SoilGrids250 — Import tiles and combine to a raster stack

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12-January-2025

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Introduction

This script combines SG250 tiles into a raster stack that can be used for (among other things) pattern analysis.

Directories

Set the base directory where the imported tiles are stored, specific to the local file system. This is the same as used in R Markdown file `SoilGrids250_WCS_Import.Rmd`.

```
(base.dir <- path.expand("~/ds_reference/DSM2025"))
```

```
[1] "/Users/rossiter/ds_reference/DSM2025"
```

These are the base of destination directories built below

Packages

```
library(terra)          # raster data, replaces `raster`
```

Source files

```
# directory for this AOI
AOI.dir.prefix <- paste0("lat", params$lrc_lat, params$lrc_lat+params$size,
                         "_lon", params$lrc_long-params$size,
```

```
                          params$lrc_long)
(files.dir <- paste0(base.dir, "/", AOI.dir.prefix))
```

```
[1] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778"
```

```
length(files.list <- list.files(files.dir, pattern = "*.tif"))
```

```
[1] 42
```

Raster stack

Make a stack from the set of TIF images.

```
rs <- rast(paste0(files.dir, "/", files.list))
sources(rs)
```

```
 [1] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/bdod_0-
5cm_mean.tif"
 [2] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/bdod_100-
200cm_mean.tif"
 [3] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/bdod_15-
30cm_mean.tif"
 [4] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/bdod_30-
60cm_mean.tif"
 [5] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/bdod_5-
15cm_mean.tif"
 [6] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/bdod_60-
100cm_mean.tif"
 [7] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cec_0-
5cm_mean.tif"
 [8] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cec_100-
200cm_mean.tif"
 [9] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cec_15-
30cm_mean.tif"
[10] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cec_30-
60cm_mean.tif"
[11] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cec_5-
15cm_mean.tif"
[12] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cec_60-
100cm_mean.tif"
[13] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cfvo_0-
5cm_mean.tif"
[14] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cfvo_100-
200cm_mean.tif"
[15] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cfvo_15-
30cm_mean.tif"
[16] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cfvo_30-
60cm_mean.tif"
[17] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cfvo_5-
15cm_mean.tif"
```

```
[18] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/cfvo_60-
100cm_mean.tif"
[19] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/clay_0-
5cm_mean.tif"
[20] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/clay_100-
200cm_mean.tif"
[21] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/clay_15-
30cm_mean.tif"
[22] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/clay_30-
60cm_mean.tif"
[23] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/clay_5-
15cm_mean.tif"
[24] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/clay_60-
100cm_mean.tif"
[25] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/phh2o_0-
5cm_mean.tif"
[26] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/phh2o_100-
200cm_mean.tif"
[27] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/phh2o_15-
30cm_mean.tif"
[28] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/phh2o_30-
60cm_mean.tif"
[29] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/phh2o_5-
15cm_mean.tif"
[30] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/phh2o_60-
100cm_mean.tif"
[31] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/silt_0-
5cm_mean.tif"
[32] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/silt_100-
200cm_mean.tif"
[33] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/silt_15-
30cm_mean.tif"
[34] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/silt_30-
60cm_mean.tif"
[35] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/silt_5-
15cm_mean.tif"
[36] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/silt_60-
100cm_mean.tif"
[37] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/soc_0-
5cm_mean.tif"
[38] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/soc_100-
200cm_mean.tif"
[39] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/soc_15-
30cm_mean.tif"
[40] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/soc_30-
60cm_mean.tif"
[41] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/soc_5-
15cm_mean.tif"
[42] "/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778/soc_60-
100cm_mean.tif"
```

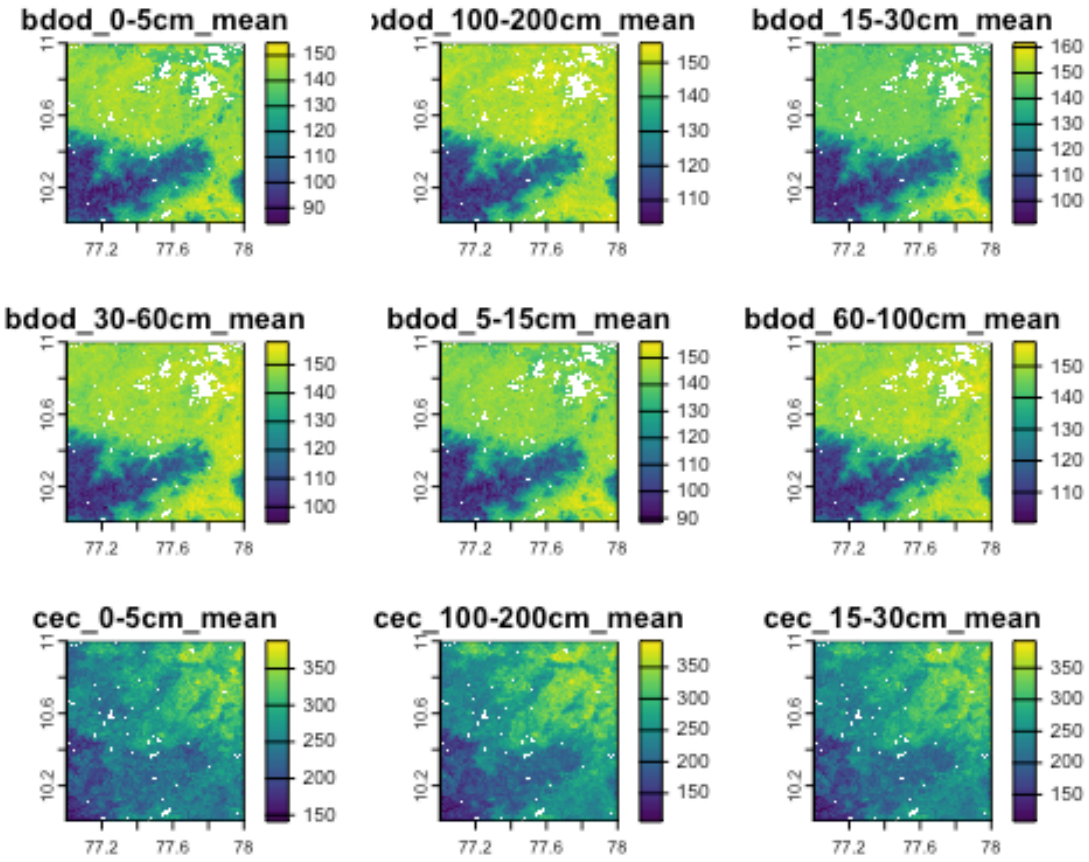
```
summary(rs)
```

```
 bdod_0.5cm_mean  bdod_100.200cm_mean bdod_15.30cm_mean bdod_30.60cm_mean
 Min.   : 83.66   Min.   :103.8       Min.   : 91.0     Min.   : 94.91
 1st Qu.:122.11   1st Qu.:136.0       1st Qu.:129.1     1st Qu.:133.04
 Median :140.24   Median :147.7       Median :144.2     Median :147.30
 Mean   :131.72   Mean   :141.1       Mean   :136.8     Mean   :139.65
 3rd Qu.:144.36   3rd Qu.:149.8       3rd Qu.:147.2     3rd Qu.:149.94
 Max.   :153.95   Max.   :155.7       Max.   :161.7     Max.   :158.00
 NA's   :4832     NA's   :4832        NA's   :4832      NA's   :4832
 bdod_5.15cm_mean bdod_60.100cm_mean cec_0.5cm_mean  cec_100.200cm_mean
 Min.   : 88.32   Min.   :100.4      Min.   :141.4   Min.   :105.0
 1st Qu.:125.30   1st Qu.:134.2      1st Qu.:233.2   1st Qu.:219.3
 Median :141.41   Median :147.9      Median :257.4   Median :252.9
 Mean   :133.64   Mean   :140.7      Mean   :260.4   Mean   :253.8
 3rd Qu.:144.99   3rd Qu.:150.1      3rd Qu.:286.9   3rd Qu.:293.8
 Max.   :155.94   Max.   :157.7      Max.   :384.4   Max.   :394.7
 NA's   :4832     NA's   :4832       NA's   :1302    NA's   :1302
 cec_15.30cm_mean cec_30.60cm_mean cec_5.15cm_mean cec_60.100cm_mean
 Min.   :107.6    Min.   :108.3    Min.   :114.3   Min.   :108.0
 1st Qu.:220.8    1st Qu.:219.6    1st Qu.:221.9   1st Qu.:219.5
 Median :249.6    Median :250.6    Median :249.7   Median :253.9
 Mean   :252.2    Mean   :253.0    Mean   :252.0   Mean   :257.0
 3rd Qu.:287.8    3rd Qu.:291.6    3rd Qu.:284.0   3rd Qu.:299.8
 Max.   :390.8    Max.   :392.4    Max.   :388.8   Max.   :401.3
 NA's   :1302     NA's   :1302     NA's   :1302    NA's   :1302
 cfvo_0.5cm_mean  cfvo_100.200cm_mean cfvo_15.30cm_mean cfvo_30.60cm_mean
 Min.   : 41.38   Min.   : 75.84      Min.   : 39.57    Min.   : 56.14
 1st Qu.: 82.52   1st Qu.:156.50      1st Qu.: 94.39    1st Qu.:124.73
 Median : 95.98   Median :175.16      Median :108.86    Median :141.07
 Mean   : 99.85   Mean   :175.28      Mean   :113.04    Mean   :142.10
 3rd Qu.:114.01   3rd Qu.:193.87      3rd Qu.:129.10    3rd Qu.:158.45
 Max.   :219.21   Max.   :301.49      Max.   :227.36    Max.   :250.22
 NA's   :1302     NA's   :1302        NA's   :1302      NA's   :1302
 cfvo_5.15cm_mean cfvo_60.100cm_mean clay_0.5cm_mean clay_100.200cm_mean
 Min.   : 43.46   Min.   : 71.0      Min.   :192.9   Min.   :280.3
 1st Qu.: 84.87   1st Qu.:139.3      1st Qu.:284.1   1st Qu.:346.6
 Median : 97.81   Median :157.5      Median :305.0   Median :361.6
 Mean   :103.53   Mean   :158.2      Mean   :303.6   Mean   :363.6
 3rd Qu.:118.71   3rd Qu.:175.8      3rd Qu.:323.4   3rd Qu.:378.9
 Max.   :222.27   Max.   :280.2      Max.   :399.3   Max.   :472.3
 NA's   :1302     NA's   :1302       NA's   :1302    NA's   :1302
 clay_15.30cm_mean clay_30.60cm_mean clay_5.15cm_mean clay_60.100cm_mean
 Min.   :228.4     Min.   :264.3     Min.   :193.5    Min.   :268.4
 1st Qu.:324.3     1st Qu.:349.2     1st Qu.:294.2    1st Qu.:356.4
 Median :339.3     Median :365.3     Median :312.9    Median :372.3
 Mean   :339.7     Mean   :366.5     Mean   :312.5    Mean   :373.8
 3rd Qu.:355.0     3rd Qu.:382.8     3rd Qu.:331.0    3rd Qu.:389.8
 Max.   :437.3     Max.   :468.2     Max.   :412.9    Max.   :476.3
 NA's   :1302      NA's   :1302      NA's   :1302     NA's   :1302
```

```
 phh2o_0.5cm_mean phh2o_100.200cm_mean phh2o_15.30cm_mean phh2o_30.60cm_mean
 Min.   :50.00    Min.   :52.00        Min.   :50.10      Min.   :51.04
 1st Qu.:62.59    1st Qu.:63.70        1st Qu.:62.55      1st Qu.:63.00
 Median :69.24    Median :71.00        Median :69.97      Median :70.82
 Mean   :66.96    Mean   :68.38        Mean   :67.50      Mean   :68.18
 3rd Qu.:72.00    3rd Qu.:73.72        3rd Qu.:73.00      3rd Qu.:74.00
 Max.   :79.82    Max.   :79.00        Max.   :80.00      Max.   :82.02
 NA's   :1302     NA's   :1302         NA's   :1302       NA's   :1302
 phh2o_5.15cm_mean phh2o_60.100cm_mean silt_0.5cm_mean silt_100.200cm_mean
 Min.   :50.05     Min.   :51.50       Min.   :146.4   Min.   :156.0
 1st Qu.:62.61     1st Qu.:63.38       1st Qu.:258.7   1st Qu.:240.4
 Median :69.73     Median :71.00       Median :273.9   Median :255.6
 Mean   :67.24     Mean   :68.30       Mean   :278.1   Mean   :259.7
 3rd Qu.:72.49     3rd Qu.:73.76       3rd Qu.:292.7   3rd Qu.:274.4
 Max.   :79.95     Max.   :80.00       Max.   :399.5   Max.   :369.5
 NA's   :1302      NA's   :1302        NA's   :1302    NA's   :1302
 silt_15.30cm_mean silt_30.60cm_mean silt_5.15cm_mean silt_60.100cm_mean
 Min.   :146.4     Min.   :148.4     Min.   :149.4    Min.   :155.4
 1st Qu.:247.7     1st Qu.:238.0     1st Qu.:254.1    1st Qu.:235.8
 Median :263.5     Median :252.3     Median :268.6    Median :249.0
 Mean   :267.9     Mean   :257.7     Mean   :274.2    Mean   :255.8
 3rd Qu.:283.8     3rd Qu.:272.3     3rd Qu.:289.3    3rd Qu.:269.3
 Max.   :375.8     Max.   :365.9     Max.   :393.9    Max.   :376.8
 NA's   :1302      NA's   :1302      NA's   :1302     NA's   :1302
 soc_0.5cm_mean   soc_100.200cm_mean soc_15.30cm_mean soc_30.60cm_mean
 Min.   : 170.3   Min.   : 20.61     Min.   : 64.44   Min.   : 42.23
 1st Qu.: 262.9   1st Qu.: 37.98     1st Qu.: 99.31   1st Qu.: 67.40
 Median : 330.0   Median : 57.51     Median :135.84   Median : 92.73
 Mean   : 388.6   Mean   : 72.12     Mean   :169.29   Mean   :114.26
 3rd Qu.: 478.6   3rd Qu.: 99.22     3rd Qu.:210.15   3rd Qu.:147.51
 Max.   :1163.8   Max.   :337.78     Max.   :723.99   Max.   :460.49
 NA's   :1342     NA's   :1342       NA's   :1342     NA's   :1342
 soc_5.15cm_mean soc_60.100cm_mean
 Min.   :101.3   Min.   : 27.35
 1st Qu.:150.6   1st Qu.: 50.04
 Median :191.6   Median : 72.64
 Mean   :241.9   Mean   : 85.37
 3rd Qu.:295.1   3rd Qu.:111.49
 Max.   :811.8   Max.   :386.13
 NA's   :1342    NA's   :1342
```

Plot the first nine layers to check the stack:

```
plot(rs[[1:9]])
```



Save the stack in R format.

```
print(paste("file name:",
      file.out <- paste0(base.dir, "/", AOI.dir.prefix, "_stack.tif")))
```

```
[1] "file name:
/Users/rossiter/ds_reference/DSM2025/lat1011_lon7778_stack.tif"
```

```
writeRaster(rs, filename = file.out,
            datatype="FLT4S",
            overwrite=TRUE,
            gdal ="TFW=YES")
```