

Mapmaking

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NOAA / Climate Prediction Center - International Desks

Fiji Pacific Climate Early Warning Workshop

Fiji, 15 – 24 July 2023

Outline

- Mapmaking
- Elements of a map
- Some Examples
- QGIS Tools

Mapmaking

- A good map should tell a story
- Does not overwhelm with too much information
- Shows clear data
- Has a useful color scale and a proper legend, etc.

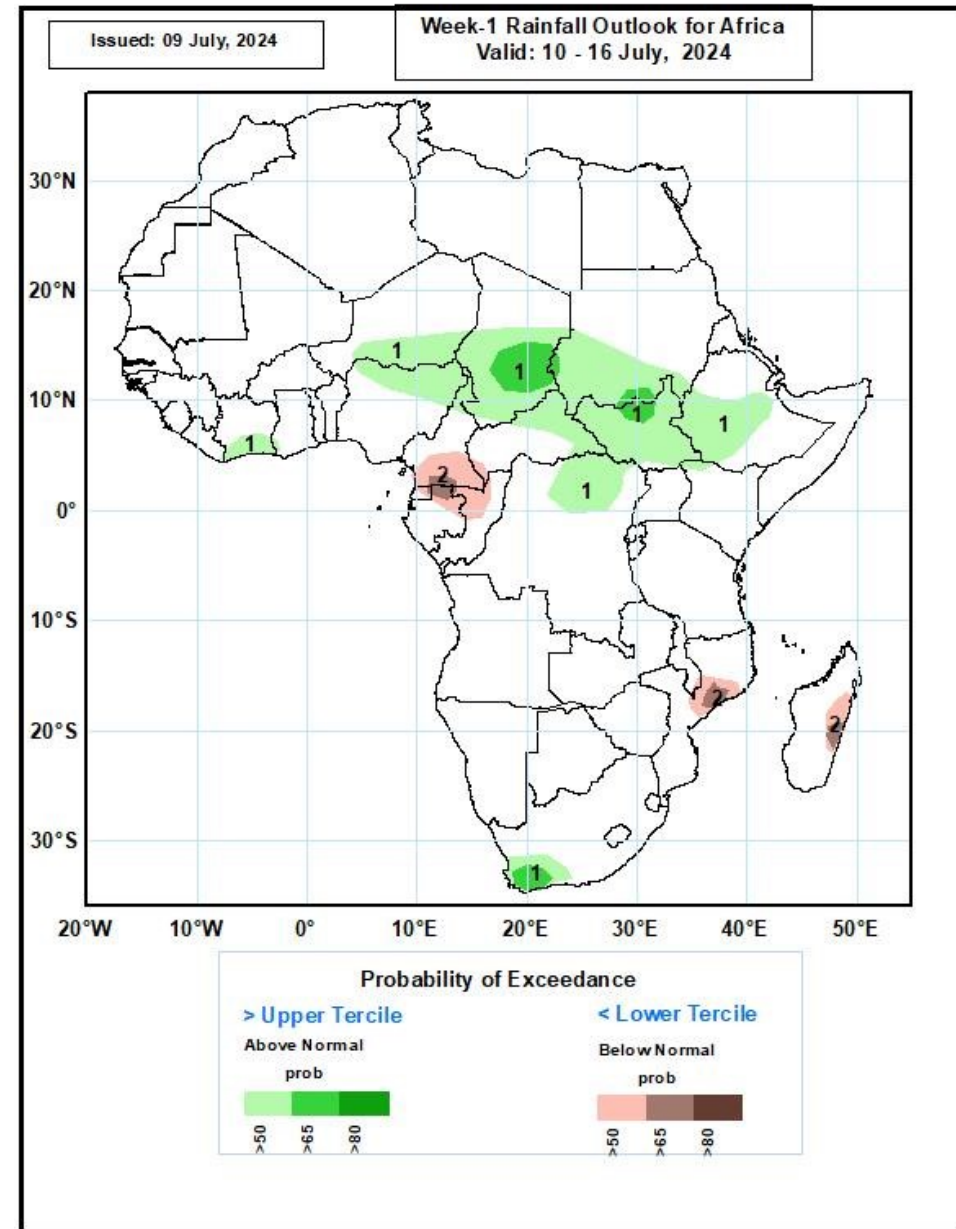
Mapmaking Design

- Pre-work
- Make an analysis
- Label fields with proper names if necessary
- Create/use a proper color scheme for clarity
- Choose a map projection and map location
- All of this before even composing the map

Elements of a Map

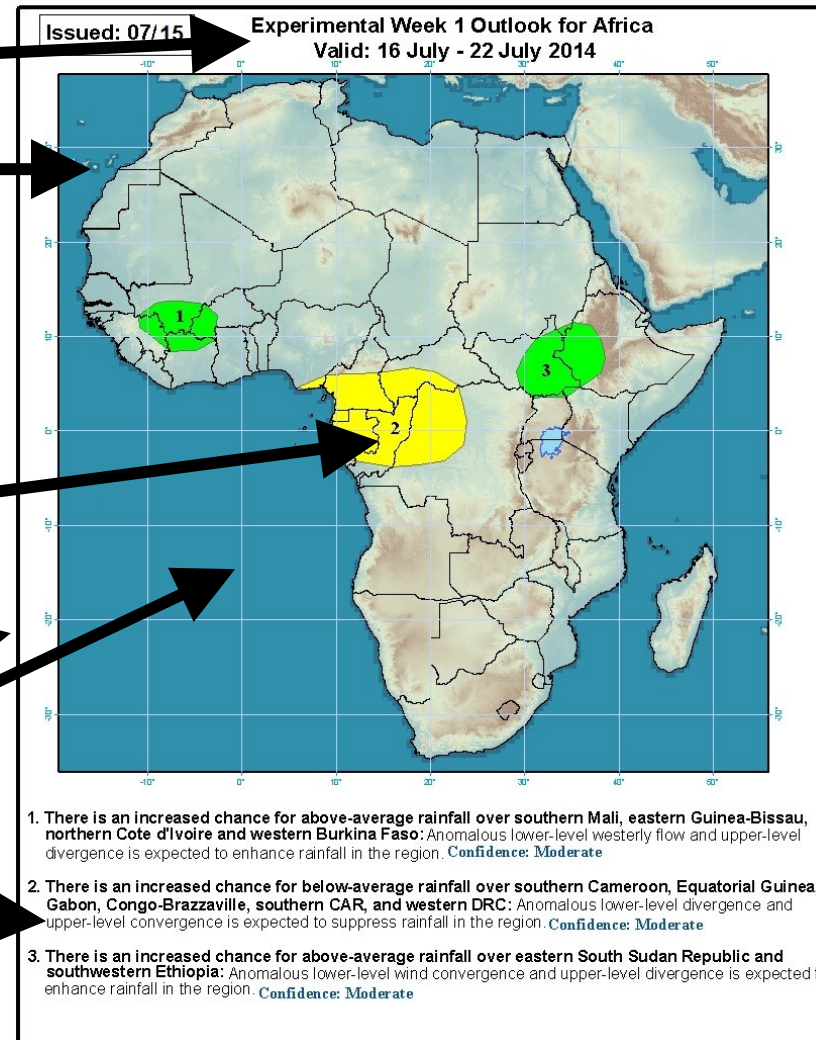
May have

- A title
- Geographic references
- Text explanations
- Data source
- Legend
- Scale bar
- North arrow, etc.



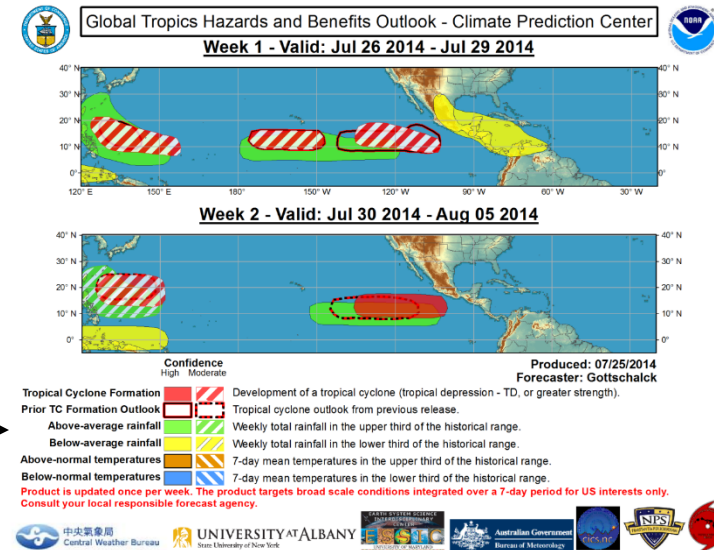
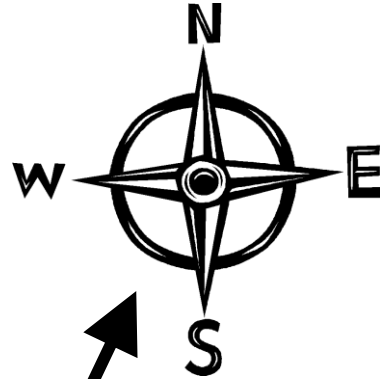
Elements of a Map (Cont'd.)

- Title
- Body
- Location - Africa
- Map Scale
- Legend
- Directional Indicator
- Labels
- Metadata
- Neatline
- Gridlines
- Explanation



Elements of a Map (Cont'd.)

- Title
- Body
- Location
- **Map Scale**
- **Legend**
- **Directional Indicator**
- Labels
- Metadata
- Neatline
- Graticule map
- Other



Avoid Colorblindness

If using a few colors for comparison, apparently avoid

- Green and red
- Green and brown
- Blue and purple
- Green and blue
- Light green and yellow
- Blue and grey
- Green and grey
- Green and black

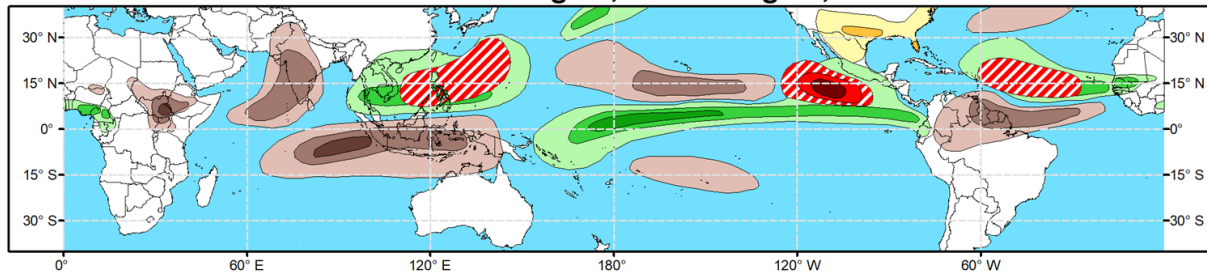
Some Examples of Maps



Global Tropics Hazards Outlook Climate Prediction Center

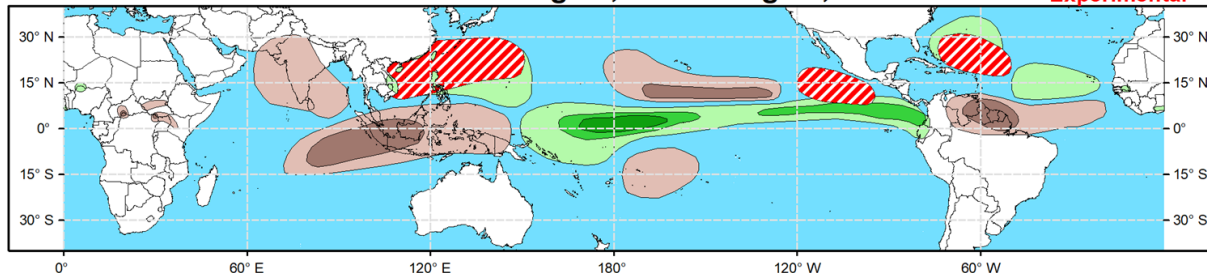


Week 2 - Valid: Aug 16, 2023 - Aug 22, 2023



Week 3 - Valid: Aug 23, 2023 - Aug 29, 2023

**** Experimental ****



Tropical Cyclone (TC) Formation Probability

 >20% >40% >60%
 Tropical Depression (TD) or greater strength

Above-Average Rainfall Probability

 >50% >65% >80%
 Weekly total rainfall in the Upper third of the historical range

Below-Average Rainfall Probability

 >50% >65% >80%
 Weekly total rainfall in the Lower third of the historical range

Above-Average Temperatures Probability

 >50% >65% >80%
 7-day max temperatures in the Upper third of the historical range

Below-Average Temperatures Probability

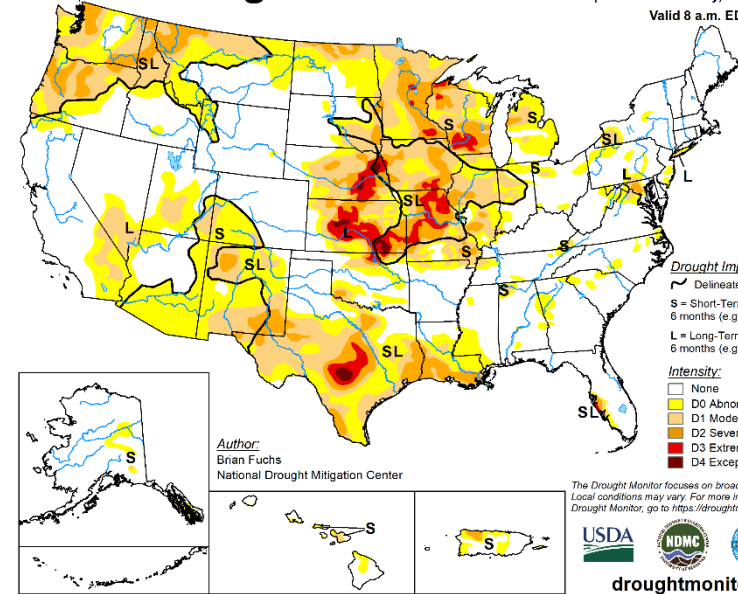
 >50% >65% >80%
 7-day min temperatures in the Lower third of the historical range

Issued: 08/08/2023
Forecaster: Novella

This product is updated once per week and targets broad scale conditions integrated over a 7-day period for US interests only. Consult your local responsible forecast agency.

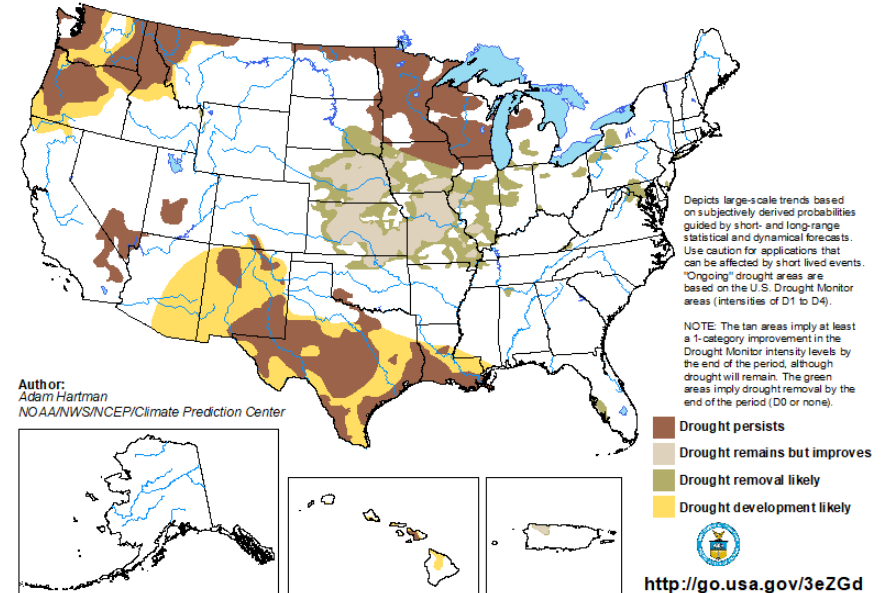
U.S. Drought Monitor

August 1, 2023
(Released Thursday, Aug. 3, 2023)
Valid 8 a.m. EDT

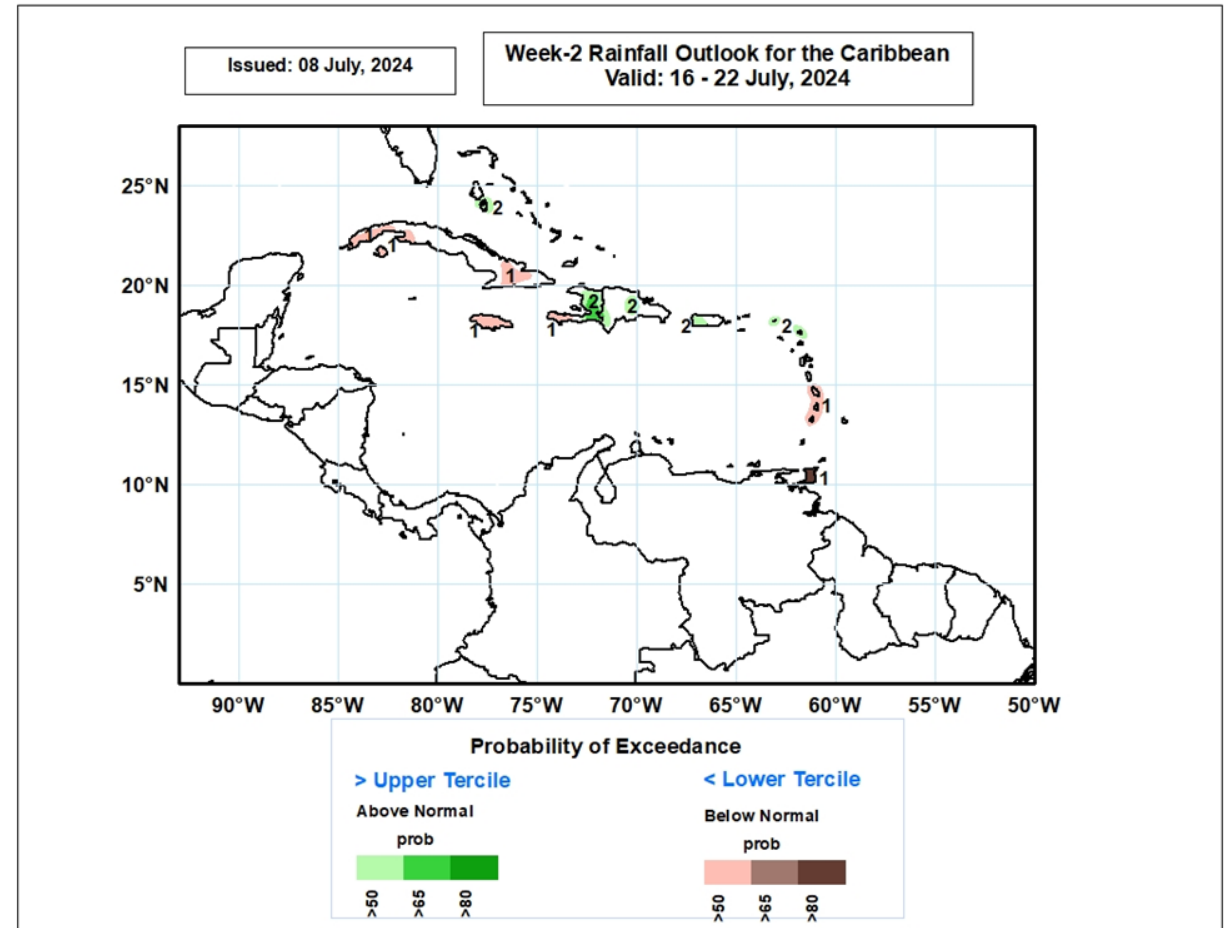
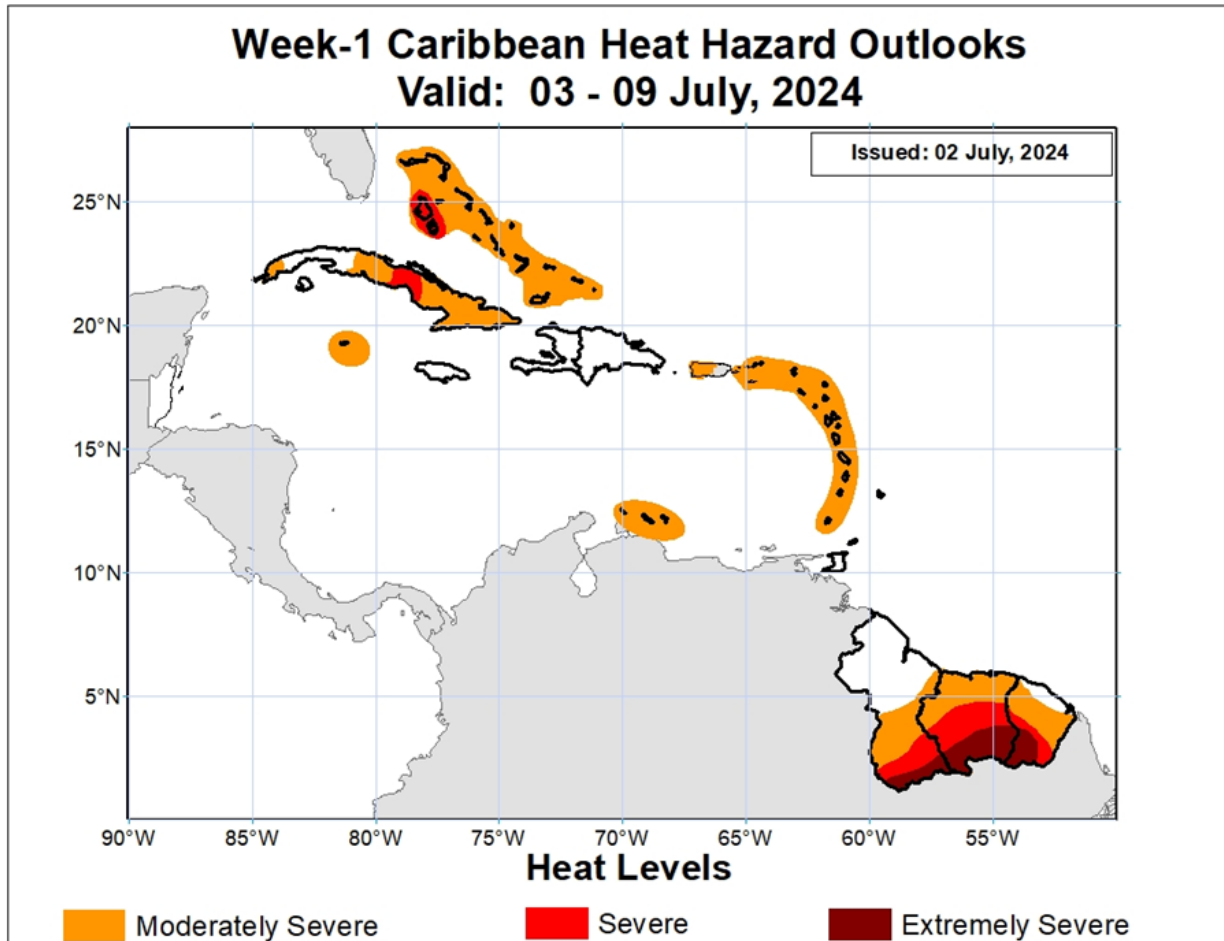


U.S. Monthly Drought Outlook Drought Tendency During the Valid Period

Valid for August 2023
Released July 31, 2023

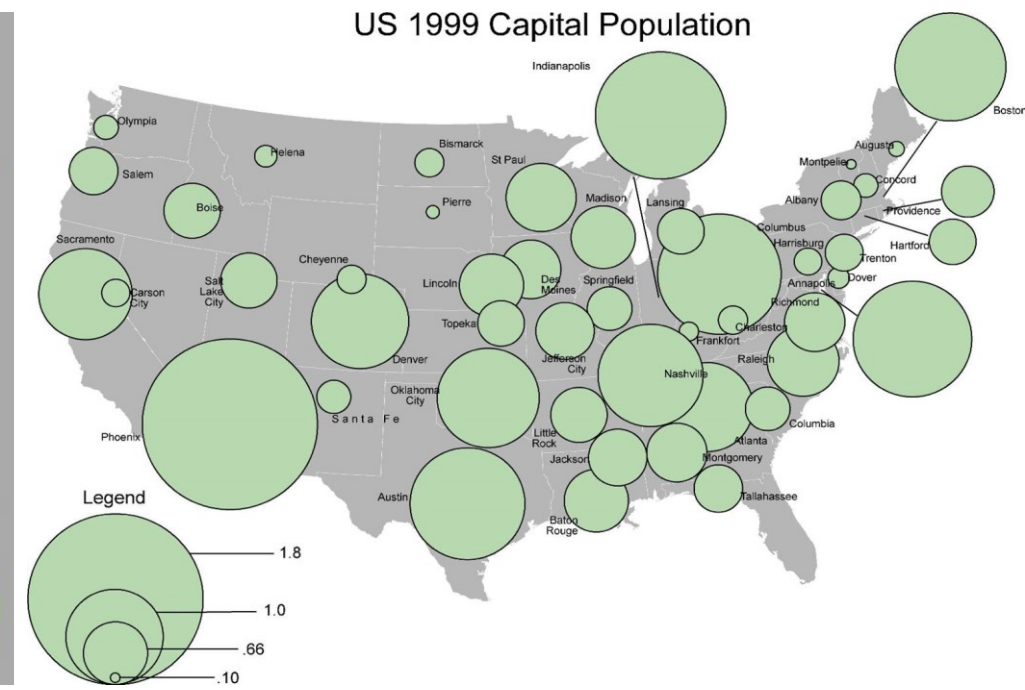
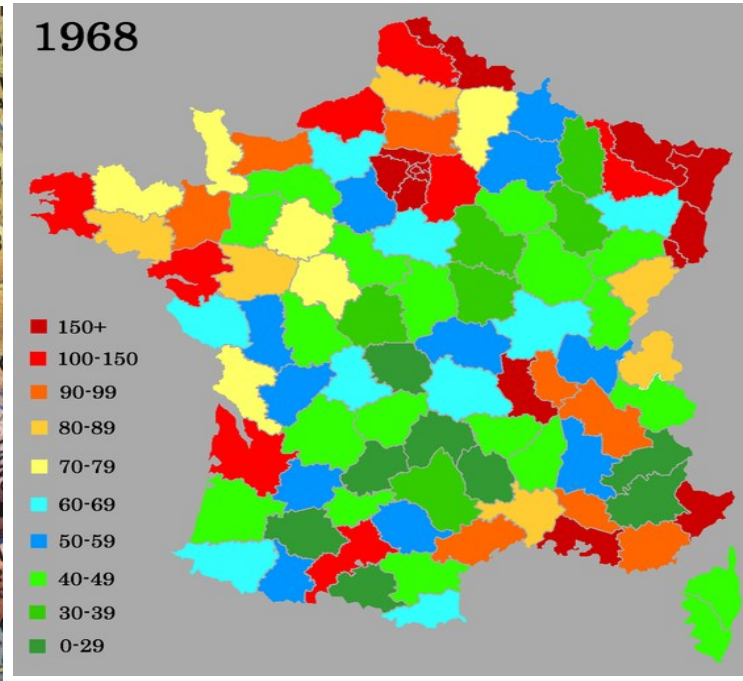


More Examples of Maps



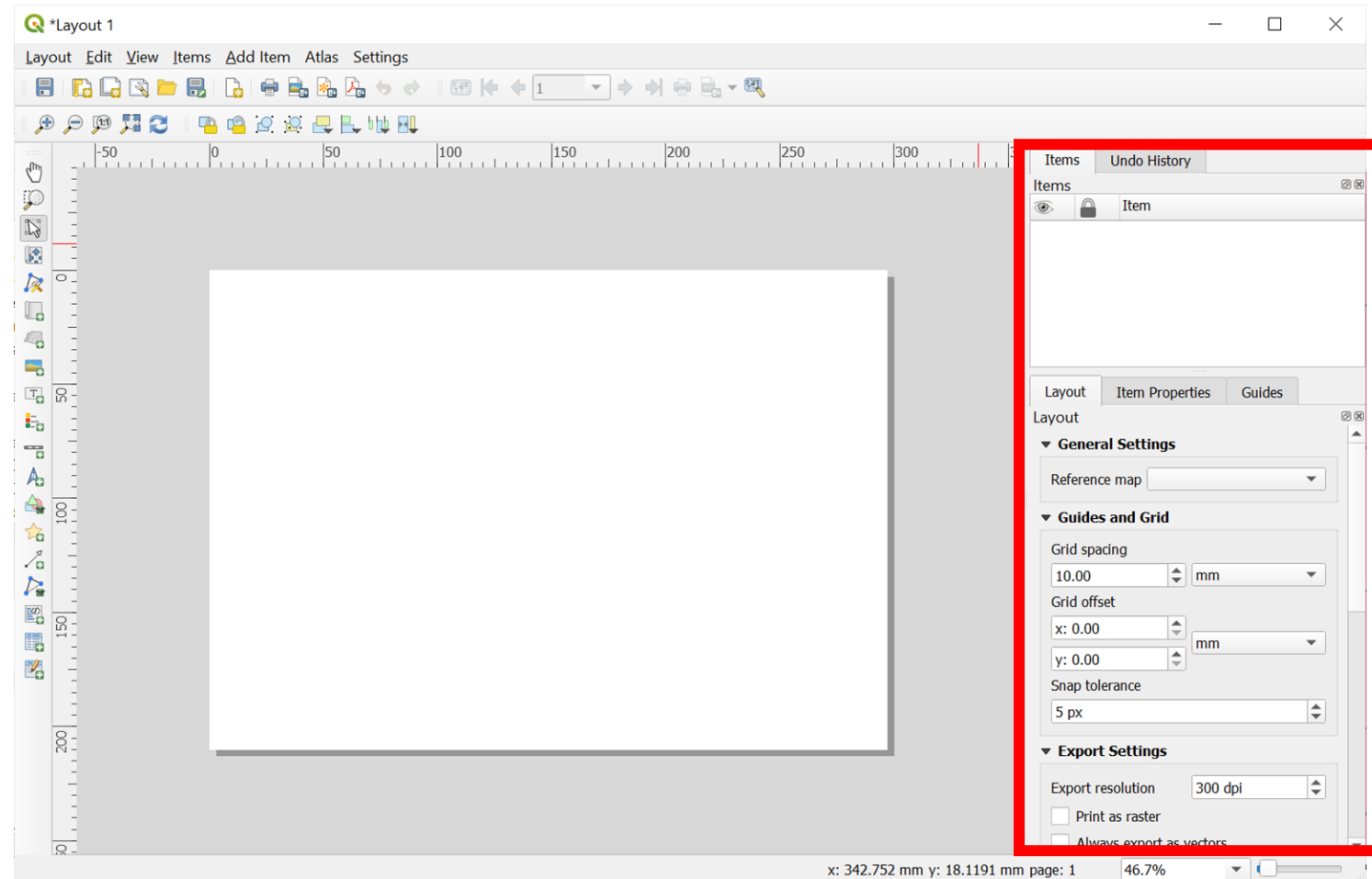
Examples of Not so Good Maps

What's wrong with each one of these maps?

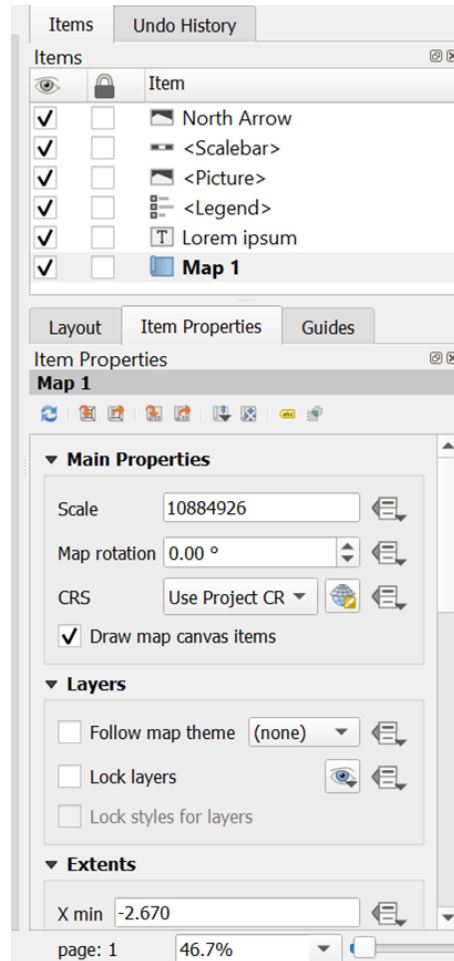


QGIS Mapmaking Tools

- Map production is done through Layout
- The properties of each map element can be changed via Item Properties
- Can export image in different formats

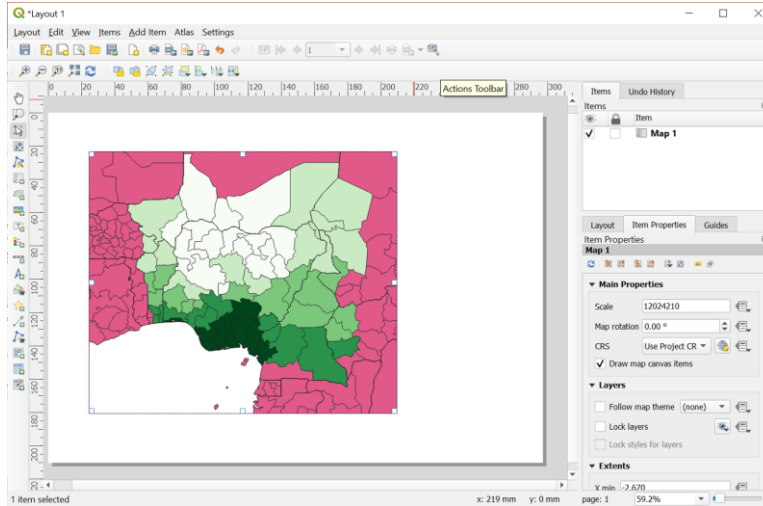
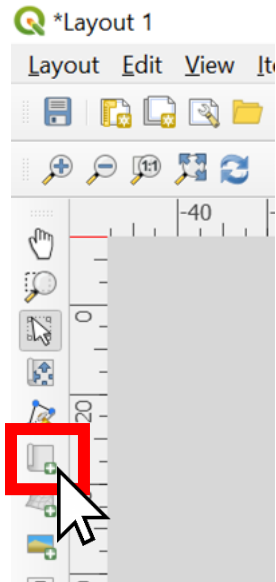


QGIS Layout Principles



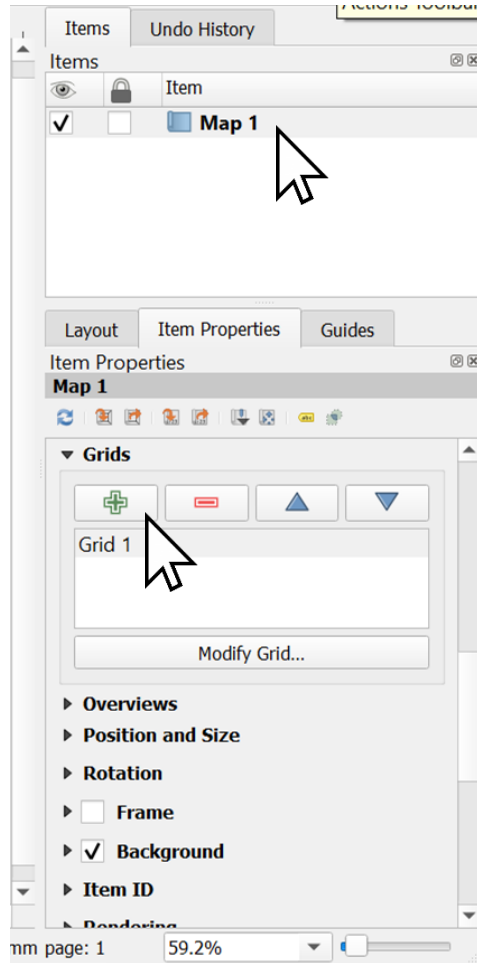
- Each item of the layout can be locked and/or customized
- In general, tools are selected first, a rectangle is drawn on the layout, and then the characteristics of the element is customized through Item properties/Layout
- and lastly image is exported

Example: Creating a Very Simple Map



1. Click on the Add Map toolbar
1. Draw a rectangle on the Layout, while leaving some margins for the title and coordinates
1. The map should appear where you drew the rectangle

Map Coordinates



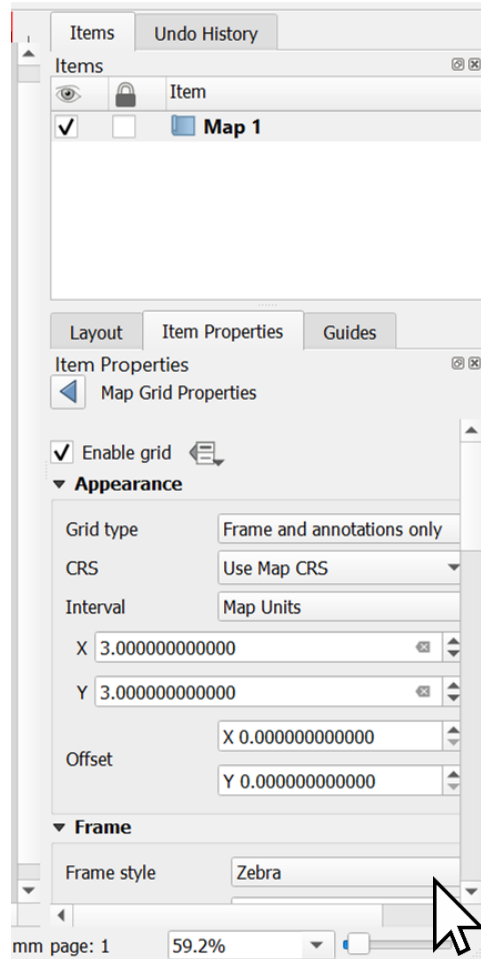
1. Click on Map1

1. Scroll down Item Properties until you see Grids, expand Grids.

1. Click on the + sign to add grid

1. Click Grid1, then Modify Grid

Map Coordinates (Cont'd.)



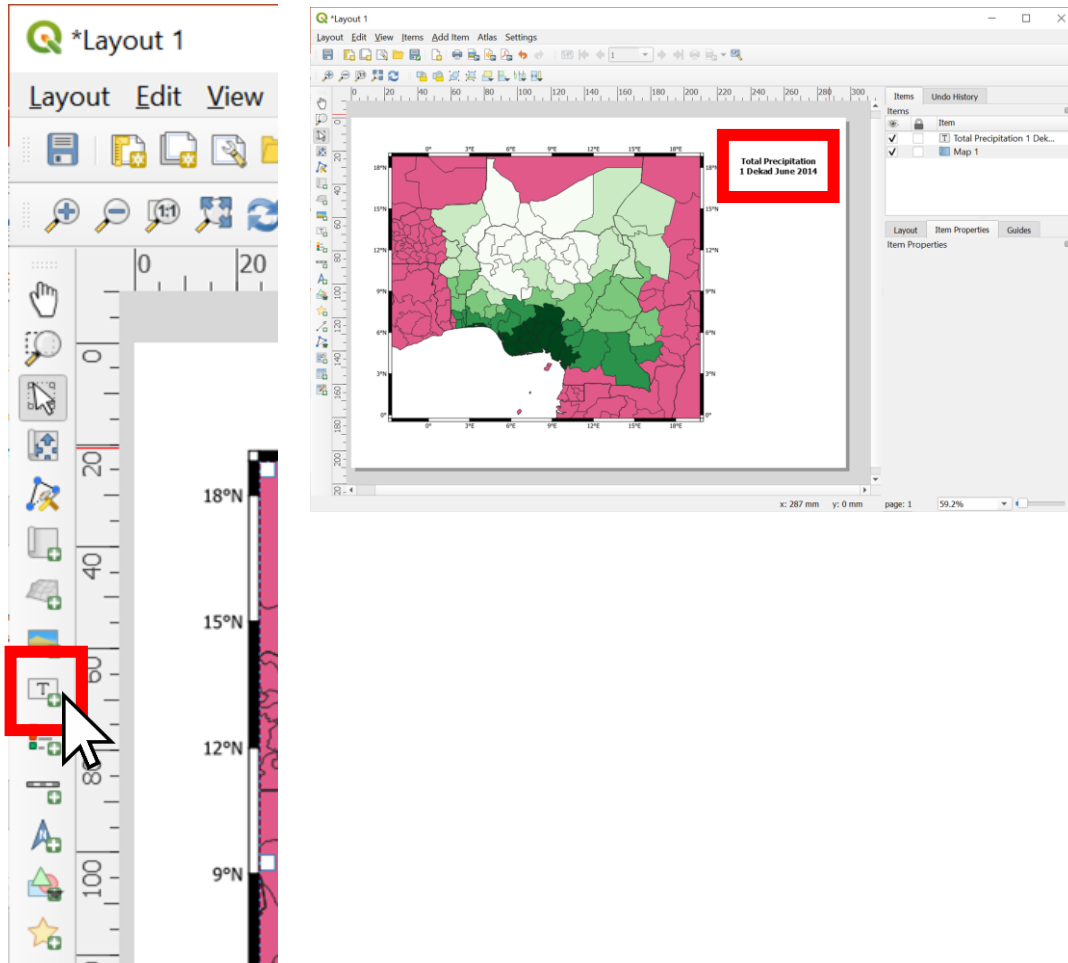
Set parameters to the following

- Grid Type: Frame and Annotations only
- Interval: $x = 3$, $y = 3$ (degrees as CRS is WGS84)
- Frame Style: Zebra
- Check the box on Draw Coordinates
- Format: Decimal with Suffix
- Coordinate Precision: 0

Map Coordinates (Cont'd.)

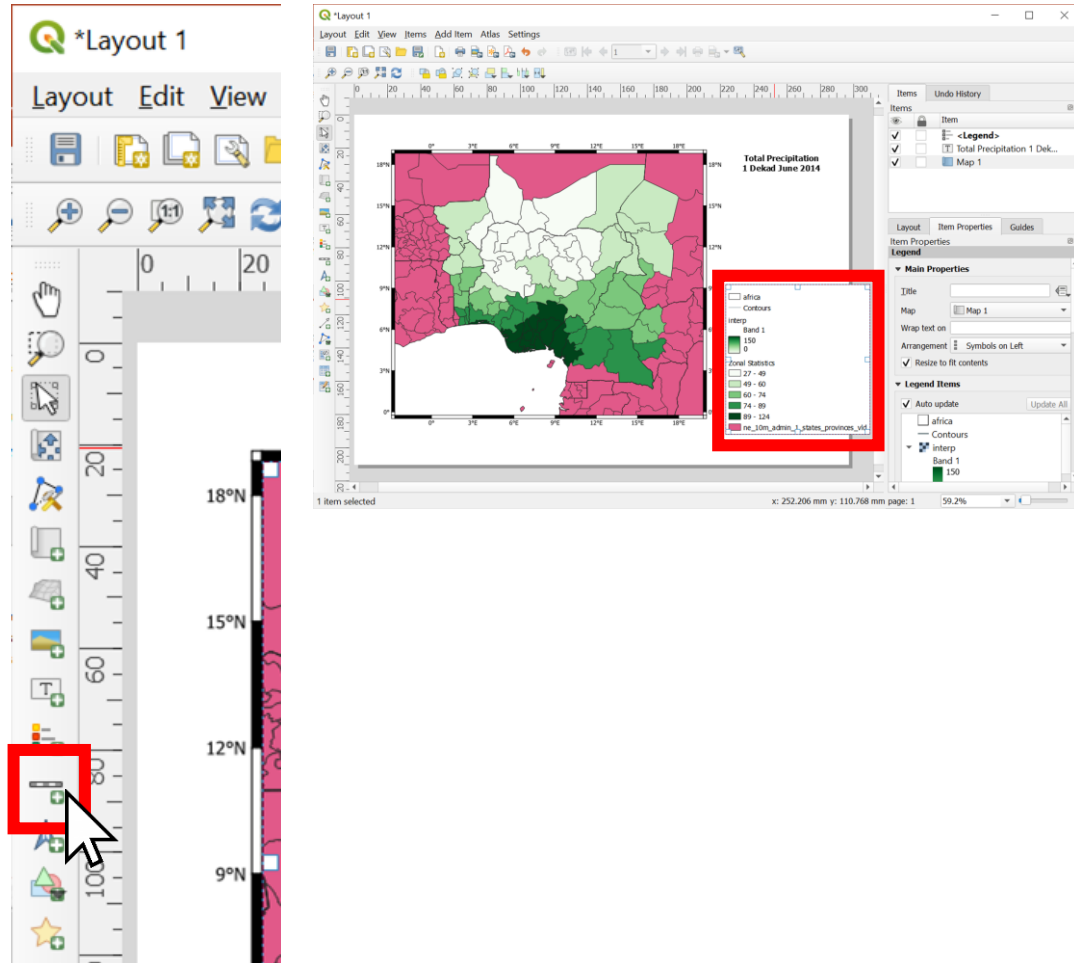
The screenshot displays the QGIS interface with a map of West Africa. The map is overlaid with a grid. The horizontal axis (Longitude) is labeled from 0° to 18°E in increments of 3°. The vertical axis (Latitude) is labeled from 0° to 18°N in increments of 3°. The map shows various colored regions, likely representing different administrative boundaries or data layers. The QGIS interface includes a menu bar (Layout, Edit, View, Items, Add Item, Atlas, Settings), a toolbar with various icons, and a status bar at the bottom showing 'x: 257 mm y: 0 mm page: 1 59.2%'. On the right side, there are panels for 'Items' (showing 'Map 1') and 'Item Properties' (showing 'Map Grid Properties' with options like 'Enable grid', 'Grid type', 'CRS', 'Interval', 'X', 'Y', 'Offset', and 'Frame style').

Adding a Title



1. Click the Add Label toolbar
2. Draw a rectangle where you want to place the title
3. Edit and format text in the Item Properties

Adding a Legend



1. Click the Add Legend toolbar
2. Draw a rectangle where you want to place the legend
3. By default, the legend displays all data in the QGIS Editor. But, the legend can also be edited via Item Properties as well

Adding a Legend (Cont'd.)

1. If you like, type Legend in the Title
2. Turn off Auto update

The screenshot displays the QGIS interface. On the left, a map titled "Total Precipitation 1 Dekad June 2014" is shown with a legend. The legend includes a title "Legend", a legend for "africa" (ne_10m_admin_1_states_provinces_vld), and a legend for "interp" (Band 1) with a color scale from 0 to 150. On the right, the "Item Properties" panel for the "Legend" item is open. The "Title" field is set to "Legend" and is highlighted with a red box. The "Auto update" checkbox is unchecked and also highlighted with a red box. A mouse cursor is pointing at the "Auto update" checkbox. The "Legend Items" section shows a tree view of the legend items, including "africa", "Contours", "interp", "Band 1", and "150".

Items

Undo History

Items

Item

Legend

Total Precipitation 1 Dek...

Map 1

Layout Item Properties Guides

Item Properties

Legend

▼ Main Properties

Title Legend

Map Map 1

Wrap text on

Arrangement Symbols on Left

Resize to fit contents

Update All

▼ Legend Items

Auto update

africa

Contours

interp

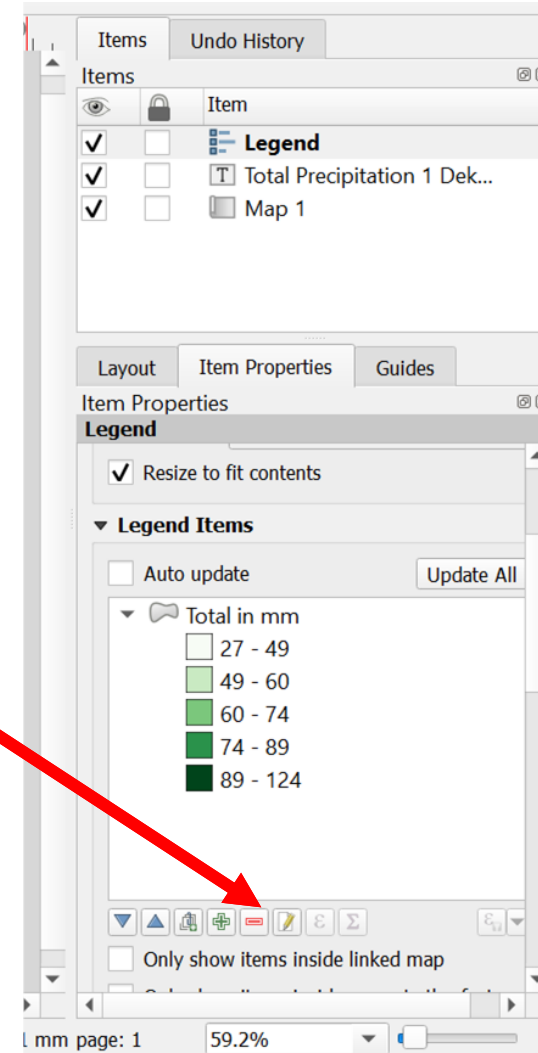
Band 1

150

x: 295.084 mm y: 132.207 mm page: 1 59.2%

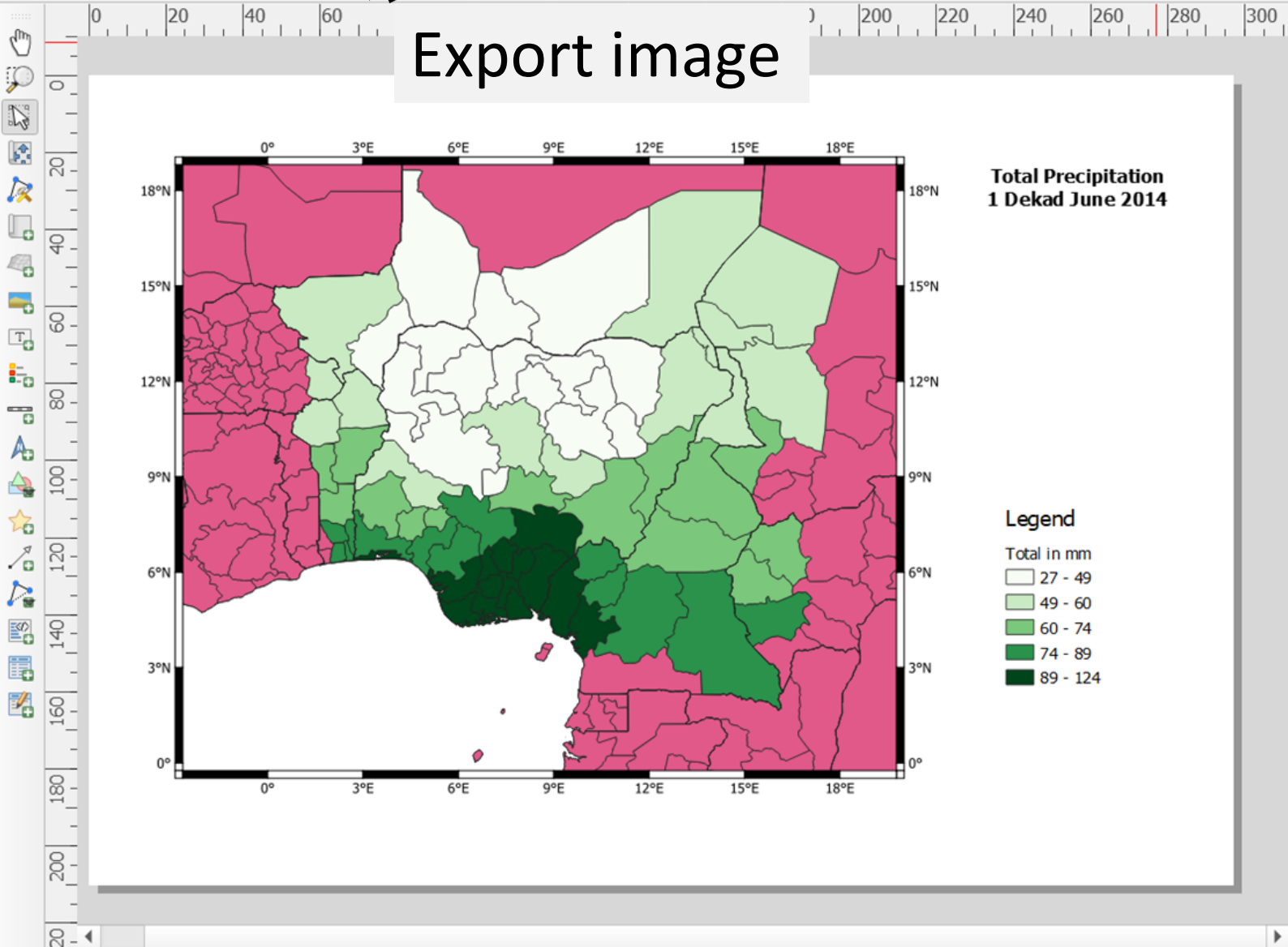
Adding a Legend (Cont'd.)

1. In the legend, select unneeded data such as africa, contour, etc. and remove each one using the – button
2. Remove all except for zonal statistics
3. Double click zonal statistics and type instead Total in mm





Export image



Items Undo History

Items

Eye	Lock	Item
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Legend
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Total Precipitation 1 Dek...
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Map 1

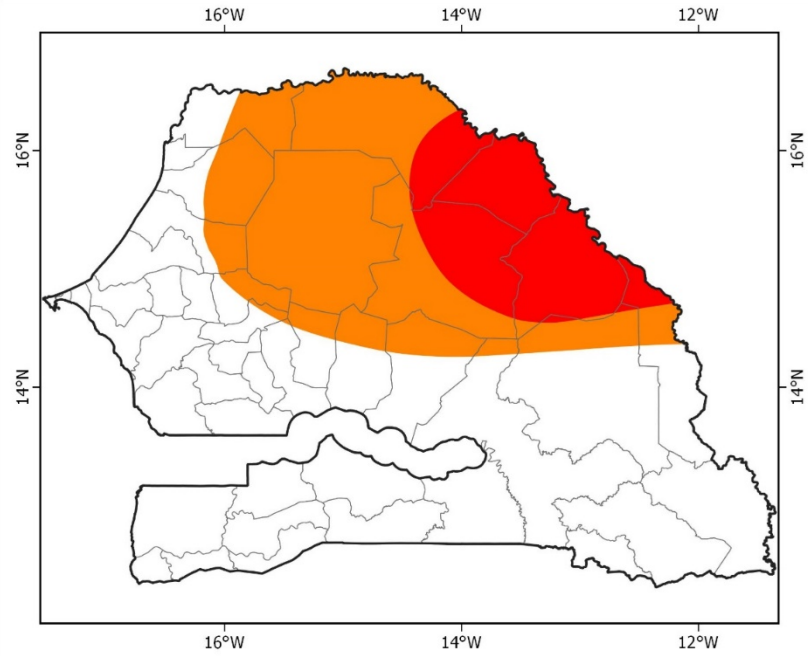
Layout Item Properties Guides

Item Properties



Week 1 Heat Hazards Outlook
Valid: 10 - 16 March 2023

Issued: 3 February 2023

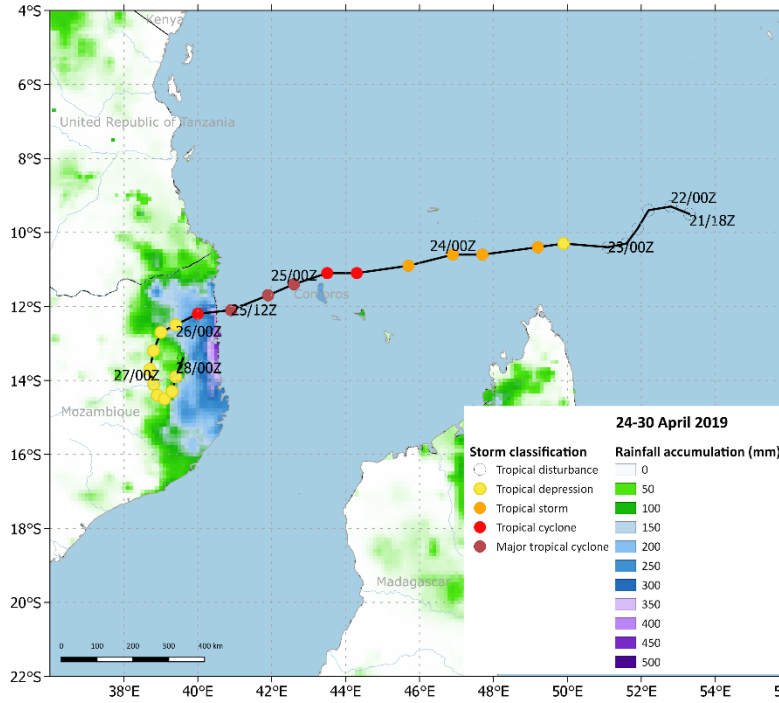


Data Source for the Administrative Boundaries for Senegal: Humanitarian Data Exchange (HDX)
Coordinate Reference System: EPSG:4326

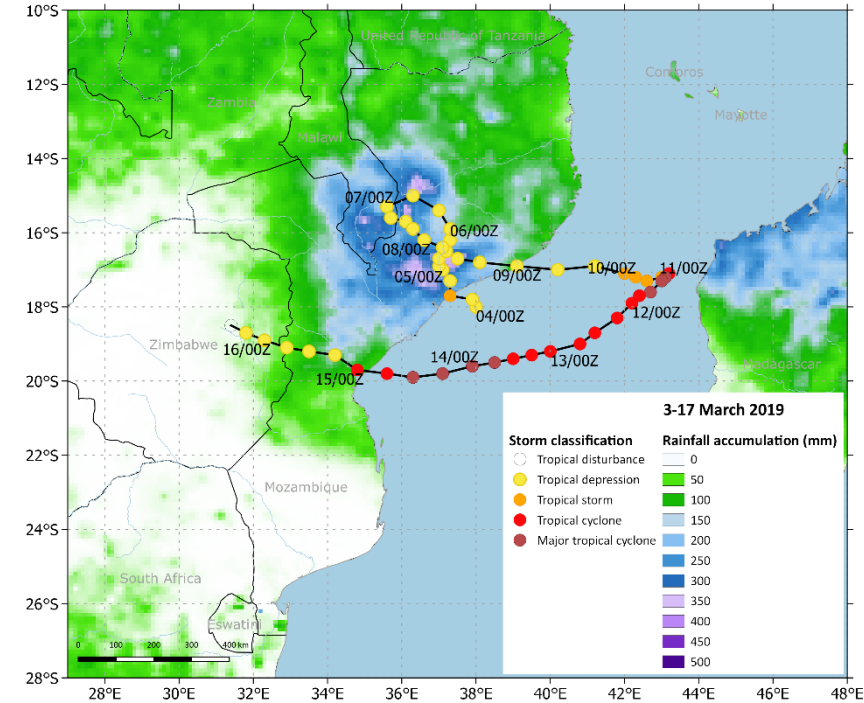
Legend

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- Risque moder

Author: Miliarihana Robjion



- | 24-30 April 2019 | |
|-----------------------------|-----------------------------------|
| Storm classification | Rainfall accumulation (mm) |
| ○ Tropical disturbance | 0 |
| ● Tropical depression | 50 |
| ● Tropical storm | 100 |
| ● Tropical cyclone | 150 |
| ● Major tropical cyclone | 200 |
| | 250 |
| | 300 |
| | 350 |
| | 400 |
| | 450 |
| | 500 |



- | 3-17 March 2019 | |
|-----------------------------|-----------------------------------|
| Storm classification | Rainfall accumulation (mm) |
| ○ Tropical disturbance | 0 |
| ● Tropical depression | 50 |
| ● Tropical storm | 100 |
| ● Tropical cyclone | 150 |
| ● Major tropical cyclone | 200 |
| | 250 |
| | 300 |
| | 350 |
| | 400 |
| | 450 |
| | 500 |

Practice

- Make production level forecast maps