

# MODIS data Santa Lucia extract

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## Introduction

This document covers downloading satellite data:

- MODIS16A ET (collection 5) using the package MODISTools

## Downloading MODIS ET data using MODISTools

The first component is a demonstration of using the package MODISTools in R to download the data. In this case the example will be based on extracting data for the midpoints of the subbasins of a SWAT model for the Santa Lucia catchment

### how to extract the midpoints

This is fairly easy in ARCSWAT, the model actually generates the midpoints as part of the watershed delineation and you can access this through the table of data of the shape file.

### Downloading the data

Below is the actual download of the MODIS data, this requires an input file with the coordinates of the midpoints.

```
# Install package if needed
if(!require(MODISTools)) install.packages("MODISTools")

## Loading required package: MODISTools
library(MODISTools)

# read in file with xy locations (or create a data.frame)
xy.loc <- read.csv("Inputdata/subbasins_SantaLucia.csv")
# Following the MODIS tools manual
coords <- data.frame(lat=xy.loc$Lat,
                     long=xy.loc$Long_,
                     start.date=rep(2000,nrow(xy.loc)),
                     end.date=rep(2014,nrow(xy.loc)),
                     ID=1:nrow(xy.loc))

# We need to figure out the name of the product, you can use GetProducts()
GetProducts()

##      getproductsResponse
## [1,] Character,0
## [2,] "MCD12Q1"
## [3,] "MCD12Q2"
```

```

## [4,] "MCD43A1"
## [5,] "MCD43A2"
## [6,] "MCD43A4"
## [7,] "MOD09A1"
## [8,] "MOD11A2"
## [9,] "MOD13Q1"
## [10,] "MOD15A2"
## [11,] "MOD15A2GFS"
## [12,] "MOD16A2"
## [13,] "MOD17A2_51"
## [14,] "MOD17A3"
## [15,] "MYD09A1"
## [16,] "MYD11A2"
## [17,] "MYD13Q1"
## [18,] "MYD15A2"

# and check out the data bands that are in the product
GetBands(Product="MOD16A2")

## [1] "ET_1km"      "LE_1km"      "PET_1km"      "PLE_1km"      "ET_QC_1km"

#Create directory in which to save data
if (!dir.exists("MODIS/SantaLucia")) {
  dir.create("MODIS/SantaLucia")
}

# check if directory is empty

# # Now download data using MODISSubsets (This can take very long)
MODISSubsets(LoadDat=coords, Product = "MOD16A2",
             Bands=c("ET_1km", "ET_QC_1km"), StartDate=T, Size=c(0,0),
             SaveDir="MODIS")

## Files downloaded will be written to MODIS.
## Found 29 unique time-series to download.
## Getting subset for location 1 of 29...
## Getting subset for location 2 of 29...
## Getting subset for location 3 of 29...
## Getting subset for location 4 of 29...
## Getting subset for location 5 of 29...
## Getting subset for location 6 of 29...
## Getting subset for location 7 of 29...
## Getting subset for location 8 of 29...
## Getting subset for location 9 of 29...
## Getting subset for location 10 of 29...
## Getting subset for location 11 of 29...
## Getting subset for location 12 of 29...
## Getting subset for location 13 of 29...
## Getting subset for location 14 of 29...
## Getting subset for location 15 of 29...
## Getting subset for location 16 of 29...
## Getting subset for location 17 of 29...
## Getting subset for location 18 of 29...
## Getting subset for location 19 of 29...
## Getting subset for location 20 of 29...
## Getting subset for location 21 of 29...

```

```
## Getting subset for location 22 of 29...
## Getting subset for location 23 of 29...
## Getting subset for location 24 of 29...
## Getting subset for location 25 of 29...
## Getting subset for location 26 of 29...
## Getting subset for location 27 of 29...
## Getting subset for location 28 of 29...
## Getting subset for location 29 of 29...
## Full subset download complete. Writing the subset download file...
## Done! Check the subset download file for correct subset information and download messages.
```