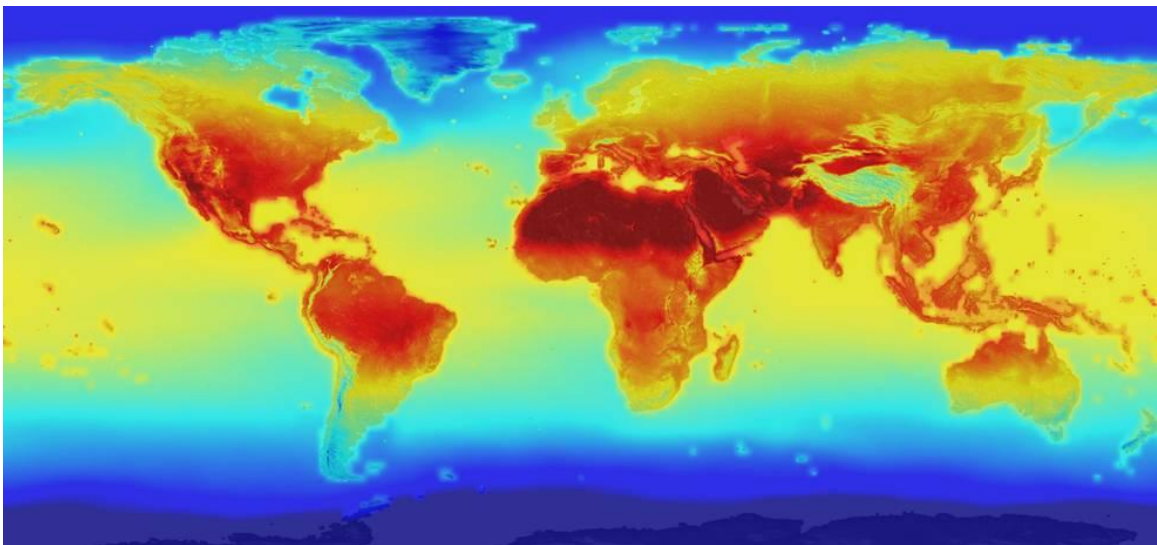


Laura Eugercios Gil



<https://www.nasa.gov>

WORKING WITH CLIMOGRAPH AND EXCEL

LESSON PLAN: MAKE YOUR OWN CLIMOGRAPH ON EXCEL 2010

Subject area	Biology and Geology
Educational stage	ESO
Target grade	1º ESO
Unit	5 (Learning our planet, the Earth)
Learning standard	Identify several atmospheric conditions Understand the difference between weather and climate
Key competencies	Digital (D) Learning by themselves (AA) Linguistic (L) Mathematical, science, and technology (MCT)
Duration	2 days

LESSON PLAN:

In order to introduce our students using different computer programs, I decided to begin with Excel because they don't usually pay attention to it and, in my opinion, it is a powerful unknown program with a lot of facilities for our students.

Due to climate is a knowledge teaching in two subjects (Biology and Geology, and Geography and History) we have a little advantage because our students usually learned some previous concepts in Geography related with Earth's movements, climate factors and so on.

Desired results	
Established goals	Notice the different meaning between weather and climate Be able to obtain information from a climograph Use Excel for drawing climograph
Understandings	Meanings of weather and climate Latitude is not only the major factor for climate zones Extract information from climograph Construct some climograph
Assessment evidence (see activities below)	
Performance tasks	Students construct understandings from observations and data analysis (all activities) Students explain their own observations (all activities) Students are able to criticize information from the Internet (activity 3, part 2) Students use technology: websites, Excel 2010 and email (all activities)
Learning plan	
Day 1	Differences between weather and climate (point 1) Extract information from a climograph (points 2 and 3)
Day 2	Create their own climograph on Excel 2010 (point 4)

This lesson has several activities:

1: Weather or climate?	
Activities	Resources
1: notice the different meaning between climate and weather. (R)	https://www.nasa.gov/mission_pages/noaa-n/climate/climate_weather.html
2: identify elements which determinate atmospheric conditions. (R)	https://en.wikipedia.org/wiki/Weather_and_climate http://www.climateandweather.net/
2: Climograph	
Activities	Resources
1: identify the parts on a climograph. (I, P)	https://sitasilvi.wordpress.com/2013/05/02/comentar-io-del-climograma-de-san-sebastian-word/ : picture of Donostia climograph
2: notice the different scales in the vertical axes and their relationship. (P, C)	
3: use their knowledge in order to be criticism with the information on Internet. (P)	https://en.wikipedia.org/wiki/Climograph : climograph for being analyze
3: Climate zones	
Activities	Resources
1: looking at a map, understand that latitude affects to climate zone's distribution. (R)	UK Meteorological Office: map of climate zones http://www.geography.learnontheinternet.co.uk/topics/climatezones.html
2: do a table with the principal characteristics of several climates. (C)	https://content.meteoblue.com/en/meteoscool/general-climate-zones and http://www.blueplanetbiomes.org/climate.htm
3: investigate how is the climate in several parts of the world. (H)	http://www.climate-zone.com/
4: extract information from different climograph. (P)	Data: https://es.climate-data.org/ and http://www.weatherbase.com/weather/weather.php3?s=154340
4: Make your own climograph on Excel 2010	
Activities	Resources
1: from a series of data, construct the graph on Excel 2010. (P, R, E)	Computer with Excel 2010 Data: https://es.climate-data.org/

STUDENT'S ACTIVITY



WORKING WITH CLIMOGRAPHS

Trough this lesson you will be able to make a Climograph in your computer, analyze its principal characteristics and determine which climate zone belong to. You will find several points with different activities. Complete all of them.

1. WEATHER OR CLIMATE?

Source: <http://www.differencebtw.com>

Weather vs. Climate

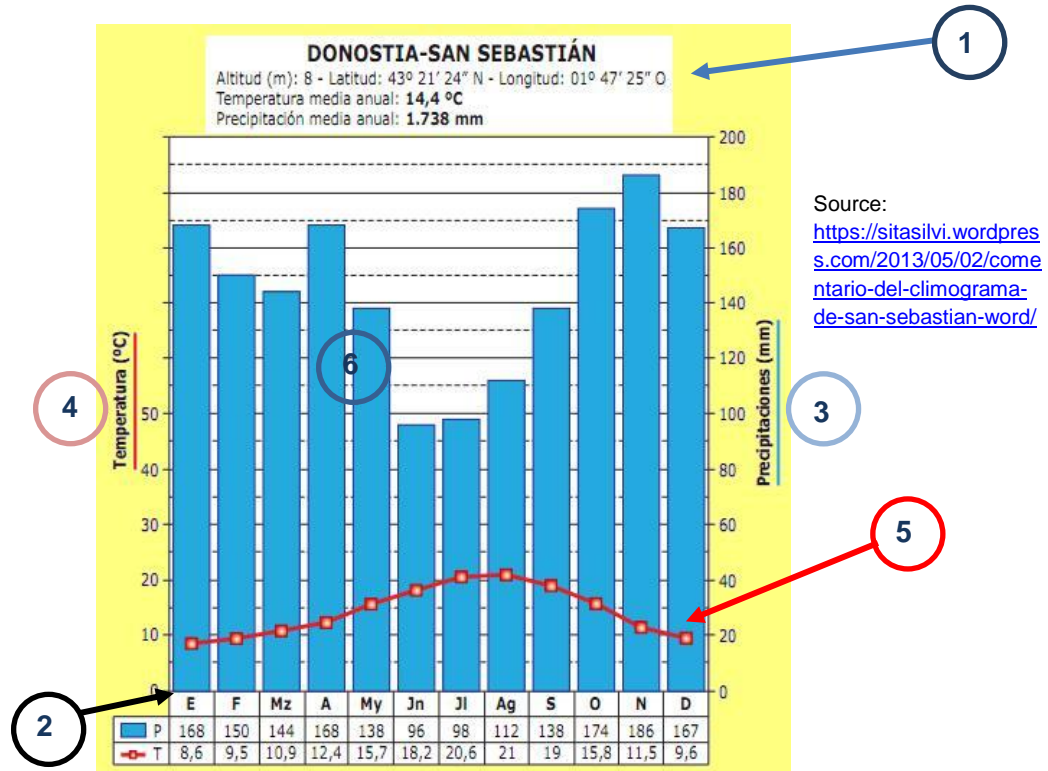
We have two words for indicating the atmospheric conditions: weather and climate. What's the difference between them?

There are five major elements that make up the weather and climate of a place. Write them:

TIP: take a glance to these websites:
https://www.nasa.gov/mission_pages/noaa-n/climate/climate_weather.html
https://en.wikipedia.org/wiki/Weather_and_climate
<http://www.climateandweather.net/>

2. CLIMOGRAPH

A climograph is a graphic representation used for a quick review of the climate of a location. They contain two elements: temperature and precipitation. The values of these elements are based on observations taken over long time periods.



In a climograph there is a lot of information:

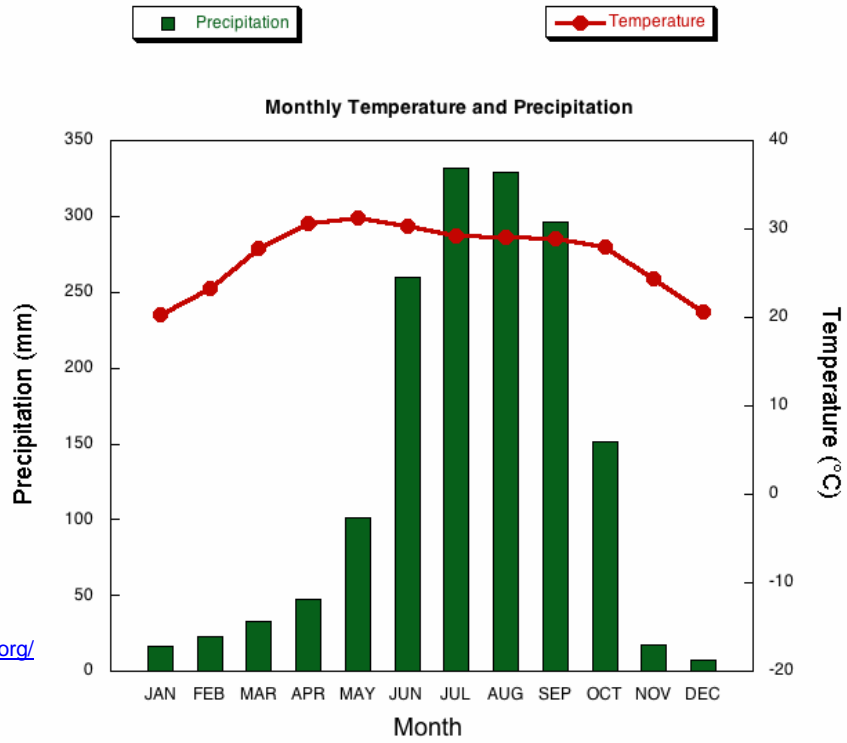
- Title: inform us about the location and its altitude above sea level.
- Period of time: it usually takes a year and its place on the horizontal axis.
- Two vertical axes: one for precipitation and other for temperature. It's important to indicate the units.
- Line graph: shows the average monthly temperatures.
- Bar graph: shows the average monthly precipitation (rainfall).

According to the previous notes, make a correspondence between points and climograph's parts:

POINT	CLIMOGRAPH'S INFORMATION
1	
2	
3	
4	
5	
6	

Waste a little time studying the values of the vertical axes. Are they the same? If not, is there any relation between them?

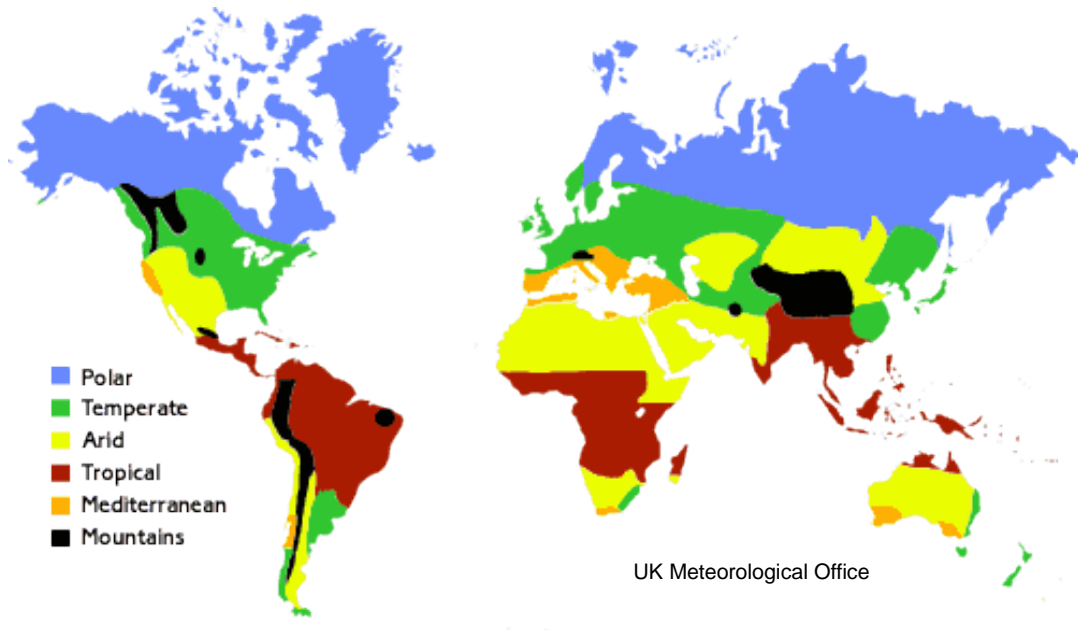
According to your observations, is there anything wrong in this climograph? If so, what is it?



Source:
<https://en.wikipedia.org/wiki/Climograph>

3. CLIMATE ZONES

Look at this map.



As you can see, in order to study atmospheric conditions, we join them in several climate zones. Do they show a linear pattern or a bar pattern?

There is a major factor which provides this pattern. What is it?

Do you think about other factors that affected climate? If so, what are they?

Pick up the information visiting the next website:

<http://www.geography.learnontheinternet.co.uk/topics/climatezones.html>

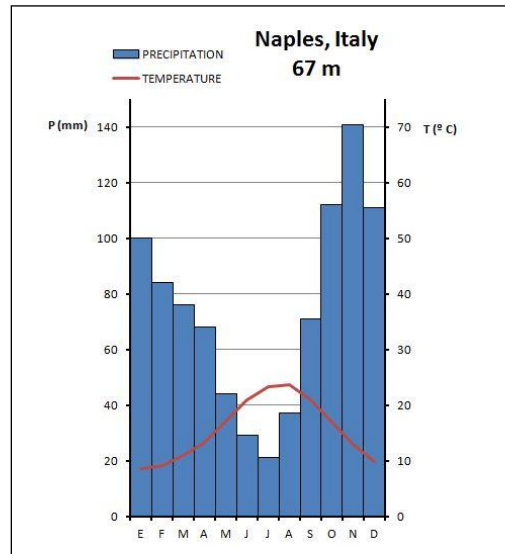
Every climate zone has some special characteristics. Try to complete the following table (you can obtain the information from <https://content.meteoblue.com/en/meteoscool/general-climate-zones> and <http://www.blueplanetbiomes.org/climate.htm>)

Climate zone	Location	Temperature	Precipitation
Polar			
Temperate			
Arid			
Tropical			
Mediterranean			

Time for relaxing: look the climate of several countries (<http://www.climate-zone.com/>).

Studying a climograph we can determine its climate zone. Look at the next example:

1. Firstly, studying temperatures and precipitations we can think it belongs to a temperate zone.
2. Summers are hot. On the other hand, winters are not so cold.
3. During June, July and August the precipitation bars are above the temperature line. It means that during the summer the precipitations are limited (summer drought).
4. The principal precipitations are on winter.
5. With all these facts we can say that Naples belongs to the Mediterranean climate zone.



Climograph data from <https://es.climate-data.org/>

EXERCISE:

Look at the Climograph in the next page and answer these questions:

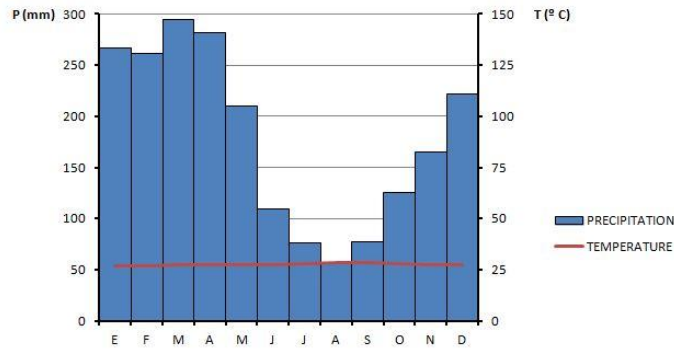
1. Can you determine the climate zone of everyone?

2. Is there anything special in Eismitte climograph? Studying this climograph try to imagine the Antarctic climate.

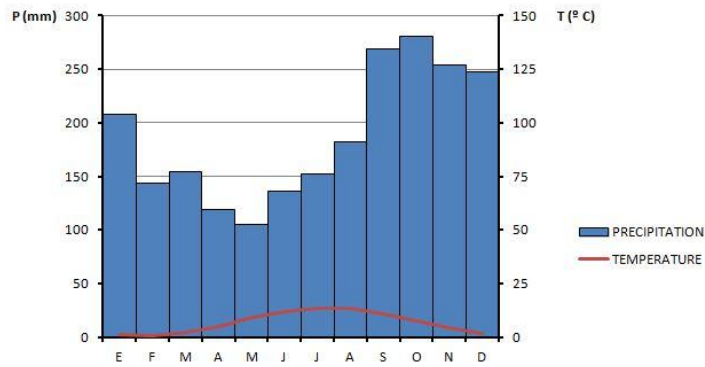
3. If we have a horizontal temperature line, what does it mean? Look at Brazil climograph.

4. On the other hand, if our temperature line looks like a “mountain”, what does it mean?

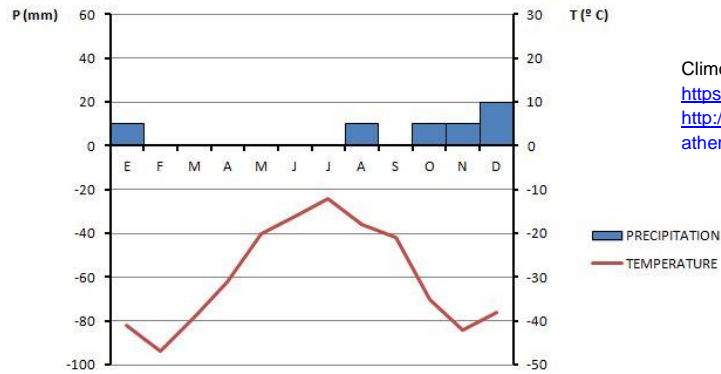
**Manaos, Brazil
44 m**



**Bergen, Norway
43 m**

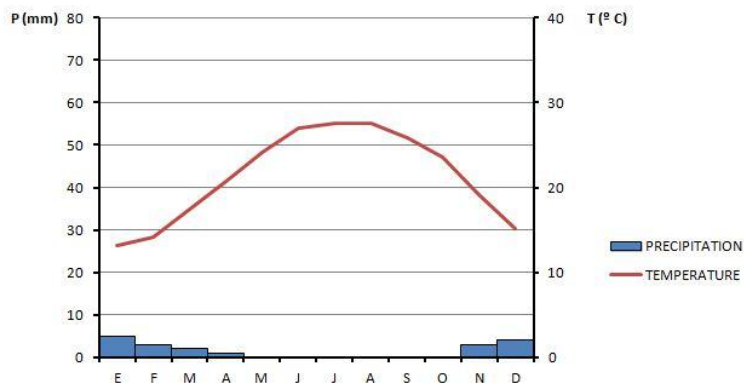


**Eismitte, Greenland
3,000 m**



Climograph data from <https://es.climate-data.org/> and <http://www.weatherbase.com/weather/weather.php3?s=154340>

**El Cairo, Egypt
116 m**



4. MAKE YOUR OWN CLIMOGRAPH ON EXCEL 2010

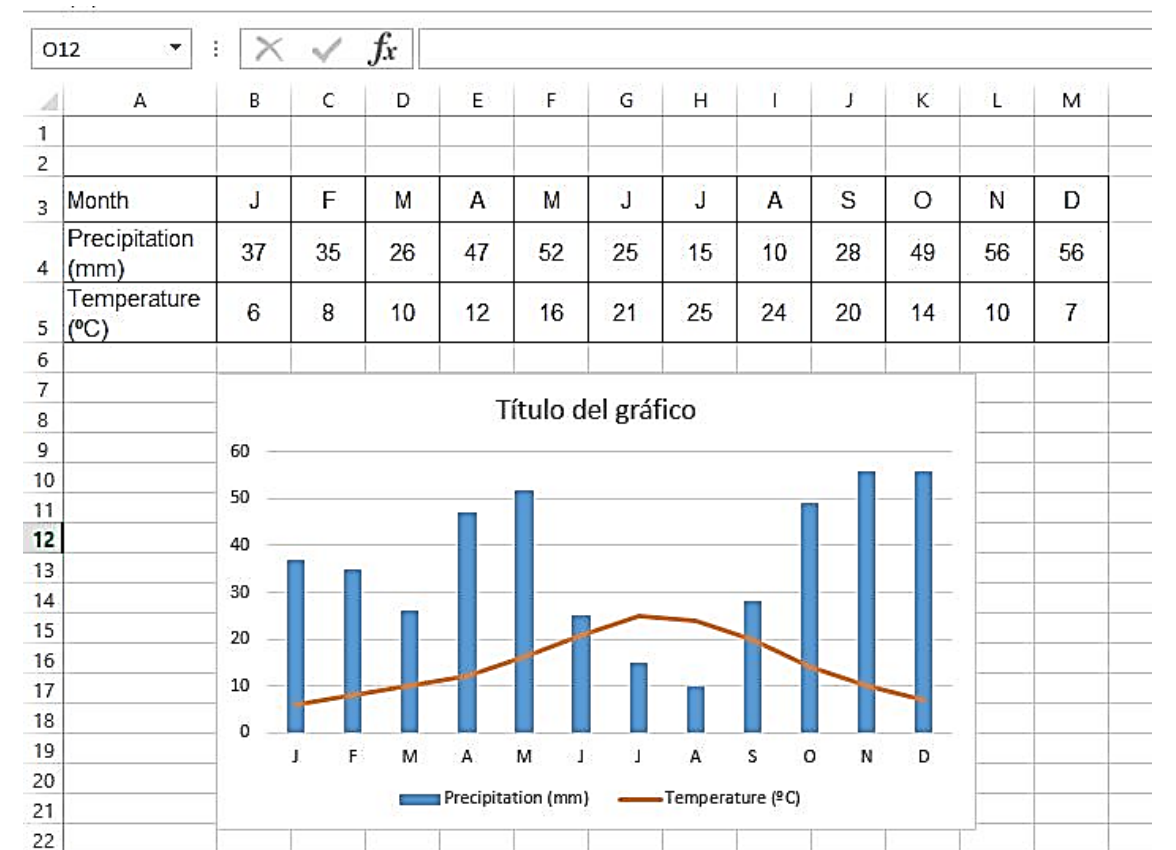
We are ready for making a climograph and decide what climate zone is represented. For this purpose, we use Excel 2010. Read the following instructions and try to make at the same time the example.

Instructions:

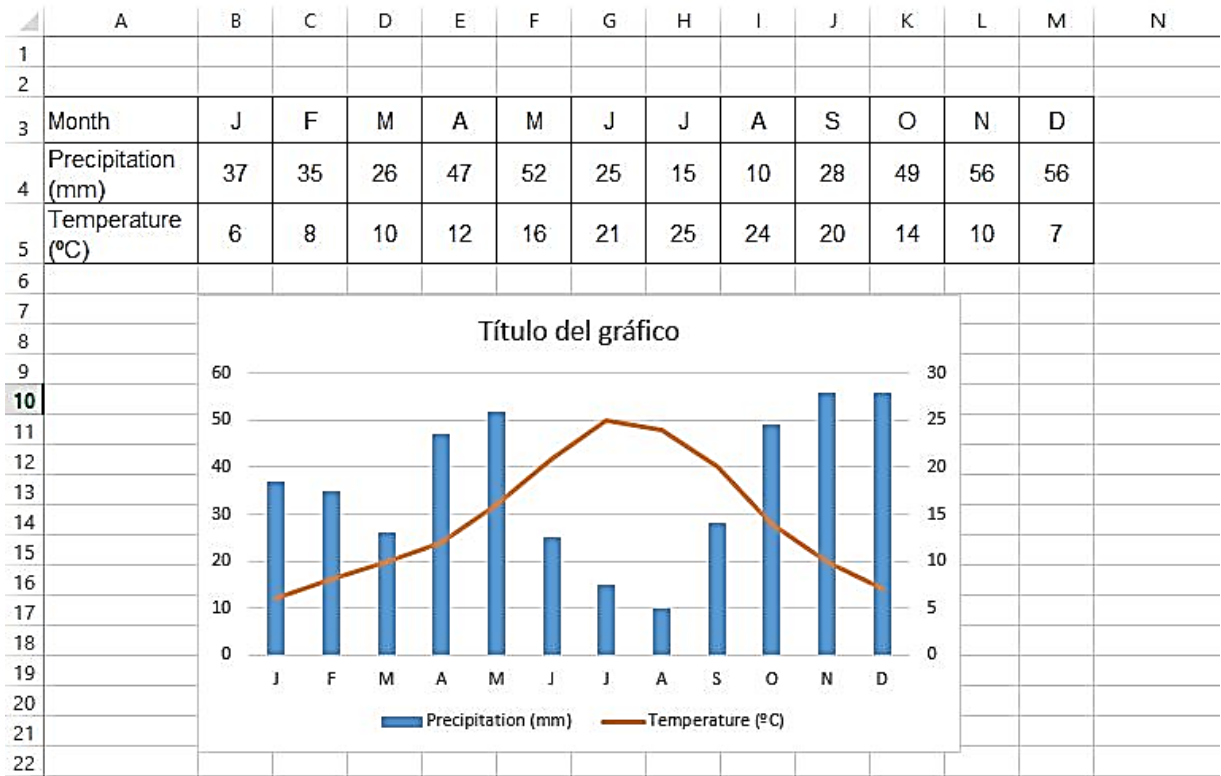
1. Open Excel 2010 and create a new file with the name "Climograph". Save it. In the first sheet copy the information in order to create your first climograph. For this example, we use the information provided by a meteorological station from Barajas, Madrid. Try to get something similar to this:

S20													
	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2													
3	Month	J	F	M	A	M	J	J	A	S	O	N	D
4	Precipitation (mm)	37	35	26	47	52	25	15	10	28	49	56	56
5	Temperature (°C)	6	8	10	12	16	21	25	24	20	14	10	7
6													
7													
8													

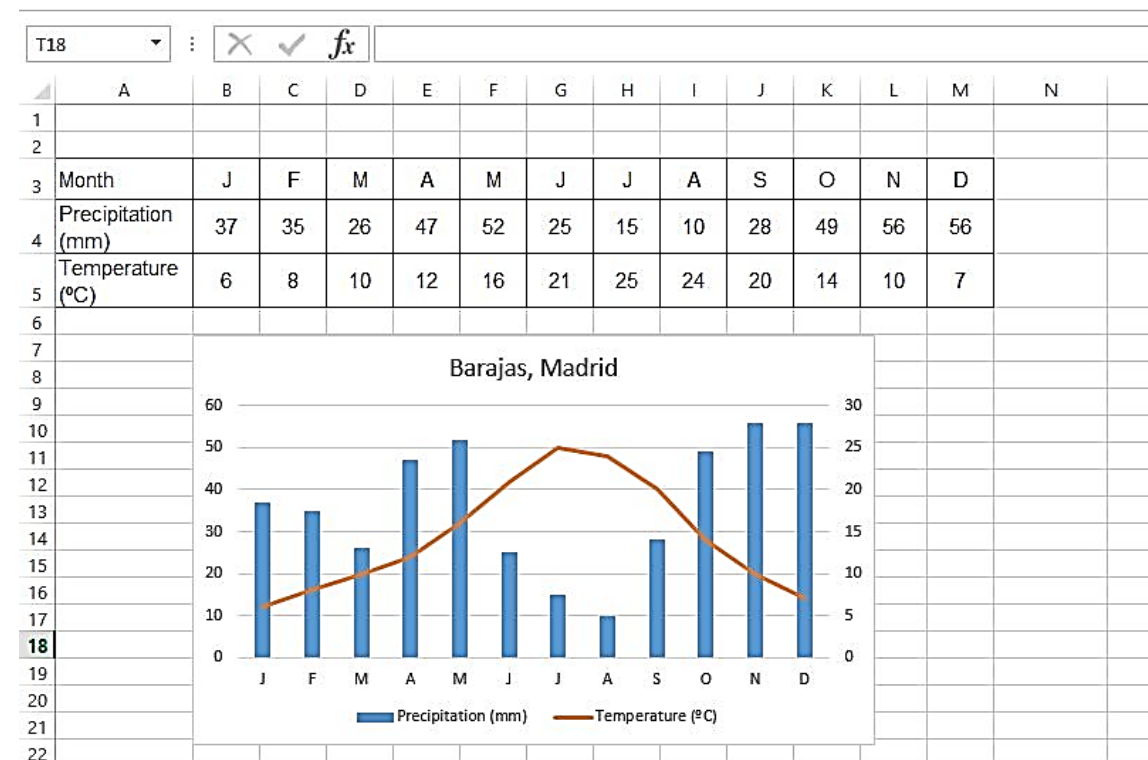
2. Select cells A3 trough M5. With these cells selected, choose "Gráficos recomendados" from the "Insertar" menu. Click on "Todos los gráficos" → "Cuadro combinado". You create a graphic which it's added in the sheet. Move it below the information files.



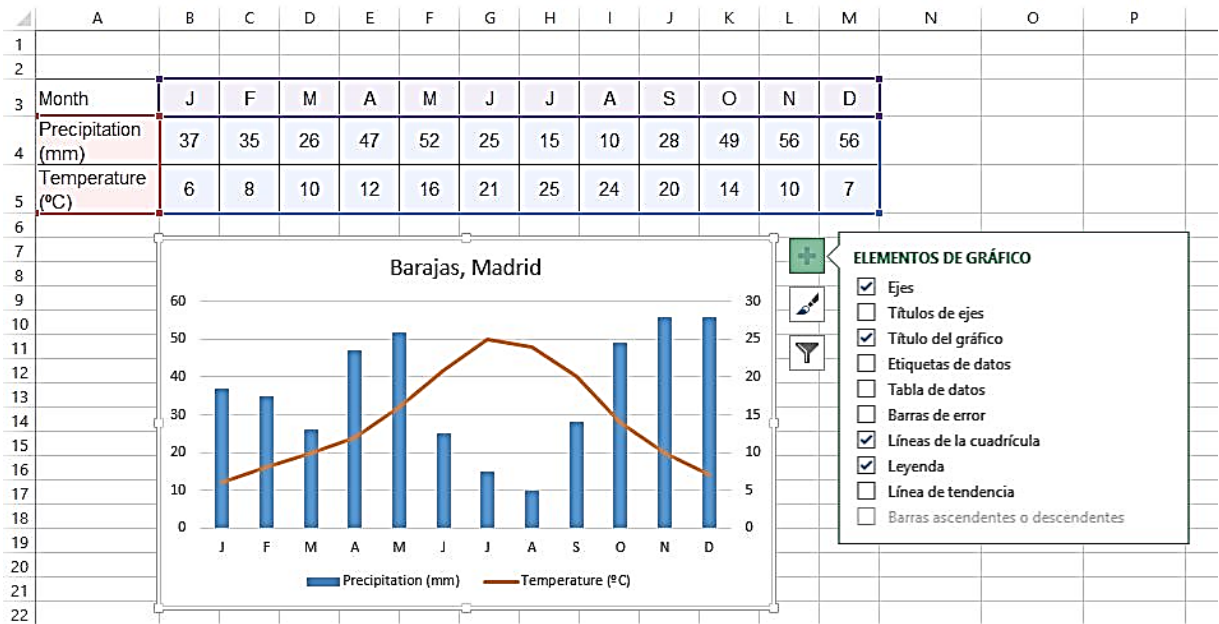
- Now we have to draw a secondary axis for temperatures. Click on temperature line and, with the right button of your mouse, choose "Dar formato a la serie de datos". In the right part of the sheet appears a dialog box named "Formato de la serie de datos", and it's opened on "Opciones de serie". Choose "eje secundario". Your climograph is already done.



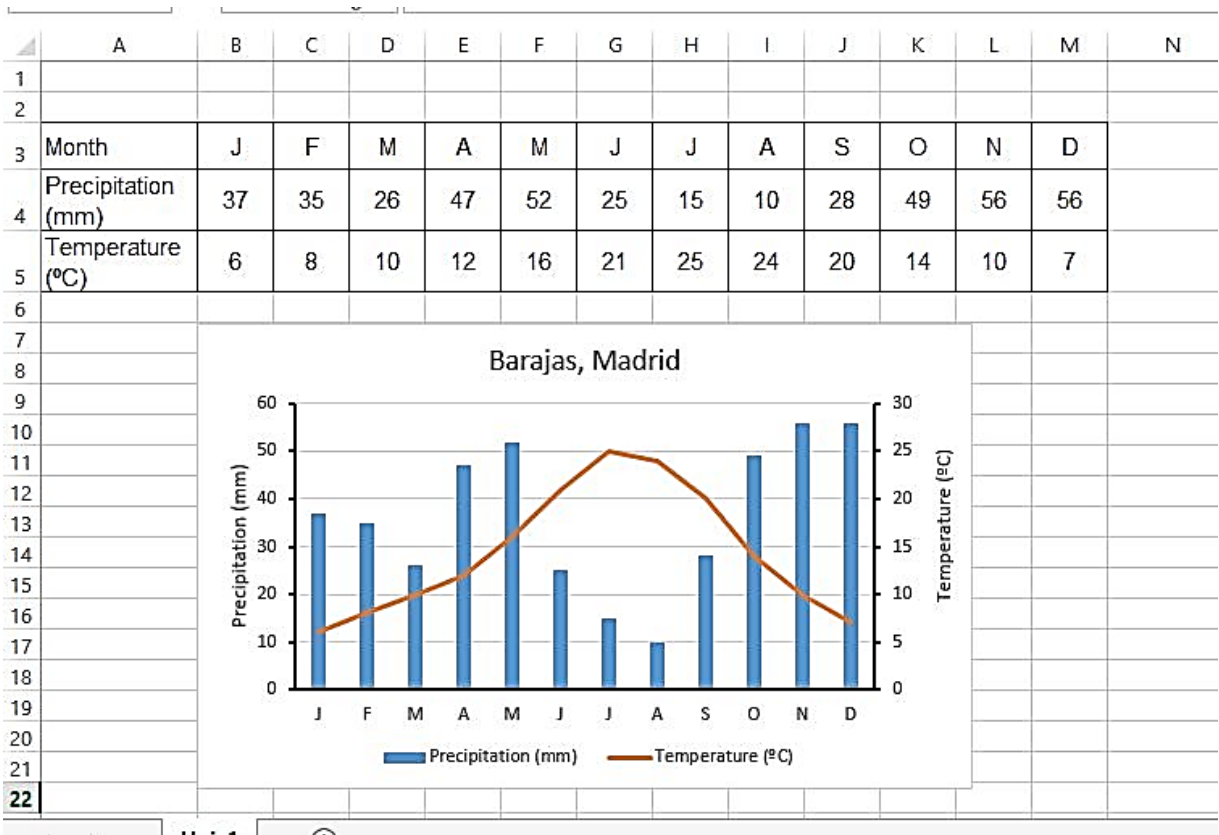
- Now you can decorate your graphic. Let's begin with the title. Click on "Título del gráfico" and put the name of the meteorological station (in this case "Barajas, Madrid").



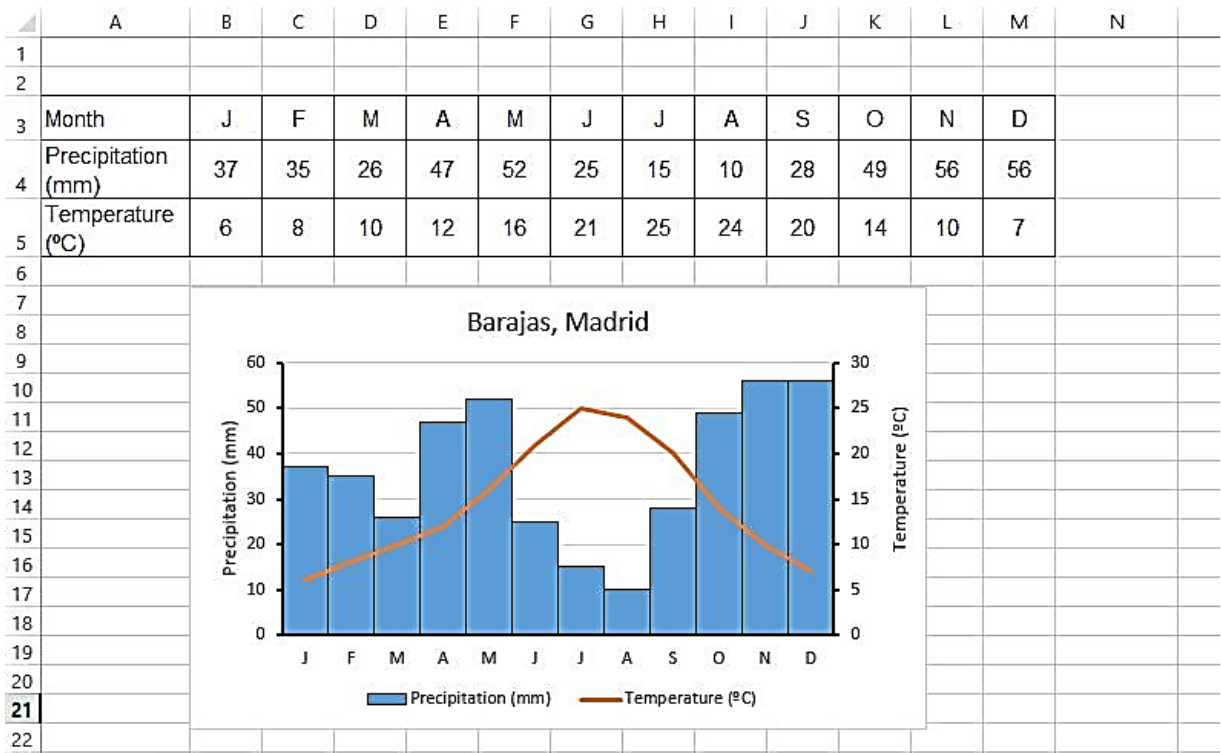
5. You can also add axes titles and other things. For these purposes click on the graph and you can see, in the right corner, 3 different symbols. Choose “+” and click on “Títulos de ejes”. Immediately vertical and horizontal axes have a new box called “Título del eje”. Do the same as you did with “Título del gráfico”.



6. You can also add an axis line. Click on any axis and open “Dar formato al eje” with the right button of your mouse. Explore different options according to your likes.



7. The last change is to increase the thickness of the precipitation's columns. Click on any column and, with the right button of your mouse, choose "Dar formato a la serie de datos". In "Opciones de serie" change the values of "Superposición de series" to 100% and "Ancho de intervalo" to 0%. And that's all. Your graph should look similar to this:



Now you can make your own climograph on Excel 2010. Below you have the information of four meteorological stations. For each one make the climograph and write down the major climate characteristics. Send the file to your teacher.

Month	Xi'an, China (405 m)		Hamburg, Germany (6 m)		Sevilla, Spain (11 m)		La Paz, Bolivia (3,625 m)	
	T (°C)	P (mm)	T (°C)	P (mm)	T (°C)	P (mm)	T (°C)	P (mm)
J	0.1	5	-0.2	59	10.3	76	11.1	115
F	3.4	7	0.2	42	11.9	73	10.9	102
M	9.5	21	3.5	52	14.3	66	10.8	68
A	15.8	42	7.8	46	16.9	53	10.3	30
M	21.7	55	12	56	19.9	34	9	13
J	26.5	54	15.3	71	24.3	14	7.5	6
J	28.5	89	17.3	78	27.8	1	7.2	7
A	26.9	91	17	79	27.6	3	8.5	12
S	21.1	84	13.9	64	24.7	18	9.8	31
O	15.4	55	9.1	58	19.5	69	11.3	37
N	7.4	18	4.8	63	14.6	87	11.9	48
D	1.8	7	1.6	70	11	82	11.3	90