Meteorological statistic

for 4th stage undergraduate lecturer

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**Statistic:** A branch of mathematics dealing with the collection, classification, presentation and analysis of data. The two major types of statistics are descriptive statistics and inferential statistics.

**Descriptive statistics:** the branch of statistics devoted to the summarization, organization and description of data. It's includes the construction of graphs, charts and tables. Descriptive statistics measures (measures of central tendency, measures of dispersion and variability and percentiles).

**Inferential statistics:** the branch of statistics concerned with using sample data to make an inference about a population of data. It's includes methods like point estimation, interval estimation and hypothesis testing which are all based on probability theory.

There are many applications of statistics in all branches of science meteorological one of them.

**Basic statistical terms**

**Variable:** is any characteristic, number or quantity that can be measured or counted. So variables can be classified as:

**Population** is any specific collection of objects of interest.

**Sample** is any subset or sub collection of the population, including the case that the sample consists of the whole population.

**Data** is the most basic element in statistics consists of observations, variables and data values.

**Types of variables**

there are different ways variables can be described according to the ways they can be studied, measured and presented. So variables can be classified as:

**Qualitative:** the data collected for categorical variable where use words like names and labels, example: Baghdad station.
**Quantitative**: the data collected for a numeric variable where use numbers, example: temperature is 23°C.

**Potential**: use name and number for example: temperature of Baghdad station is very high is 50°C.

*****Data in atmospheric science is observation from device like temperature or measurement from equation like evaporation.

**Data presentation**

After data collection is important to display the in an easy and understandable which appropriate to the size and type of data. There is more than one way

a-**Tables**

A way to summarize data in different way, frequency tables one of them. For example the table below.

Table of No. of dust storm for three stations

<table>
<thead>
<tr>
<th>Stations</th>
<th>No. of dust storm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baghdad</td>
<td>13</td>
</tr>
<tr>
<td>Basra</td>
<td>10</td>
</tr>
<tr>
<td>Mosul</td>
<td>12</td>
</tr>
</tbody>
</table>

*****must put title of table above it

b- **Diagram**

Representation data by using graphical way. There are many types of diagram like (histogram, line polygon----). For example the diagram below.
No. of dust storm for three stations

****must put title of diagram down it

c- Pie Charts

is a circular graph divided into sectors, each sector shows the relative size of each value. we must estimate percent and sector where

**Percent** is divide each value by the total and multiply by 100%

\[
\text{percent} = (\text{value/total}) \times 100\%
\]

**Sector** is divide each value by the total and multiply by 360

\[
\text{Sector} = (\text{value/total}) \times 360
\]

******all percent equal 100 and all sector equal 360.

**example:** if the total amount of precipitation (400mm) for the station Sulaymaniyah (120mm) of them in the form of hail and (60mm) snow and (220mm) rain, use pie chart to show precipitation.

\[
\text{percent} = (\text{value/total}) \times 100\%
\]

\[
\text{p\% hail} = (120/400) \times 100\% = 30\%
\]

\[
\text{p\% snow} = (60/400) \times 100\% = 15\%
\]

\[
\text{p\% rain} = (220/400) \times 100\% = 55\%
\]
Sector = (value/total) * 360

Sector hail = \((\frac{120}{400}) \times 360\) = 108°

Sector snow = \((\frac{60}{400}) \times 360\) = 54°

Sector rain = \((\frac{220}{400}) \times 360\) = 198°

**********in class room there are more examples in Data presentation and in the end of course you can take pdf for all examples with solution.

Frequency table