Data visualization: from R to Google Earth and QGIS

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Outline

- Data visualization: why is it important?
- Direct interpretation of the ML predictions,
- From R to QGIS to Google Earth,
- plotKML package,
- gdal2tiles,

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plotKML: Scientific Visualization of Spatio-Temporal Data

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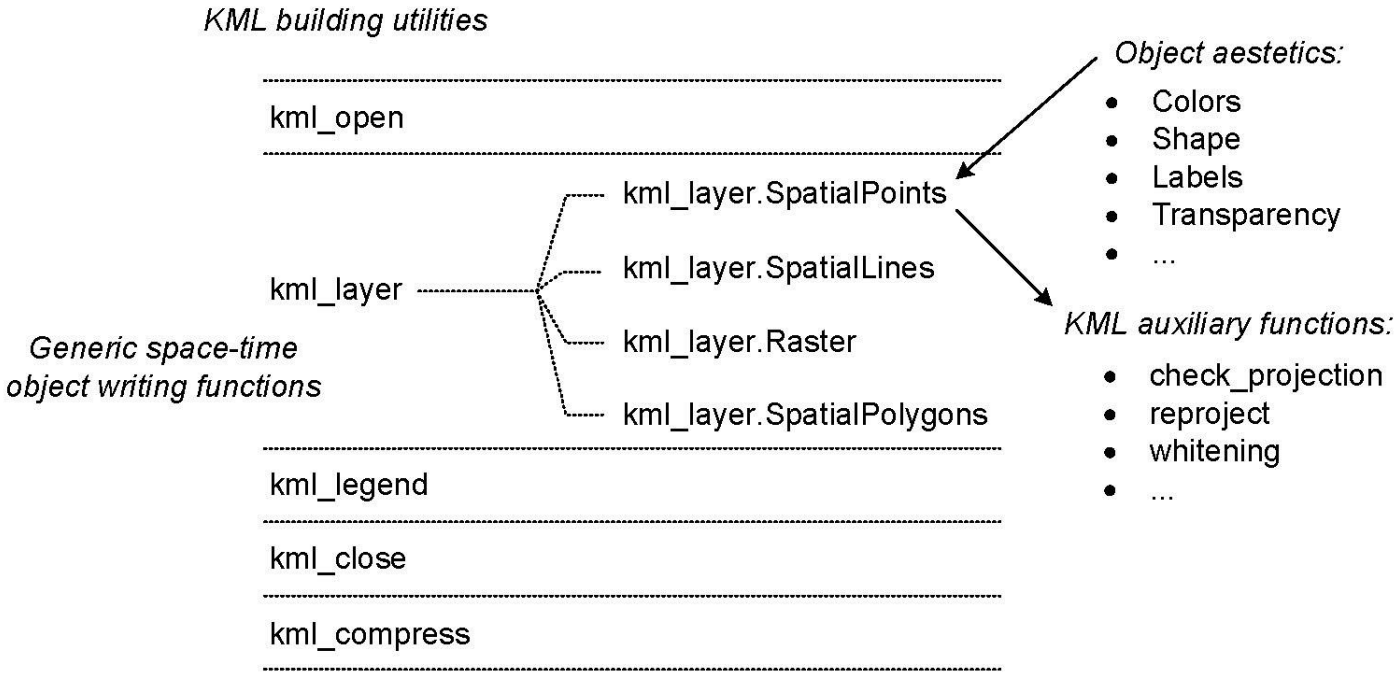
Abstract

plotKML is an R package that provides methods for writing the most common R spatial classes into KML files. It provides a simple interface to generate KML files with a small number of arguments, and gives users a possibility to visually explore spatio-temporal data available in R: points, polygons, gridded maps, trajectory-type data, vertical profiles, ground photographs, time series vector objects or raster images, but also the results of spatial analysis such as geostatistical mapping, spatial simulations of vector and gridded objects, optimized sampling designs, species distribution models and similar. A generic `plotKML()` method automatically determines the parsing order and visualizes data directly from R; lower level functions can be combined to allow for new user-created visualization templates. In comparison to other KML writing packages, **plotKML** is more modular, it links more closely to the existing R classes for spatio-temporal data, and provides users with the possibility to create their own templates.

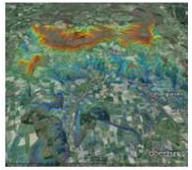
Keywords: space-time objects, scientific visualization, R, KML, geostatistics.

Hengl, T., Roudier, P., Beaudette, D., Pebesma, E., & others. (2015). plotKML: Scientific visualization of spatio-temporal data. Journal of Statistical Software, 63(5), 1–25. Retrieved from https://www.jstatsoft.org/article/view/v063i05

Make your own function

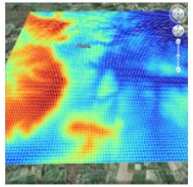


plotKML gallery

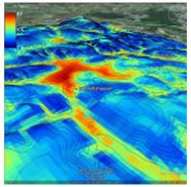


SpatialLines

SpatialPolygons



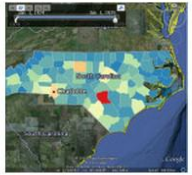
grid2poly



Raster

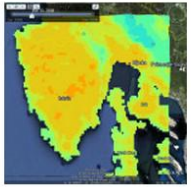
spMetadata

STIDFtraj

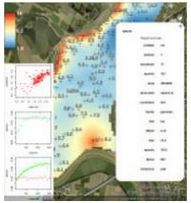


STIDF_Polygons

STIDF_Points

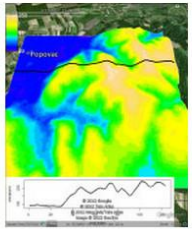


RasterBrick

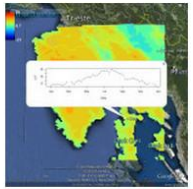


SpatialPredictions

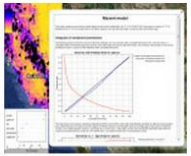
VectorsSimulations



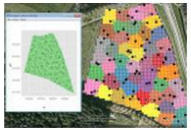
RasterBrickSimulations



RasterBrickTimeSeries

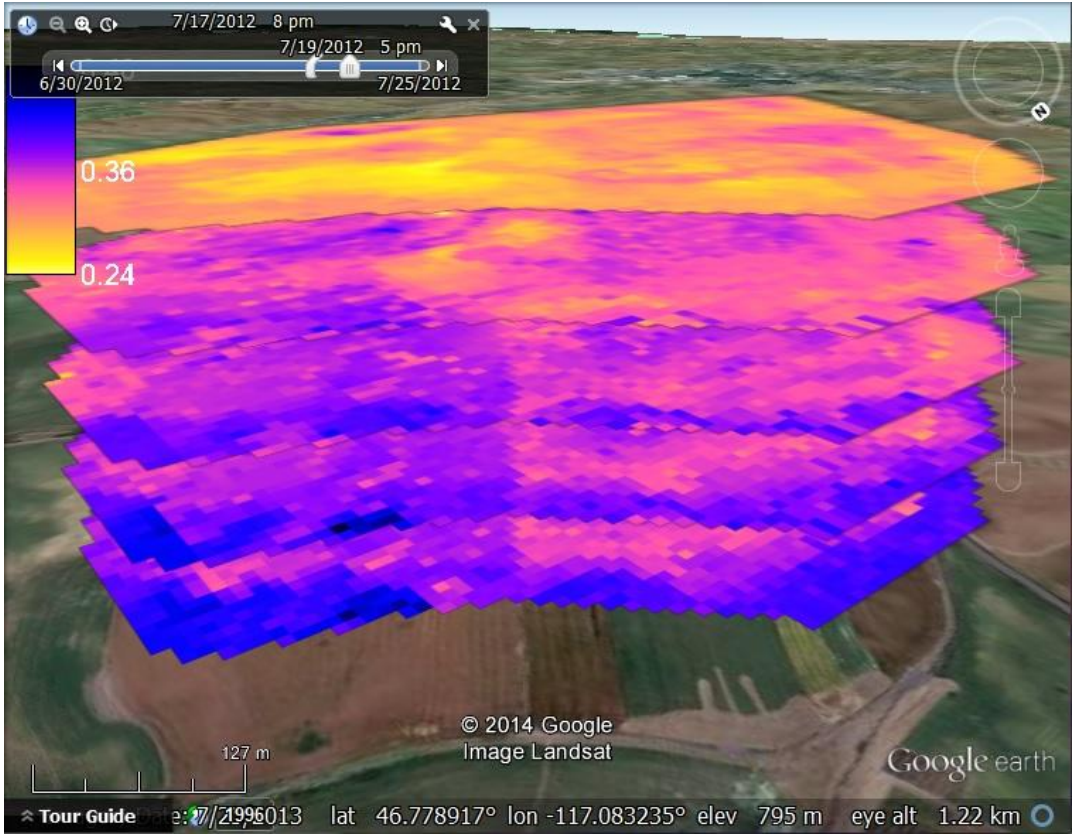


SpatialMaxEntOutput



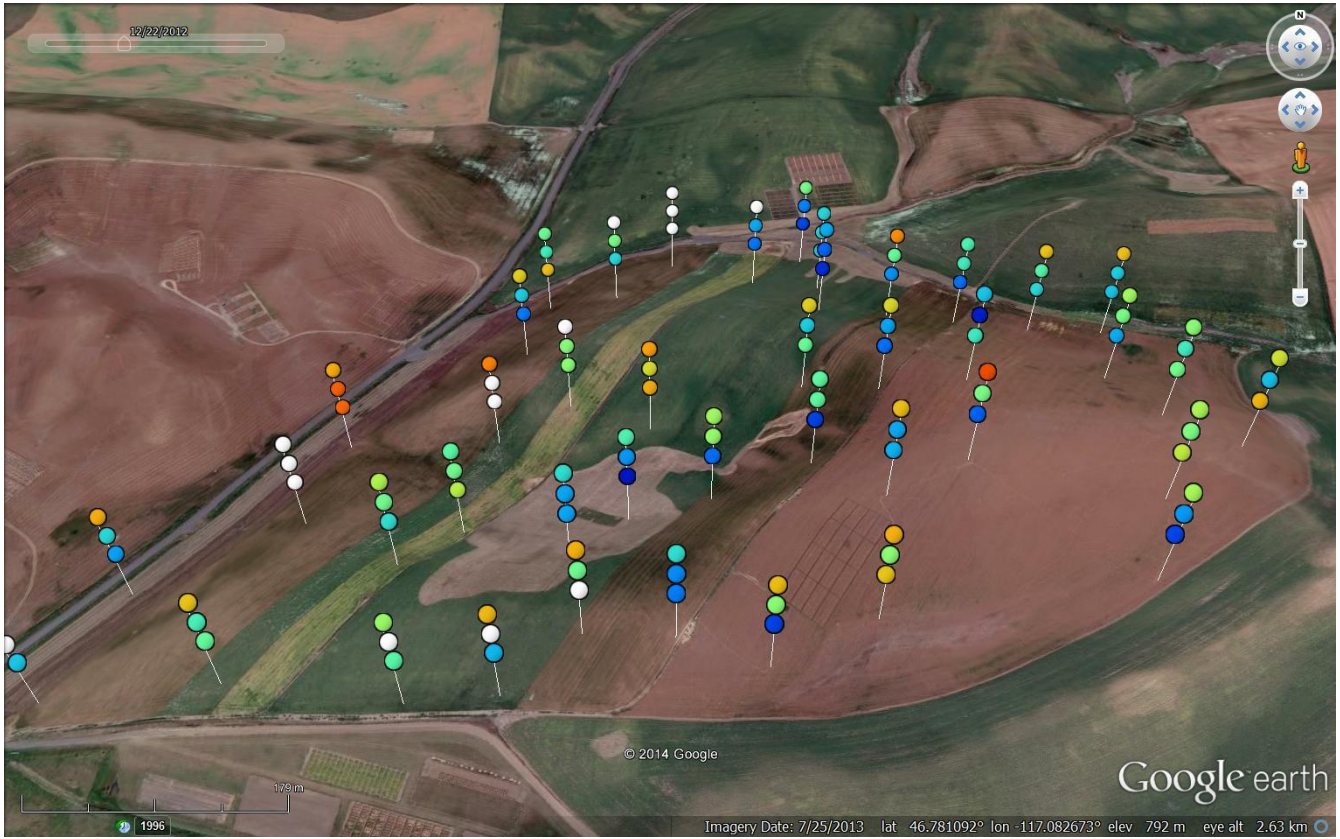
SpatialSamplingPattern

Water volumetric content



Cookfarm dataset
3D+T

3D+T stations



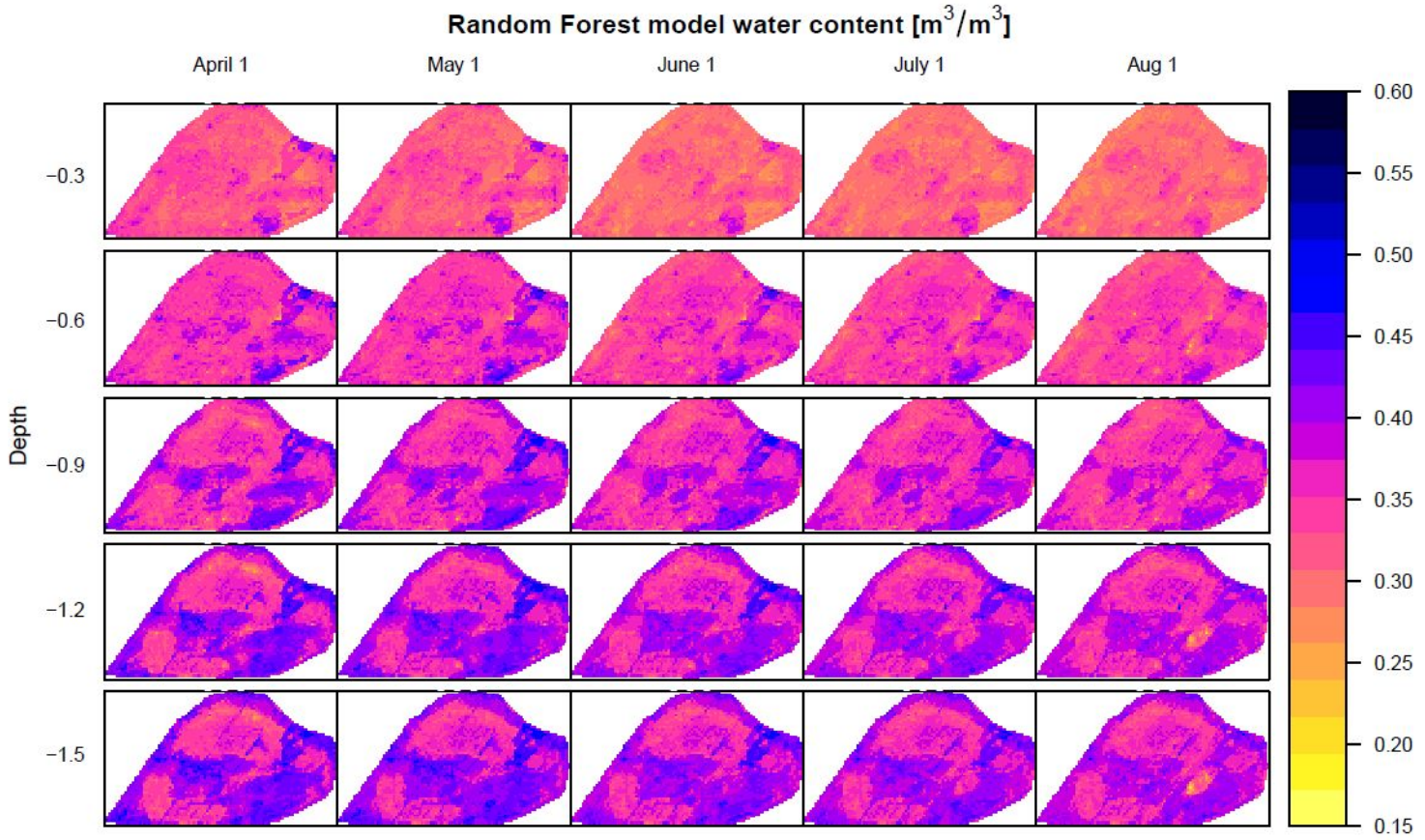
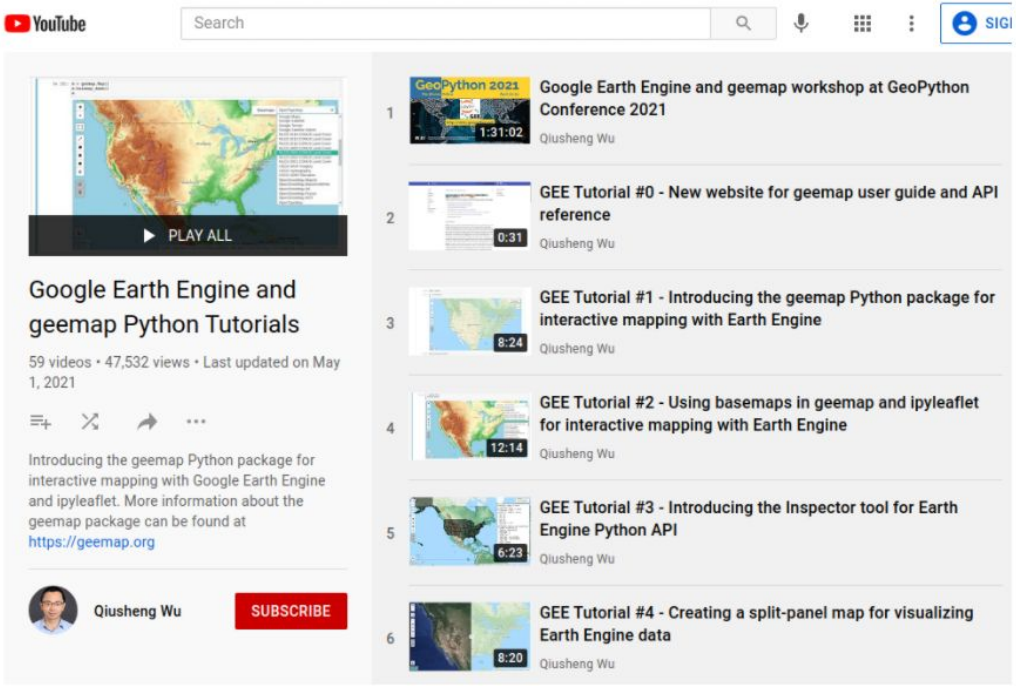


Fig. 5. Spatio-temporal predictions of soil water content at Cook Agronomy Farm for the growing season in 2012 using the random forests (RF) model. Note that relative changes in water content are accurate, but absolute sensor readings require correction.

YouTube Channel

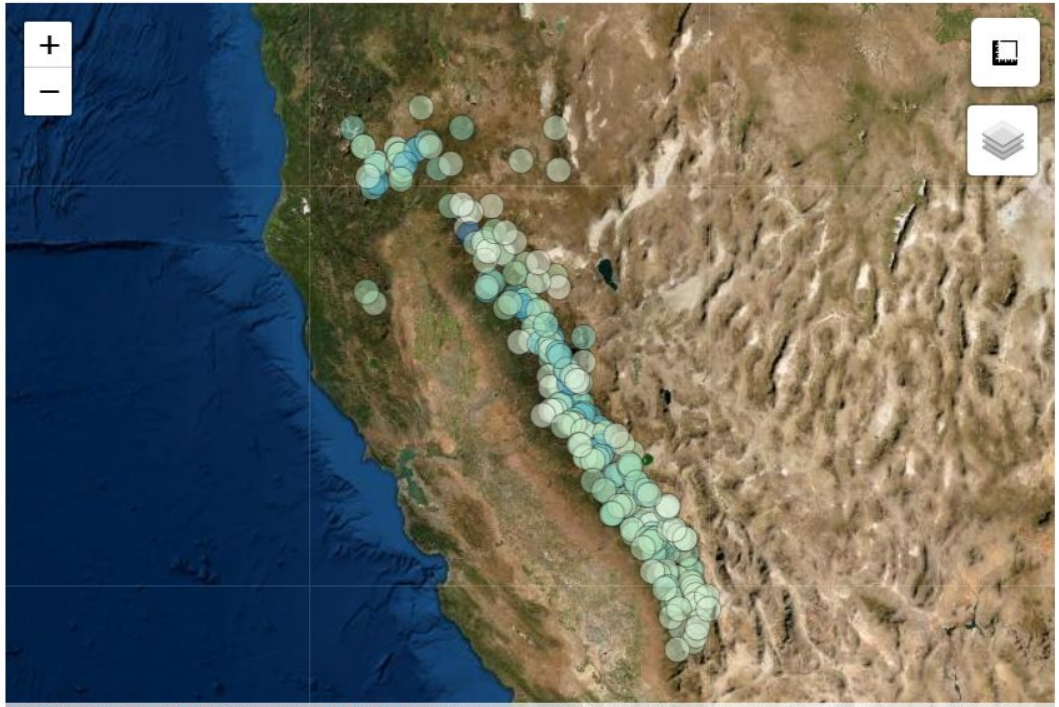
I have created a YouTube Channel for sharing **geemap** tutorials. You can subscribe to my channel for regular updates. If there is any specific tutorial you would like to see, please submit a feature request here.



Science

A leaflet map takes a bit more formatting, but the sky is the limit. We can make the map look pretty much exactly as we'd like, there are far fewer limitations.

Code

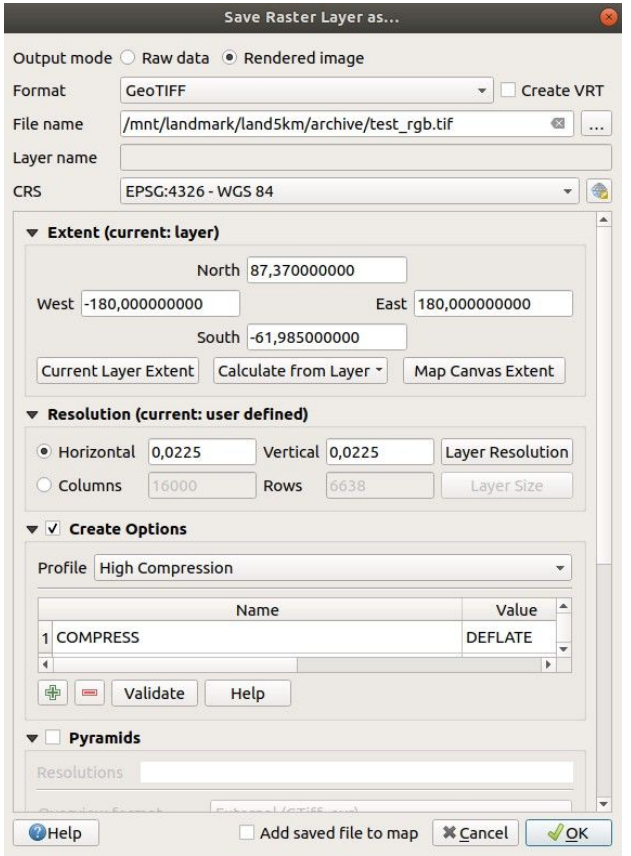


gdal2tiles

Prepare visualization in QGIS and export raster to RGB and downscale to 1/2 pixel,

Generate tiles using gdal2tiles:

```
system('gdal2tiles.py --title=\"INSERT TITLE\" --zoom=1-6 --profile=geodetic input_rgb.tif /mnt/outputdir/ -k')
```



Advantages of KML

If you prepare the views on your data/analysis as KML files, you can share your work without having to train the users in GIS.

KML is **ideal for project delivery** --- you can put all your data (or at least link to it), metadata and multimedia description (including the complete report) so that the whole project can boil down to --- making a single KML file!

PS: KML was never meant to be used for data distribution (the original data should go to a database e.g. geoserver or similar);