# Data Analysis Project
# "Exploring Weather Trends"

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## Introduction

In this project, I will analyze local (Lima, Peru) and global temperature data and compare the temperature trends in Lima to overall global temperature trends.

**Instructions:**

1. Extract data using SQL
2. Calculate decade moving averages using Excel
3. Create a line chart in Excel
4. Make observations

### 1. Extract Data using SQL:

```
SELECT
        gd.year,
        cd.city,
        cd.country,
        cd.avg_temp city_temp,
        gd.avg_temp global_temp
FROM global_data gd
JOIN (SELECT * FROM city_data
WHERE city = 'Lima') cd
ON cd.year = gd.year;
```

### 2. Calculate Decade Moving Averages Using Excel (with AVERAGE() function for every 10 years)

| year | city | country | city_temp | city_temp_decade | global_temp | global_temp_decade |
|---|---|---|---|---|---|---|
| 1881 | Lima | Peru | 15.75 | | 8.27 | |
| 1882 | Lima | Peru | 15.88 | | 8.13 | |
| 1883 | Lima | Peru | 16.18 | | 7.98 | |
| 1884 | Lima | Peru | 16.14 | | 7.77 | |
| 1885 | Lima | Peru | | | 7.92 | |
| 1886 | Lima | Peru | 15.81 | | 7.95 | |
| 1887 | Lima | Peru | | | 7.91 | |

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|---|---|---|---|---|---|---|
| 1888 | Lima | Peru | | | 8.09 | |
| 1889 | Lima | Peru | | | 8.32 | |
| 1890 | Lima | Peru | | 15.952 | 7.97 | 8.031 |
| 1891 | Lima | Peru | 16.05 | 16.012 | 8.02 | 8.006 |
| 1892 | Lima | Peru | 16.06 | 16.048 | 8.07 | 8 |
| 1893 | Lima | Peru | 15.98 | 16.008 | 8.06 | 8.008 |
| 1894 | Lima | Peru | 16.22 | 16.024 | 8.16 | 8.047 |
| 1895 | Lima | Peru | 16.35 | 16.07833333 | 8.15 | 8.07 |
| 1896 | Lima | Peru | 16.53 | 16.19833333 | 8.21 | 8.096 |
| 1897 | Lima | Peru | 16.4 | 16.22714286 | 8.29 | 8.134 |
| 1898 | Lima | Peru | 15.49 | 16.135 | 8.18 | 8.143 |
| 1899 | Lima | Peru | 16.31 | 16.15444444 | 8.4 | 8.151 |
| 1900 | Lima | Peru | 16.75 | 16.214 | 8.5 | 8.204 |
| 1901 | Lima | Peru | 16.46 | 16.255 | 8.54 | 8.256 |
| 1902 | Lima | Peru | 16.49 | 16.298 | 8.3 | 8.279 |
| 1903 | Lima | Peru | 16.26 | 16.326 | 8.22 | 8.295 |
| 1904 | Lima | Peru | 16.31 | 16.335 | 8.09 | 8.288 |
| 1905 | Lima | Peru | 16.76 | 16.376 | 8.23 | 8.296 |
| 1906 | Lima | Peru | 16.4 | 16.363 | 8.38 | 8.313 |
| 1907 | Lima | Peru | 16.19 | 16.342 | 7.95 | 8.279 |
| 1908 | Lima | Peru | 16.14 | 16.407 | 8.19 | 8.28 |
| 1909 | Lima | Peru | 16.05 | 16.381 | 8.18 | 8.258 |
| 1910 | Lima | Peru | 15.95 | 16.301 | 8.22 | 8.23 |
| 1911 | Lima | Peru | 16.38 | 16.293 | 8.18 | 8.194 |
| 1912 | Lima | Peru | 16.49 | 16.293 | 8.17 | 8.181 |
| 1913 | Lima | Peru | 16.63 | 16.33 | 8.3 | 8.189 |
| 1914 | Lima | Peru | 16.49 | 16.348 | 8.59 | 8.239 |
| 1915 | Lima | Peru | 16.66 | 16.338 | 8.59 | 8.275 |
| 1916 | Lima | Peru | 15.82 | 16.28 | 8.23 | 8.26 |
| 1917 | Lima | Peru | 16.34 | 16.295 | 8.02 | 8.267 |
| 1918 | Lima | Peru | 16.74 | 16.355 | 8.13 | 8.261 |
| 1919 | Lima | Peru | 17.08 | 16.458 | 8.38 | 8.281 |
| 1920 | Lima | Peru | 16.48 | 16.511 | 8.36 | 8.295 |
| 1921 | Lima | Peru | 16 | 16.473 | 8.57 | 8.334 |
| 1922 | Lima | Peru | 16.51 | 16.475 | 8.41 | 8.358 |
| 1923 | Lima | Peru | 16.5 | 16.462 | 8.42 | 8.37 |
| 1924 | Lima | Peru | 16.38 | 16.451 | 8.51 | 8.362 |
| 1925 | Lima | Peru | 16.52 | 16.437 | 8.53 | 8.356 |
| 1926 | Lima | Peru | 16.89 | 16.544 | 8.73 | 8.406 |
| 1927 | Lima | Peru | 16.65 | 16.575 | 8.52 | 8.456 |
| 1928 | Lima | Peru | 16.76 | 16.577 | 8.63 | 8.506 |
| 1929 | Lima | Peru | 16.19 | 16.488 | 8.24 | 8.492 |
| 1930 | Lima | Peru | 16.98 | 16.538 | 8.63 | 8.519 |

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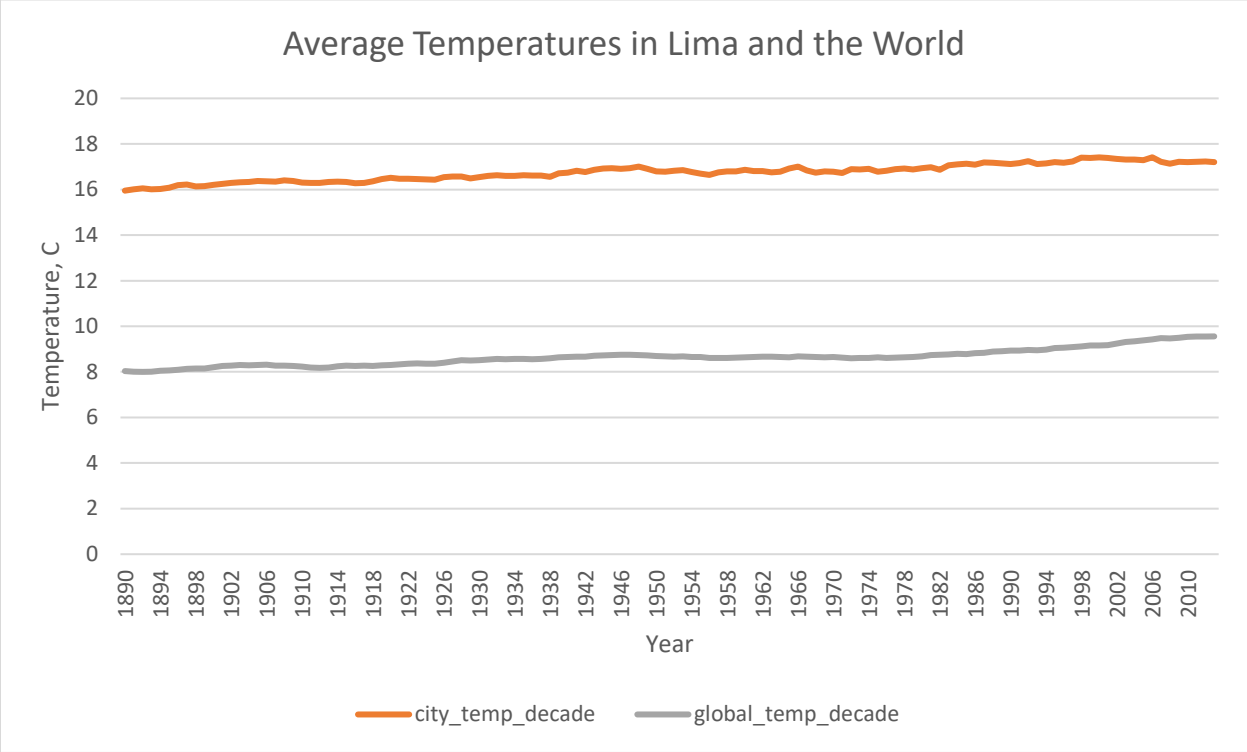
|---|---|---|---|---|---|---|
| 1931 | Lima | Peru | 16.63 | 16.601 | 8.72 | 8.534 |
| 1932 | Lima | Peru | 16.78 | 16.628 | 8.71 | 8.564 |
| 1933 | Lima | Peru | 16.2 | 16.598 | 8.34 | 8.556 |
| 1934 | Lima | Peru | 16.46 | 16.606 | 8.63 | 8.568 |
| 1935 | Lima | Peru | 16.74 | 16.628 | 8.52 | 8.567 |
| 1936 | Lima | Peru | 16.79 | 16.618 | 8.55 | 8.549 |
| 1937 | Lima | Peru | 16.55 | 16.608 | 8.7 | 8.567 |
| 1938 | Lima | Peru | 16.32 | 16.564 | 8.86 | 8.59 |
| 1939 | Lima | Peru | 17.73 | 16.718 | 8.76 | 8.642 |
| 1940 | Lima | Peru | 17.2 | 16.74 | 8.76 | 8.655 |
| 1941 | Lima | Peru | 17.47 | 16.824 | 8.77 | 8.66 |
| 1942 | Lima | Peru | 16.29 | 16.775 | 8.73 | 8.662 |
| 1943 | Lima | Peru | 17.17 | 16.872 | 8.76 | 8.704 |
| 1944 | Lima | Peru | 16.95 | 16.921 | 8.85 | 8.726 |
| 1945 | Lima | Peru | 16.96 | 16.943 | 8.58 | 8.732 |
| 1946 | Lima | Peru | 16.52 | 16.916 | 8.68 | 8.745 |
| 1947 | Lima | Peru | 16.82 | 16.943 | 8.8 | 8.755 |
| 1948 | Lima | Peru | 16.96 | 17.007 | 8.75 | 8.744 |
| 1949 | Lima | Peru | 16.74 | 16.908 | 8.59 | 8.727 |
| 1950 | Lima | Peru | 16.11 | 16.799 | 8.37 | 8.688 |
| 1951 | Lima | Peru | 17.33 | 16.785 | 8.63 | 8.674 |
| 1952 | Lima | Peru | 16.75 | 16.831 | 8.64 | 8.665 |
| 1953 | Lima | Peru | 17.45 | 16.859 | 8.87 | 8.676 |
| 1954 | Lima | Peru | 16.01 | 16.765 | 8.56 | 8.647 |
| 1955 | Lima | Peru | 16.24 | 16.693 | 8.63 | 8.652 |
| 1956 | Lima | Peru | 15.97 | 16.638 | 8.28 | 8.612 |
| 1957 | Lima | Peru | 17.98 | 16.754 | 8.73 | 8.605 |
| 1958 | Lima | Peru | 17.32 | 16.79 | 8.77 | 8.607 |
| 1959 | Lima | Peru | 16.87 | 16.803 | 8.73 | 8.621 |
| 1960 | Lima | Peru | 16.7 | 16.862 | 8.58 | 8.642 |
| 1961 | Lima | Peru | 16.8 | 16.809 | 8.8 | 8.659 |
| 1962 | Lima | Peru | 16.74 | 16.808 | 8.75 | 8.67 |
| 1963 | Lima | Peru | 16.95 | 16.758 | 8.86 | 8.669 |
| 1964 | Lima | Peru | 16.29 | 16.786 | 8.41 | 8.654 |
| 1965 | Lima | Peru | 17.59 | 16.921 | 8.53 | 8.644 |
| 1966 | Lima | Peru | 16.79 | 17.003 | 8.6 | 8.676 |
| 1967 | Lima | Peru | 16.35 | 16.84 | 8.7 | 8.673 |
| 1968 | Lima | Peru | 16.36 | 16.744 | 8.52 | 8.648 |
| 1969 | Lima | Peru | 17.46 | 16.803 | 8.6 | 8.635 |
| 1970 | Lima | Peru | 16.45 | 16.778 | 8.7 | 8.647 |
| 1971 | Lima | Peru | 16.31 | 16.729 | 8.6 | 8.627 |
| 1972 | Lima | Peru | 18.37 | 16.892 | 8.5 | 8.602 |
| 1973 | Lima | Peru | 16.82 | 16.879 | 8.95 | 8.611 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1974 | Lima | Peru | 16.55 | 16.905 | 8.47 | 8.617 |
| 1975 | Lima | Peru | 16.39 | 16.785 | 8.74 | 8.638 |
| 1976 | Lima | Peru | 17.24 | 16.83 | 8.35 | 8.613 |
| 1977 | Lima | Peru | 17.06 | 16.901 | 8.85 | 8.628 |
| 1978 | Lima | Peru | 16.65 | 16.93 | 8.69 | 8.645 |
| 1979 | Lima | Peru | 16.99 | 16.883 | 8.73 | 8.658 |
| 1980 | Lima | Peru | 17.03 | 16.941 | 8.98 | 8.686 |
| 1981 | Lima | Peru | 16.71 | 16.981 | 9.17 | 8.743 |
| 1982 | Lima | Peru | 17.21 | 16.865 | 8.64 | 8.757 |
| 1983 | Lima | Peru | 18.76 | 17.059 | 9.03 | 8.765 |
| 1984 | Lima | Peru | 17.02 | 17.106 | 8.69 | 8.787 |
| 1985 | Lima | Peru | 16.68 | 17.135 | 8.66 | 8.779 |
| 1986 | Lima | Peru | 16.77 | 17.088 | 8.83 | 8.827 |
| 1987 | Lima | Peru | 18.01 | 17.183 | 8.99 | 8.841 |
| 1988 | Lima | Peru | 16.58 | 17.176 | 9.2 | 8.892 |
| 1989 | Lima | Peru | 16.66 | 17.143 | 8.92 | 8.911 |
| 1990 | Lima | Peru | 16.84 | 17.124 | 9.23 | 8.936 |
| 1991 | Lima | Peru | 17.15 | 17.168 | 9.18 | 8.937 |
| 1992 | Lima | Peru | 17.96 | 17.243 | 8.84 | 8.957 |
| 1993 | Lima | Peru | 17.56 | 17.123 | 8.87 | 8.941 |
| 1994 | Lima | Peru | 17.31 | 17.152 | 9.04 | 8.976 |
| 1995 | Lima | Peru | 17.26 | 17.21 | 9.35 | 9.045 |
| 1996 | Lima | Peru | 16.45 | 17.178 | 9.04 | 9.066 |
| 1997 | Lima | Peru | 18.62 | 17.239 | 9.2 | 9.087 |
| 1998 | Lima | Peru | 18.13 | 17.394 | 9.52 | 9.119 |
| 1999 | Lima | Peru | 16.65 | 17.393 | 9.29 | 9.156 |
| 2000 | Lima | Peru | 17.02 | 17.411 | 9.2 | 9.153 |
| 2001 | Lima | Peru | 16.95 | 17.391 | 9.41 | 9.176 |
| 2002 | Lima | Peru | 17.44 | 17.339 | 9.57 | 9.249 |
| 2003 | Lima | Peru | 17.36 | 17.319 | 9.53 | 9.315 |
| 2004 | Lima | Peru | 17.29 | 17.317 | 9.32 | 9.343 |
| 2005 | Lima | Peru | 17.02 | 17.293 | 9.7 | 9.378 |
| 2006 | Lima | Peru | 17.61 | 17.409 | 9.53 | 9.427 |
| 2007 | Lima | Peru | 16.68 | 17.215 | 9.73 | 9.48 |
| 2008 | Lima | Peru | 17.34 | 17.136 | 9.43 | 9.471 |
| 2009 | Lima | Peru | 17.4 | 17.211 | 9.51 | 9.493 |
| 2010 | Lima | Peru | 16.97 | 17.206 | 9.7 | 9.543 |
| 2011 | Lima | Peru | 17.03 | 17.214 | 9.52 | 9.554 |
| 2012 | Lima | Peru | 17.68 | 17.238 | 9.51 | 9.548 |
| 2013 | Lima | Peru | 17 | 17.202 | 9.61 | 9.556 |

### 3. Create a Line Chart in Excel




### 4. Observations:

- The first thing we can see is that the average temperatures in Lima are almost twice as high as the global average temperatures.
- The trend of getting hotter over the last 130 years is noticeable in both my city and the World but there is a difference in consistency during recent years.
- The World got rapid consistent growth of temperatures in the last 30 years with the highest temperatures after the year 2000, while the highest temperature in Lima was in 1990s and it lowered since then.
- As well, we can see there was an opposite trend in the `60s and `70s: the global average temperatures were stable low, while Lima's temperatures were slowly increasing.