Topology_maps

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14 5 2020

R Markdown

```r
### load requisite packages
library(tidyverse)
```

```
## -- Attaching packages ------------------------------------------------------------------

## v ggplot2 3.3.0     v purrr   0.3.3
## v tibble  3.0.0     v dplyr   0.8.5
## v tidyr   1.0.2     v stringr 1.4.0
## v readr   1.3.1     v forcats 0.5.0

## -- Conflicts ---------------------------------------------------------------------------
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```r
library(ggridges)
library(mapproj)
```

```
## Loading required package: maps

##
## Attaching package: 'maps'

## The following object is masked from 'package:purrr':
##
##     map
```

```r
library(marmap)
```

```
## Registered S3 methods overwritten by 'adehabitatMA':
##   method                     from
##   print.SpatialPixelsDataFrame sp
##   print.SpatialPixels          sp

##
## Attaching package: 'marmap'

## The following object is masked from 'package:grDevices':
##
##     as.raster
```

```r
library(data.table)
```

```
##
## Attaching package: 'data.table'

## The following objects are masked from 'package:dplyr':
```

```
##
##     between, first, last

## The following object is masked from 'package:purrr':
##
##     transpose
```
```r
library(ggrepel)
library(RColorBrewer)

### set wd
setwd("D:/R-scripts/maps")

### get data from NOAA (National Oceanic and Atmospheric Administration)
coord <- getNOAA.bathy(lon1 = 7.8, lon2 = 9.5, lat1 = 46.0, lat2 = 47.25, resolution = 1)
```
```
## Querying NOAA database ...

## This may take seconds to minutes, depending on grid size

## Building bathy matrix ...
```
```r
summary(coord)
```
```
## Bathymetric data of class 'bathy', with 102 rows and 75 columns

## Latitudinal range: 46 to 47.25 (46 N to 47.25 N)

## Longitudinal range: 7.8 to 9.5 (7.8 E to 9.5 E)

## Cell size: 1 minute(s)

##

## Depth statistics:

##     Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    191.0   910.2  1499.0  1525.2  2091.8  3920.0

##

## First 5 columns and rows of the bathymetric matrix:

##                    46 46.0168918918919 46.0337837837838 46.0506756756757
## 7.8              2657             2718             2933             2687
## 7.81683168316832 2730             2806             2952             2424
## 7.83366336633663 2848             2907             2668             2713
## 7.85049504950495 3003             3067             2919             3108
## 7.86732673267327 3130             3397             3343             3503
##                  46.0675675675676
## 7.8                          2259
## 7.81683168316832             2738
## 7.83366336633663             2984
## 7.85049504950495             3367
## 7.86732673267327             3920
```
```r
coord.df <- fortify.bathy(coord)
colnames(coord.df) <- c("longitude","latitude","depth")

coord.df$ndepth <- coord.df[,c("depth")] - min(coord.df$depth)

# insert special location(s)
```
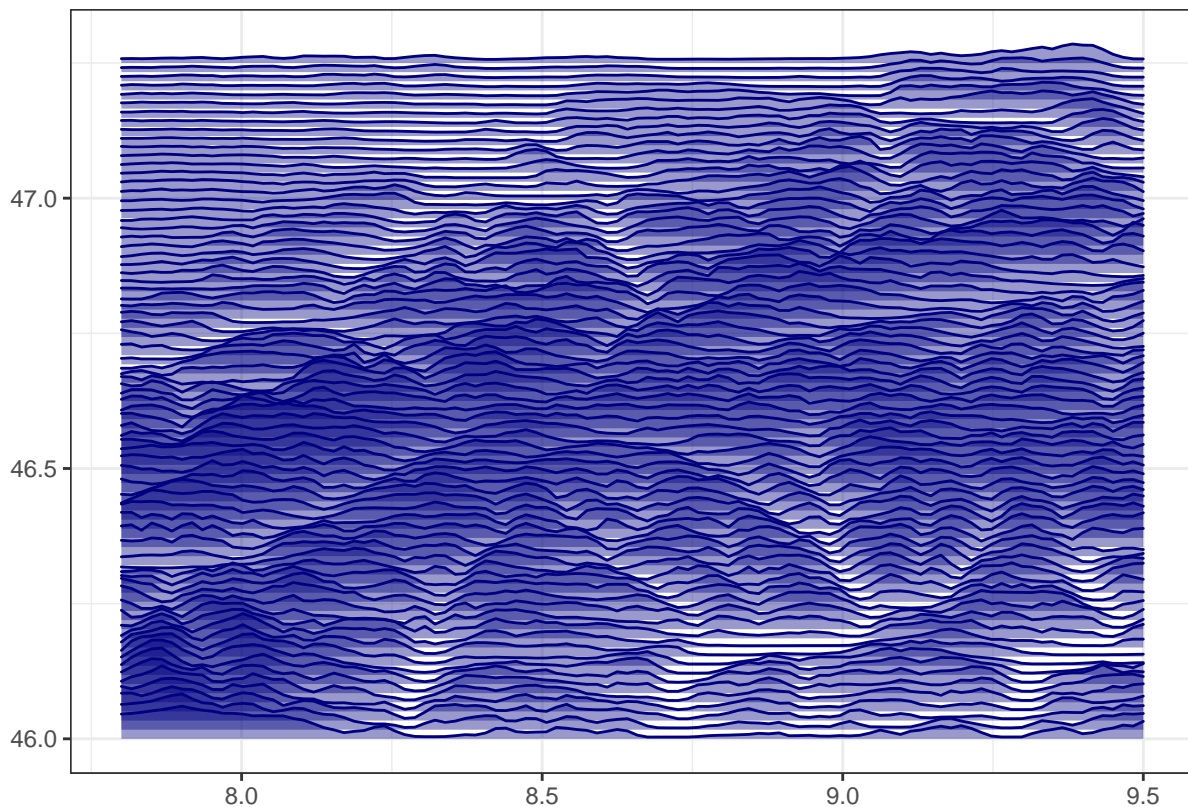
```
sites <- data.frame(longitude = c(8.811742), latitude = c(46.132199),
                    POI = c(""))
```

sites <- data.frame(longitude = c(8.801), latitude = c(46.125), POI = c("Casenzano"))

plot the transects with ggplot2 & ggridges

```
ggplot(coord.df, aes(x = longitude, y = latitude, group = latitude, height = depth, scale = 4)) +
     geom_density_ridges(stat = "identity", fill = "navy", alpha = 0.4, color = "navy") + xlab("") +
  ylab("") + theme_bw()
```


land

```
ggplot() +
  geom_density_ridges(coord.df, mapping=aes(x = longitude, y = latitude, group = latitude,
  height = depth, scale = 8),stat = "identity", fill = "forestgreen", alpha = 0.15,
  size = 0.7) + xlab("") + ylab("") +
  geom_label_repel(color = "black", data = sites, mapping = aes(x = longitude, y = latitude,
  label = POI), size = 5, segment.size  = 0.3, nudge_x = c(0.1), nudge_y = c(-0.2)) +
  geom_point(data = sites, aes(x = longitude, y = latitude), size = 5, shape = 21,
  fill = "firebrick3", alpha = 0.8) + theme_classic()
```
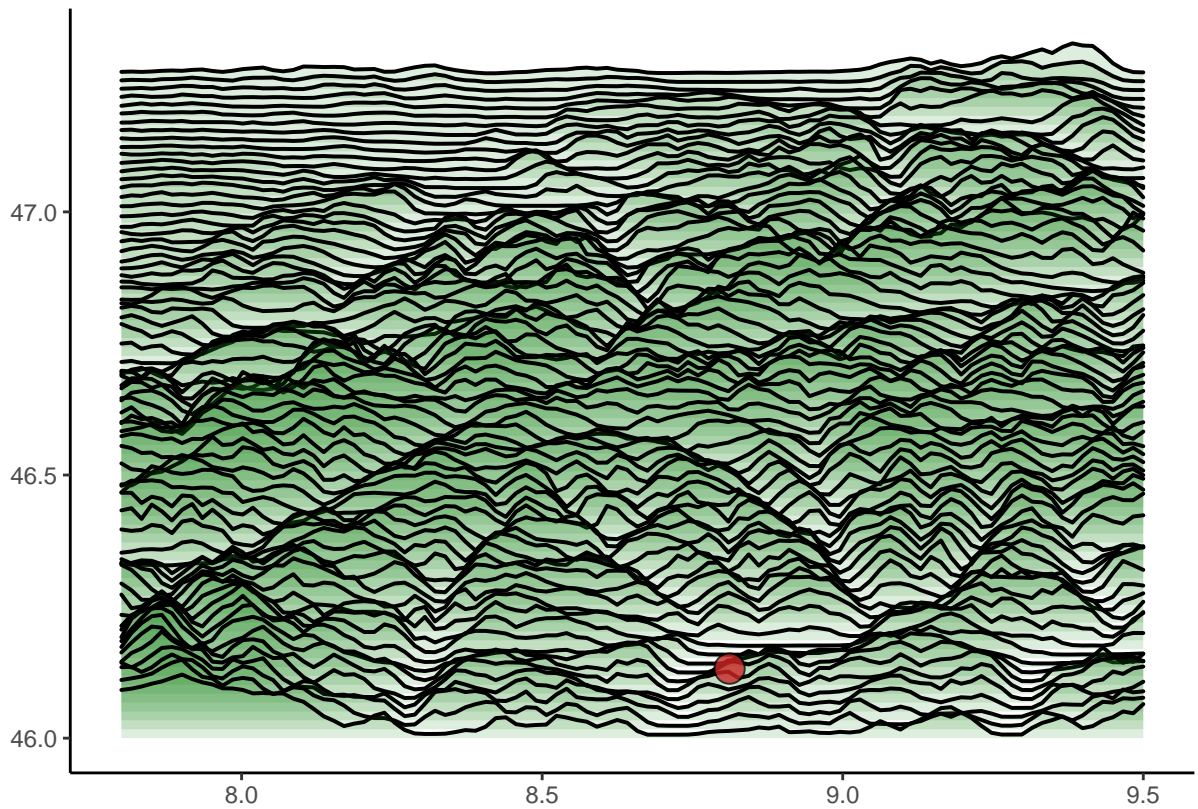
ridge overlay

```r
ggplot() +
  geom_density_ridges(coord.df, mapping=aes(x = longitude, y = latitude, group = latitude,
  height = ndepth, scale = 9), stat = "identity", fill = "blue", color = "black", alpha = 0.6,
  size = 0.1) + xlab("") + ylab("") +
  geom_density_ridges(coord.df, mapping=aes(x = longitude, y = latitude, group = latitude,
  height = depth, scale = 8), stat = "identity", fill = "indianred", alpha = 0.7, size = 0.6) +
  geom_label_repel(color = "black", data = sites, mapping = aes(x = longitude, y = latitude ,
  label = POI), size = 4, segment.size  = 0.3, nudge_x = c(0.0), nudge_y = c(-1)) +
  geom_point(data = sites, aes(x = longitude, y = latitude), size = 4, shape = 21,
  fill = "green", alpha = 0.9) + theme_classic()
```