXct class, `localtime` only affects time output.

Missing values are stored as negative integer codes and can be converted to NA with the `missingNA` parameter. Missing value descriptions can be found in the [MDF/MTS Files](#) webpage.

The use of multiple cores can speed up data retrieval for lengthy time periods. `mcores` specifies the number of cores to be used. `mcores=TRUE` will direct `okmts` to use the number cores less one in the current machine (determined by `detectCores-1`).

To prevent repeated retrieval of frequently used data, the data frame returned by `okmts` can be saved (e.g. [save](#)) or written to a file (e.g. [write.table](#)).

Value

A data frame with values from MTS files for the given station, time period, and desired variables. Time values for each measurement are returned as POSIXct class; time zone is determined by `localtime`.

See Also

[avgokmts](#) to summarize MTS data.

Examples

```
## Not run:
## Retrieve Bessie station MTS files for 00:00 Jun 01, 1997
## through 23:55 Oct 31, 1997
bess.mts <- okmts(begintime="1997-06-01 00:00:00",
  endtime="1997-10-31 23:55", station="bess")

## Use POSIXct class to retrieve Medicine Park station air
## temperature for 09:30 through 20:30 Aug 12, 2004
## Set times, using 'America/Chicago' for Oklahoma time zone
medi.time <- c(as.POSIXct("2004-08-12 09:30", tz="America/Chicago"),
  as.POSIXct("2004-08-12 20:30", tz="America/Chicago"))
medi.mts <- okmts(begintime=medi.time[1], endtime=medi.time[2],
  station="medi", variables=c("TAIR", "RELH"))

## Download all data for 2001 for station closest to
## 36.575284 latitude, -99.478455 longitude, using multiple cores
stn.mts <- okmts(begintime="2001-01-01 00:00:00",
```

```

endtime="2001-12-31 23:55:00", lat=36.575284, lon=-99.478455, mcores=T)

## Retrieve Idabel station MTS data for 00:00 through 12:00 UTC (GMT)
## Nov 23, 2003
## Time values are returned in UTC
idab.mts <- okmts(begintime="2003-11-23 00:00:00",
  endtime="2003-11-23 12:00:00", station="idab", localtime=F)

## Combine air temperature with bison movement data.
## Retrieve Foraker station MTS files for 00:00 Jan 31, 2011
## through 15:00 Feb 05, 2011
fora.mts <- okmts(begintime="2011-01-31 00:00:00",
  endtime="2011-02-05 15:00:00", station="fora")
## Round bison timestamp down to five minute mark
bison$newtime <- round(bison$timestamp, "min")
bison$newtime$min <- as.integer(format(bison$newtime, "%M")) %/% 5 * 5
bison$newtime <- as.POSIXct(bison$newtime)
## Add Foraker station air temperature to bison data
bison$TAIR <- fora.mts$TAIR[match(bison$newtime, fora.mts$TIME)]

## End(Not run)

```

okstations

List of Oklahoma Mesonet stations

Description

List of **Oklahoma Mesonet** stations. The Oklahoma Mesonet is a network of automated climate monitoring stations throughout Oklahoma, USA. Data collection began January 01, 1994; as of February 2012, there are 120 active stations. Measurements are recorded every five minutes and sent to a central facility for verification and quality control by the Oklahoma Climatological Survey.

Format

Data frame

Details

Station list is updated each time okmesonet is loaded.

Variables associated with each station include:

- Identifier: four letter station identifier
- Number: station identification number
- Name: station name
- Town: closest town
- County: Oklahoma county
- Latitude: station latitude, decimal degrees

- Longitude: station longitude, decimal degrees
- Elevation: station elevation, meters
- Commissioned: date station was commissioned
- Decommissioned: date station was decommissioned. "2099-12-31" represents currently active

See Also

[updatestn](#) to manually update station list.

updatestn

Update list of Oklahoma Mesonet stations

Description

The list of Oklahoma Mesonet stations is updated each time okmesonet is loaded. If this fails (e.g., internet connectivity is temporarily down), use updatestn to manually update the list.

Usage

```
updatestn()
```

See Also

[okstations](#)

Examples

```
## Not run:  
## Update Oklahoma Mesonet station list  
okstations <- updatestn()  
  
## End(Not run)
```


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