مـــركـــز الإحـــصـــاء

STATISTICS CENTRE

# Climate Change 2017

# Contents

## Introduction

Recently, reducing the impacts of climate change has become the concern worldwide, and has become the main concern for governments and international bodies, to monitor, regulate and reduce air pollutant emissions.

International bodies and organizations are seeking to create legislation and standards to control pollutant emissions, and to develop statistics to monitor size of the production of pollutants and its impact on the climate, and the impact of temperatures rising caused by global warming, and its impact on the ecological systems in the region.

Abu Dhabi Emirate Government has paid the utmost attention to climate change and SCAD would like to thank National Centre for Meteorology and Seismology for supplying SCAD with the data that influenced the development of this report.

## Climate

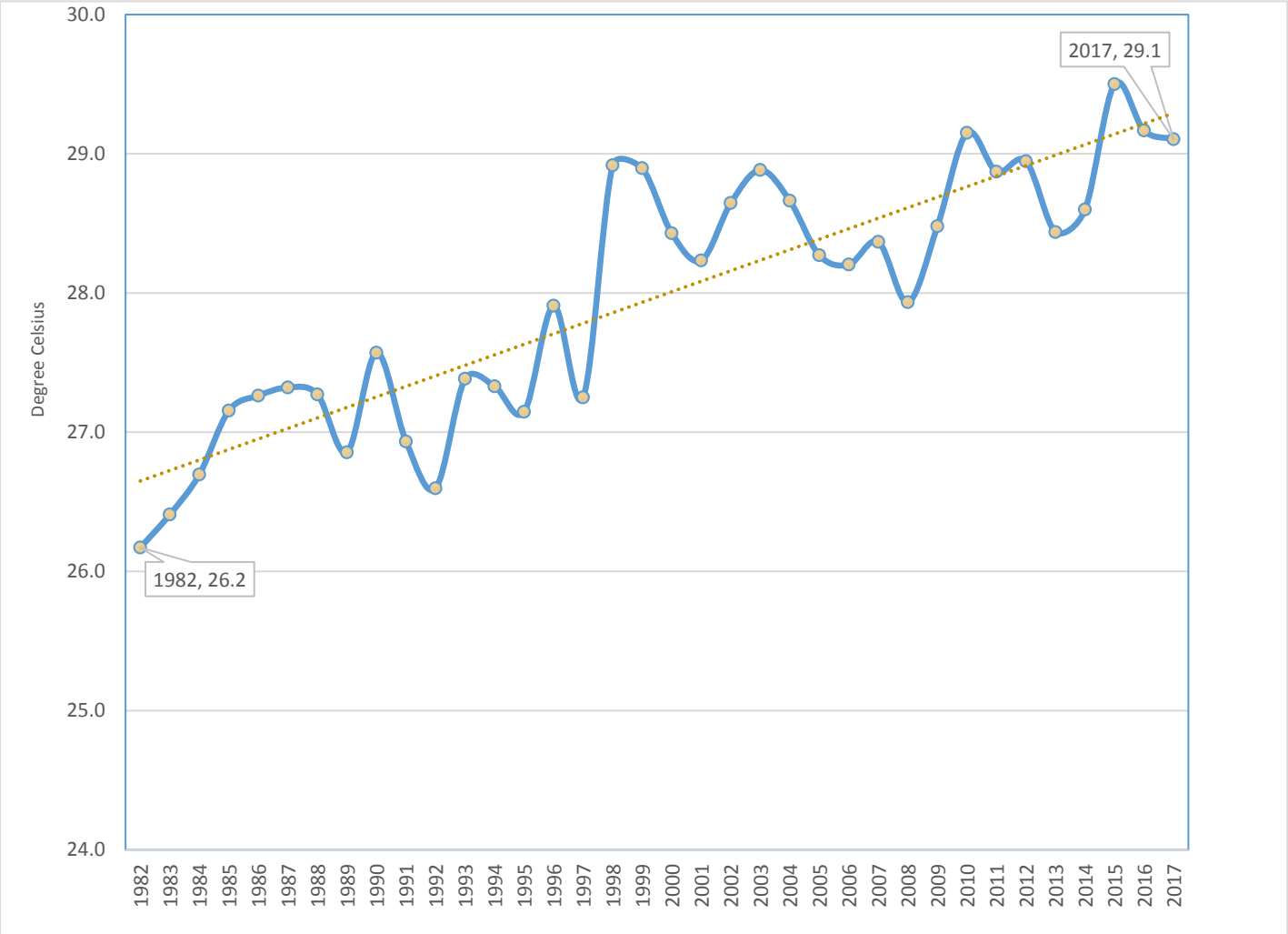
Climate change is a global phenomenon, but have local effects, which vary from one place to another on the global surface. This phenomenon known as the gradual increase of temperature in the lower layer of the atmosphere surrounding the Earth, Due to the increase of greenhouse gases such as Carbon Dioxide, Nitrous oxide, Methane and emissions of CFCs. The presence of these gases is necessary to maintain the temperature of the earth, nevertheless human activities from the industrial revolution, technology and dependency on fossil fuels as the primary source of energy, has led to increase the rate of emission of greenhouse gases, which exceeds the amount atmosphere needs. As well as increment in its concentration, which led to the occurrence of global warming, increase Earth temperature more than its normal levels, due to increment in gases absorption rate of infrared radiation, causing climate change in the world.

It’s been proven by the official international reports, that the climate change that has occurred in recent times, especially temperatures increment have already affected many physical and biological systems, resulting cases of floods, droughts and sea levels rising. Adapting to these changes considered as necessary strategy at all levels in all parts of the world to complement the efforts to alleviate the possibility of disturbing climate change, and the potential consequences in coastal urban areas that sets below sea level.

## Annual Temperature

Current study included measurement of temperatures over the past three decades. Where the study targeted average temperature data and its alteration, taking Abu Dhabi International Airport station data as a reference for change, where it's the oldest station in the Emirate of Abu Dhabi listed so far. Figure (1) shows the steady increase in average temperatures in the Emirate of Abu Dhabi since 1982 until 2017, where the change rate of temperatures over 35 years from 1982 to 2017 reached 11.0%.

**Figure (1): Annual Average Temperature in Abu Dhabi Emirate**

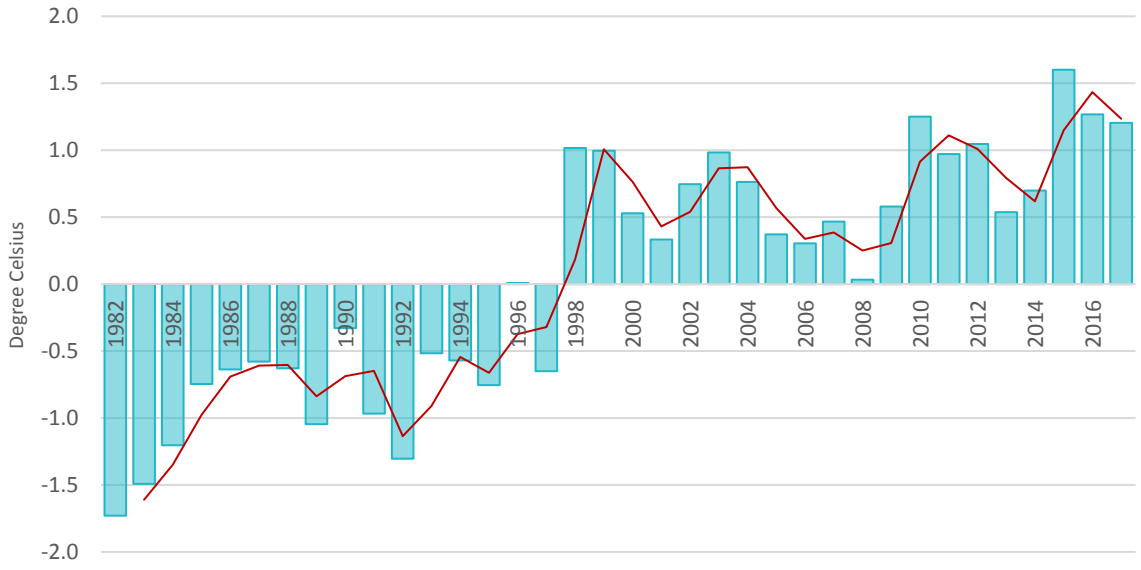



Source: National Centre of Meteorology and Seismology, Statistics Centre- Abu Dhabi

## Annual Air Temperature Deviations

The following study describes deviation on average annual temperatures degrees for long-term period of 35 year, where long-term average was 27.9 Degree Celsius. Figure (2) shows, in 2017 temperature increased about 1.2 degrees Celsius above average compared to 1.7 degrees Celsius less than the long-term average in 1982. Scientists expects steady increase in temperatures over the coming decades if preventive measures have not been able to control climate change and to ensure its mission in reducing the steady increase of temperature, which will have a significant impact on global warming, snow melting and sea level rise.

**Figure (2): Annual Air Temperature Deviations in Abu Dhabi Emirate**

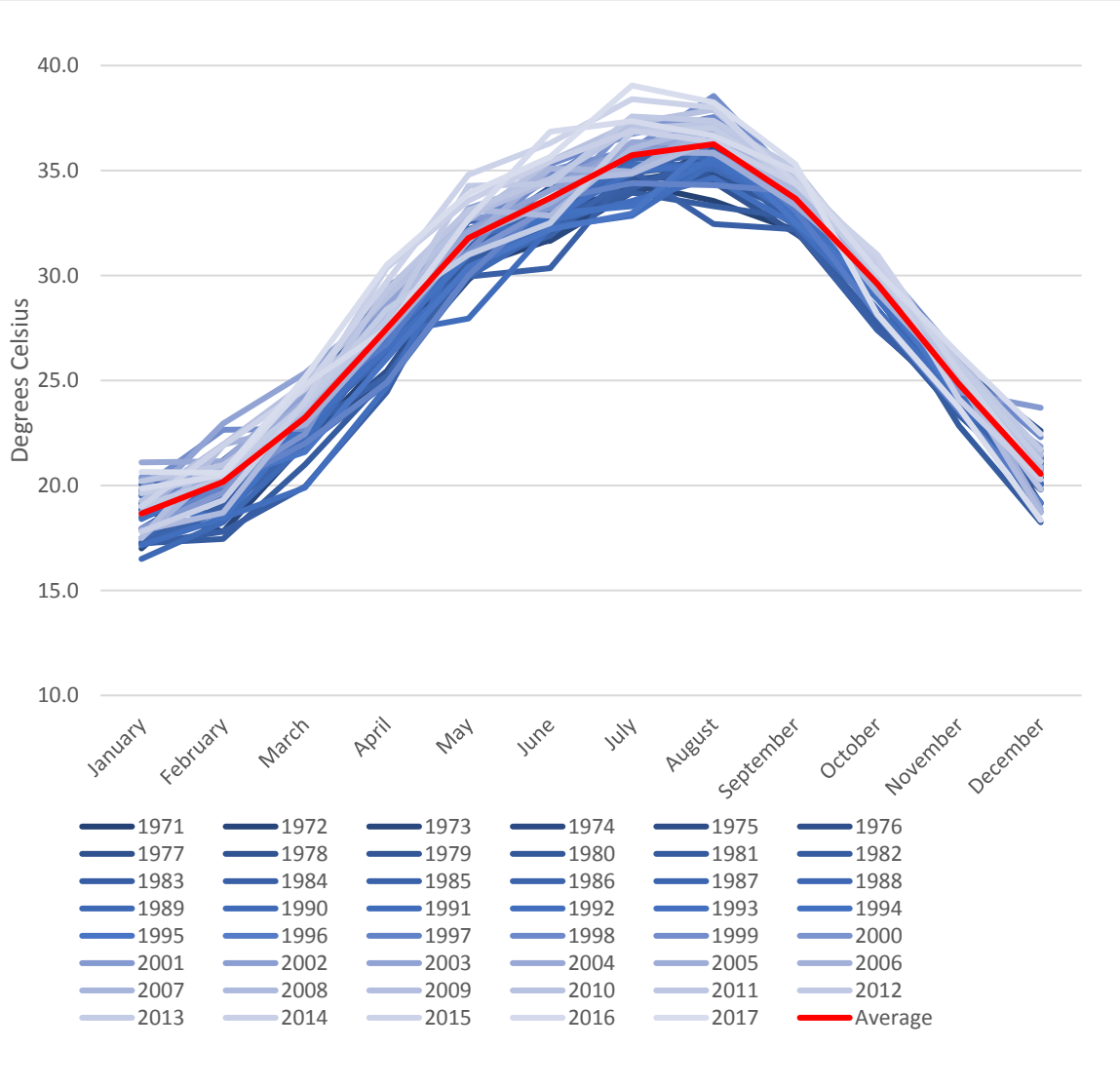



Source: National Centre of Meteorology and Seismology, Statistics Centre- Abu Dhabi

## Monthly Air Temperature

Figure (3) shows the measurement of average monthly temperature during previous 35 years. Where the study shows monthly temperatures over the years compared to long-term monthly average temperature. There have been a steady increase in monthly temperatures between years 1982-2017, where the lowest average temperature over the past 35 years recorded in January 1989 at an average rate of 16.5 degrees Celsius, while the highest average temperature within the same period was in July 2017, recording 39.1 degrees Celsius.

**Figure (3): Monthly Average Air Temperature in Abu Dhabi Emirate**

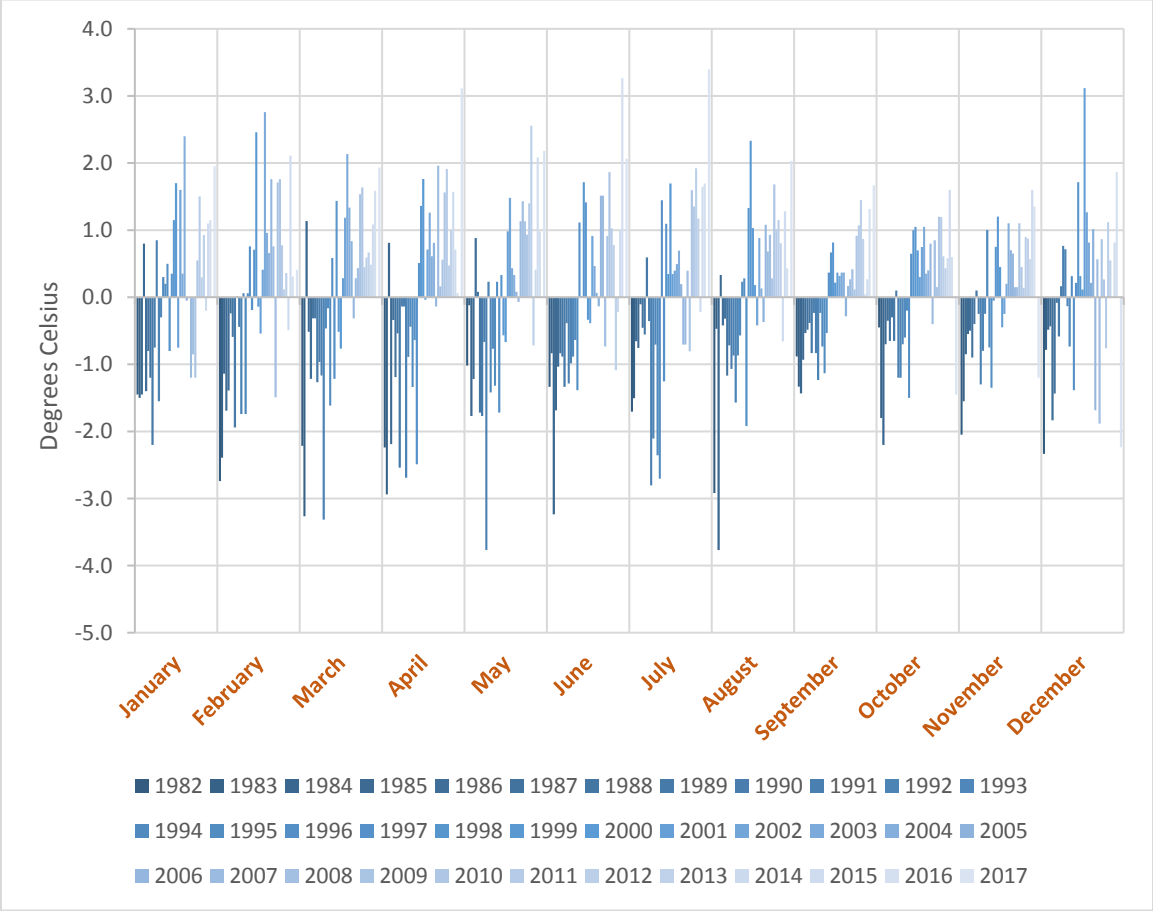



Source: National Centre of Meteorology and Seismology, Statistics Centre- Abu Dhabi

## Monthly Air Temperature Deviations

Historical data shows the changes in monthly average temperatures in current period, compared to the end of last century. Figure (4) shows the changes between temperatures during the same months over the years, compared to the long-term average within the same period. As an example, in August between years 1982 and 2017, temperature were less than 2.9 degrees Celsius in 1982 than long-term average increasing up 2 degrees Celsius than the long-term average in 2017.

**Figure (4): Variations of Monthly Temperature in Abu Dhabi Emirate**

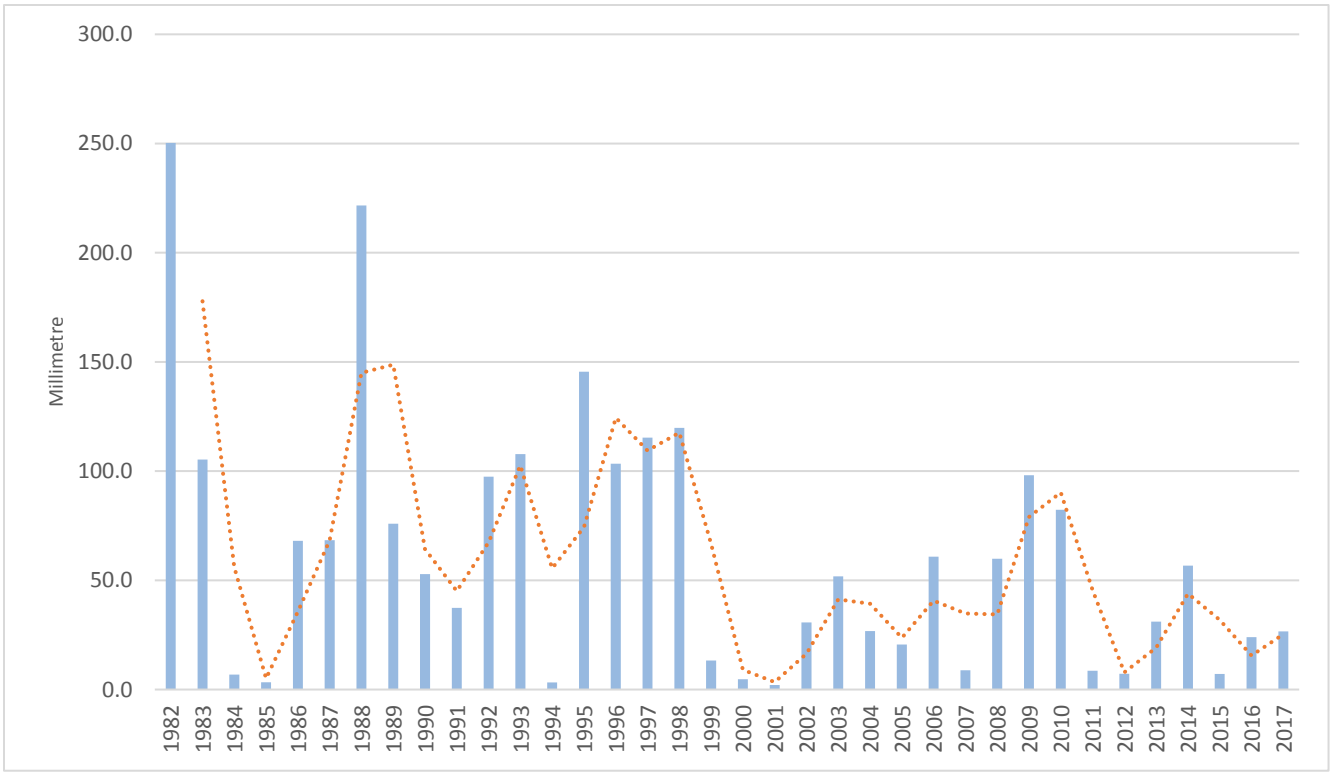



Source: National Centre of Meteorology and Seismology, Statistics Centre- Abu Dhabi.

## Total Annual Rainfall

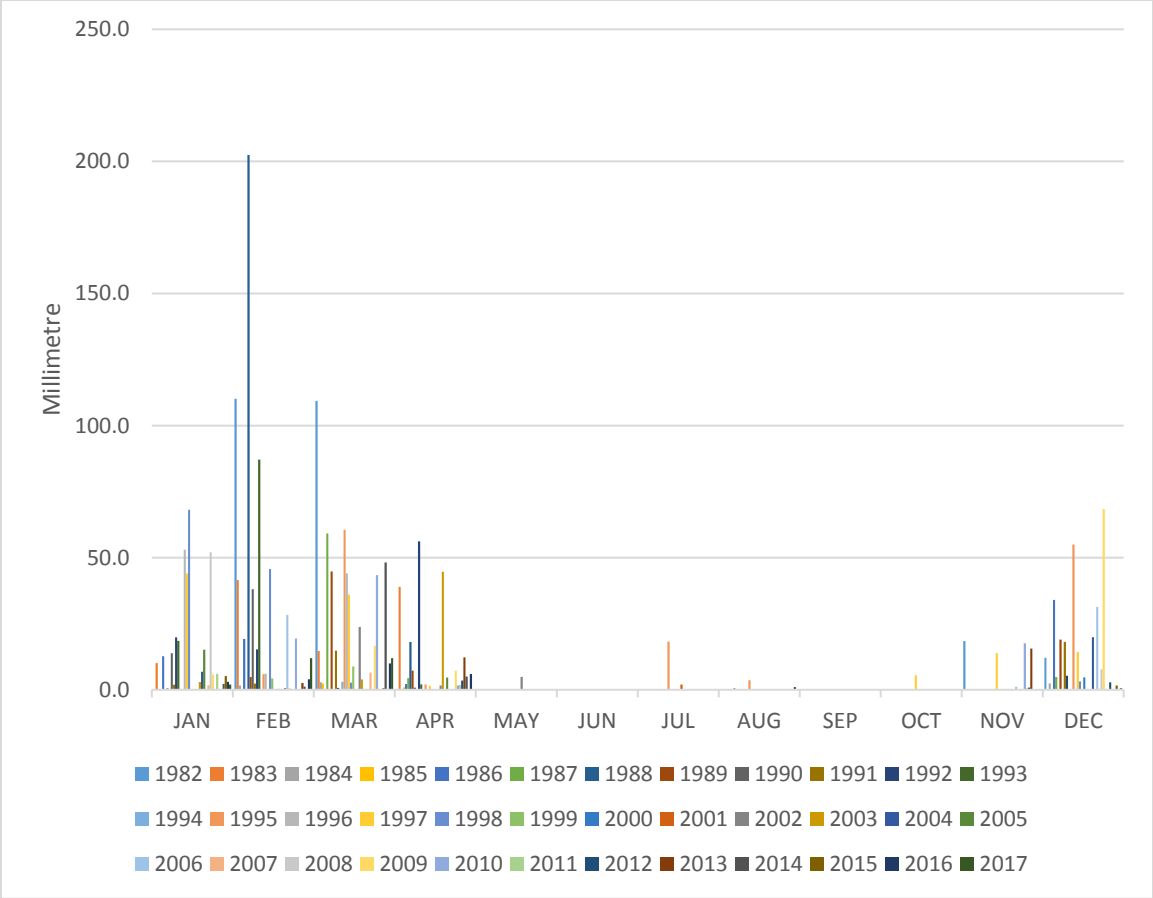
Emirate of Abu Dhabi known with its few and sudden rainfalls that falls within few days in winter season in different parts on Abu Dhabi Emirate. Rains fall during winter, spring and summer season on the mountainous areas in Al Ain region. Following study displays measuring rainfall in Abu Dhabi International Airport station only. Figure (5) shows, rainfall rates over the past 35 years, 1982 recorded the highest amount of rainfall 250.3 millimetre compared to the least amount of rainfall which were recorded in 2001 by 2.1 millimetre. As shown in Figure (6) the amount of monthly rainfall during the same period, mentioning the highest amount of rain during the 35 years recorded in February 1988, which was 202.4 millimetre.

**Figure (5): Annual Total Rainfall in Abu Dhabi Emirate**




Source: National Centre of Meteorology and Seismology, Statistics Centre- Abu Dhabi.

**Figure (6): Monthly Total Rainfall in Abu Dhabi Emirate**




Source: National Centre of Meteorology and Seismology, Statistics Centre- Abu Dhabi.

# Explanatory Notes

## Glossary

- **Climate Change**

  A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and / or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcing, or to persistent anthropogenic changes in the composition of the atmosphere or in land use also Climate variability

- **Greenhouse Gases**

  Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This property causes the greenhouse effect. Water vapour ($H_2O$), carbon dioxide ($CO_2$), nitrous oxide ($N_2O$), methane ($CH_4$), and ozone ($O_3$) are the primary greenhouse gases in the Earth's atmosphere. Moreover, there are a number of entirely human- made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine- and bromine- containing substances, dealt with under the Montreal Protocol. Besides $CO_2$, $N_2O$, and $CH_4$, the Kyoto Protocol deals with the greenhouse gases sulphur hexafluoride ($SF_6$), hydro fluorocarbons (HFCs), and per fluorocarbons (PFCs).

- **Air pollution**

  It is the presence of contaminant or pollutant substances a pollutant in air that do not disperse properly and interfere with human health or welfare, or produce other harmful environmental effects.

- **Global Warming**

  One of the environmental risks posed by the increasing carbon dioxide and other gases gas concentration levels in the air, which results  warming in a comprehensive and global, and attendant climate change may affect agricultural systems prevailing in many agricultural regions of the world total failure, this heating leads to rise sea levels over the next century, leading to the inundation of coastal areas that may be of agricultural, industrial or human density areas.

- **Carbon Dioxide ($CO_2$)**

  A colourless, odourless and non-poisonous gas results from fossil fuel combustion and is normally a part of ambient air. It is also produced in the respiration of living organisms (plants and animals), and considered to be the main greenhouse gas, contributing to climate change

- **Methane ( $CH_4$)**

  Hydrocarbon gas that has no colour, non-toxic and non-flammable that dries in the anaerobic decomposition of organic compounds. Methane is a greenhouse gases and a hydrological carbon components that's part of the greenhouse gases that formed through: the decomposition of waste in landfills in isolation from oxygen, digestion of animal, decomposition of animal waste, production and distribution of natural gas, oil and coal production and uncompleted combustion of fossil fuels. Methane, one of the six greenhouse gases, which is due to reduction under the Kyoto Protocol.

- **Nitrous Oxide ($N_2O$)**

  Relatively inert oxide of nitrogen produced because of microbial action in the soil, use of fertilizer containing nitrogen, burning of timber, and so forth. This nitrogen compound may contribute to greenhouse and ozone– depleting effects.

- **Perfluorocarbons (PFCs)**

  A group of chemicals composed of carbon and fluorine only. These chemicals (predominantly CF4 and C2F6) were introduced as alternatives, along with hydrofluorocarbons, to the ozone depleting substances. In addition, PFCs are emitted as by-products of industrial processes and are used in manufacturing. PFCs do not harm the stratospheric ozone layer, but they are powerful greenhouse gases these chemicals are predominantly human-made, though there is a small natural source of CF4.

- **Fossil Fuels:**

  Coal, petroleum and natural gas, which derived from the remains of ancient plant and animal alive.

- **Climate:**

  Conditions of the atmosphere at a particular location (microclimate) or region over a long period. It is the long –term summation of atmospheric elements- such as solar radiation, temperature, humidity, precipitation type (frequency and amount), atmospheric pressure, and wind (speed and direction), and their variation.

## Data Sources

Data obtained from the National Centre of Meteorology and Seismology, Environment Agency – Abu Dhabi. The data are processed and passed to Statistic Centre – Abu Dhabi for further editing and compilation mentioned in this release.

## More information and next release

For more information about environmental statistics and other official statistics, please visit the statistics link on the SCAD website at http://www.scad.ae

The next release expected in December 2020.

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