Satellite imagery — Part 2

DSIER [/dɪˈzaɪər/] — Summer 2024

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Data models

- vector data
- raster data

```
pacman::p_load(sf) # classes and functions for vector data
pacman::p_load(terra) # classes and functions for raster data
```

`sf` — simple features

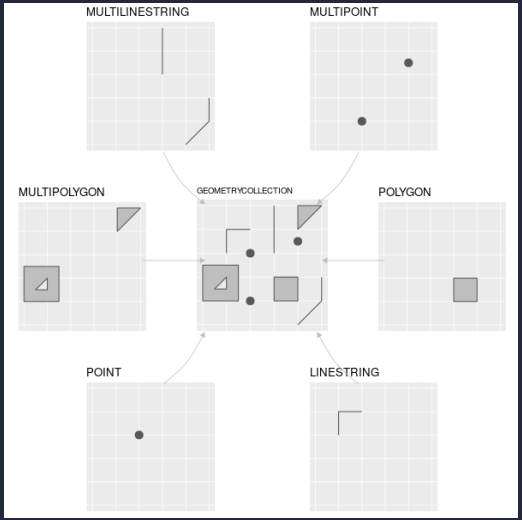
low level libraries for geocomputation

- `GDAL`, for reading, writing and manipulating a wide range of geographic data formats
- `PROJ`, a powerful library for coordinate system transformations
- `GEOS`, a planar geometry engine for operations such as calculating buffers and centroids on data with a projected CRS
- `S2`, a spherical geometry engine written in C++ developed by Google

`sf` — simple features

- `sf` objects can be treated as data frames in most operations
- `sf` function names are relatively consistent and intuitive (all begin with `st_`)
- `sf` functions can be combined using `%>%` operator and works well with the `tidyverse`

sf classes


MULTILINESTRING
MULTIPOINT
MULTIPOLYGON
GEOMETRYCOLLECTION
POLYGON
POINT
LINESTRING

`terra`

- `terra` is a reboot of the `raster` package
- *very* fast for what it's doing
- lots of interfaces between `terra` and `sf`
- alternative: `stars`

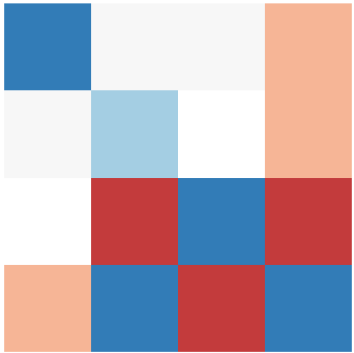
A. Cell IDs

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

B. Cell values

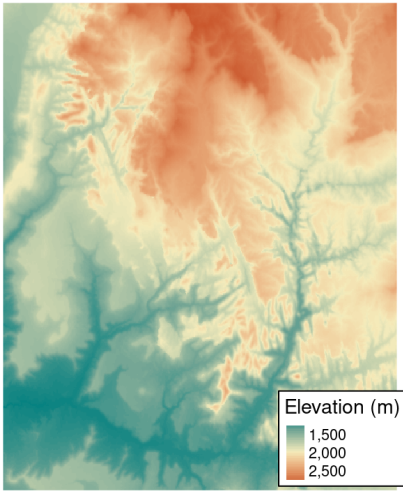
92	55	48	21
58	70	NA	37
NA	12	94	11
36	83	4	88

C. Colored values



Raster

A. Continuous data



B. Categorical data