

quickmapr: Simplified mapping and basic interactivity.

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Abstract There are many packages that already exist or are in active development that support the visualization of spatial data in R. However, there seems to be a gap for those that need to quickly view, compare, and interactively explore the results of a given spatial analysis without first having to convert to a different coordinate reference system. Functionality for the current release (v0.2.0) simplifies mapping of multiple `sf`, `sp` or raster layers, and also provides interactive zooming, panning, labelling, selecting, and identifying. These tools are intended for use within an active spatial analysis workflow and not for production quality maps. Additionally, `quickmapr` does not make any assumptions about coordinate reference systems and leaves managing of projections to the analyst. This paper introduces the package and shows examples of its typical use.

Introduction

Spatial data analysis capabilities in R have been steadily growing over the last several years. We are now to the point where nearly all Geographic Information Systems (GIS) functionality can be accomplished without leaving R. The one area that had lagged behind was spatial data visualization and interactivity. This too is changing rapidly. Initially, spatial data visualization had been handled via base plotting methods (e.g. from `sp` or `raster`) or via additional plotting packages such as `ggplot2` (Pebesma and Bivand, 2005; Bivand et al., 2013; Hijmans, 2015; Wickham, 2009). While these methods provide the ability to make high quality maps, they do not provide interactivity, a hallmark of GIS.

To address this, most solutions (e.g. `ggmap`, `leaflet`, `mapview` etc.) have relied on javascript libraries or other web APIs (Kahle and Wickham, 2013; Cheng and Xie, 2016; Appelhans et al., 2016). These provide a modern interface, with a rich set of basemaps, but all assume a geographic coordinate system or Web Mercator coordinate reference system. In the case of typical spatial data analysis workflow it is often desirable to quickly map the resultant spatial datasets in the projection chosen for the analysis. Currently, this is not possible with the most used javascript libraries.

I developed `quickmapr` to fill this gap and provide spatial data analysts with a tool to quickly map multiple layers and interact with the resultant map without having to utilize various APIs or external libraries and without having to re-project data. The goals of this paper are to describe the basic usage of `quickmapr`, show several examples of its use, and outline changes expected in future versions. We also briefly discuss the contribution that `quickmapr` makes to the existing suite of spatial data visualization tools in R.

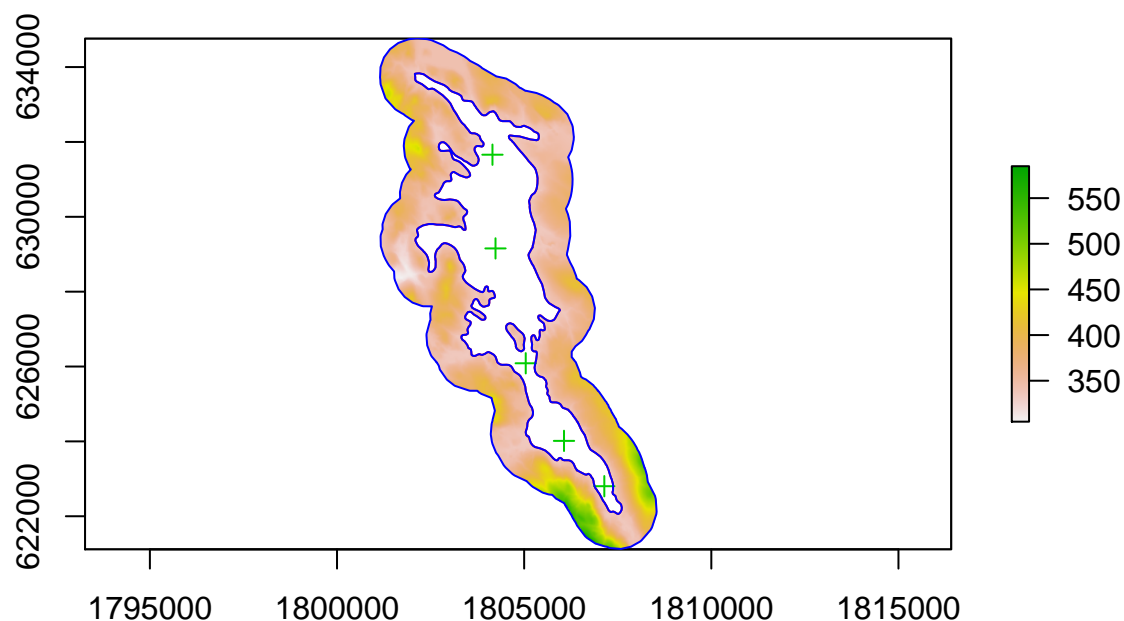
Basic usage

The basic workflow for using `quickmapr` is as follows:

1. Use the `qmap()` function to create a `qmap` object. This object holds the datasets and pertinent information about the current visualization environment (e.g. symbology, zoom/pan extent, etc.). This first step is achieved with:

```
library(quickmapr)
data(lake)

qm <- qmap(elev, lake, samples, buffer)
```



2. With a `qmap` object created you may interact with the map using the various **quickmapr** functions.

The `qmap` function and object

Zooming and panning

Identification and selection

Basemaps from the USGS National Map

Summary

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