



الطيران المدني
CIVIL AVIATION



مملكة البحرين
Kingdom of Bahrain

وزارة المواصلات
MINISTRY OF TRANSPORTATION

CLIMATE OF BAHRAIN

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Meteorological Directorate
Civil Aviation
Ministry Of Transportation

INTRODUCTION ABOUT KINGDOM OF BAHRAIN

- * It is an archipelago of 33 islands, the largest being Bahrain Island.
- * The Bahrain islands are located in the west central gulf some 20 nautical miles from the mainland of Saudi Arabia.

INTRODUCTION ABOUT KINGDOM OF BAHRAIN

- * The highest point being the Jebel Al Dukhan hills 440 feet (134 metres) above sea level in the centre of the main island.
- * The airfield is located on the island of Muharraq.



WHAT IS CLIMATE OF BAHRAIN?

- * An arid type.
- * Two main climatic periods from June to September (Summer) and from December to March (Winter), separated by two transitional periods April/May(Spring) & October/November(Autumn).



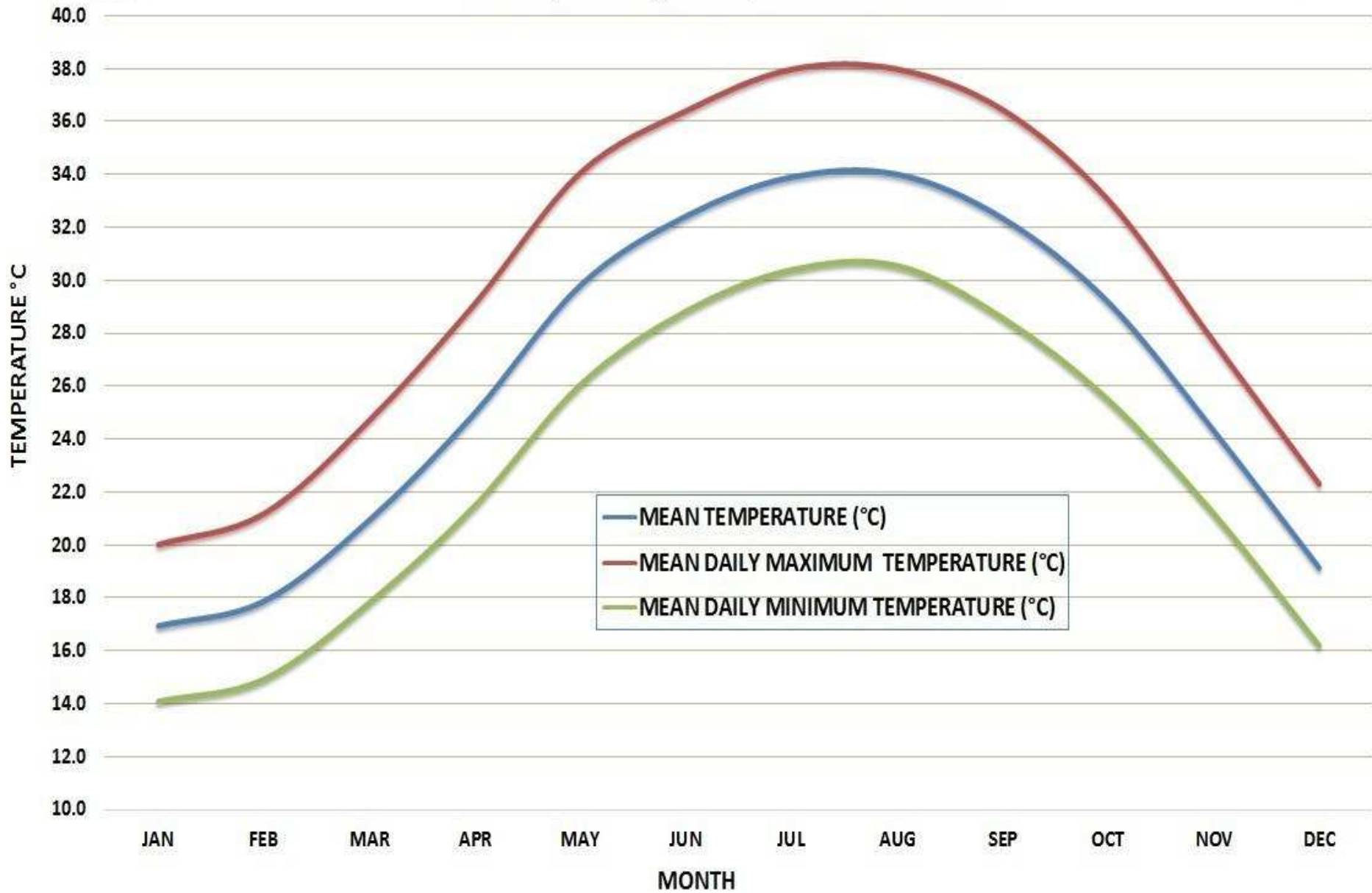
Meteorological Directorate
Climate and Observation Section
Daily Average Temperatures °C



مملكة البحرين
Kingdom of Bahrain

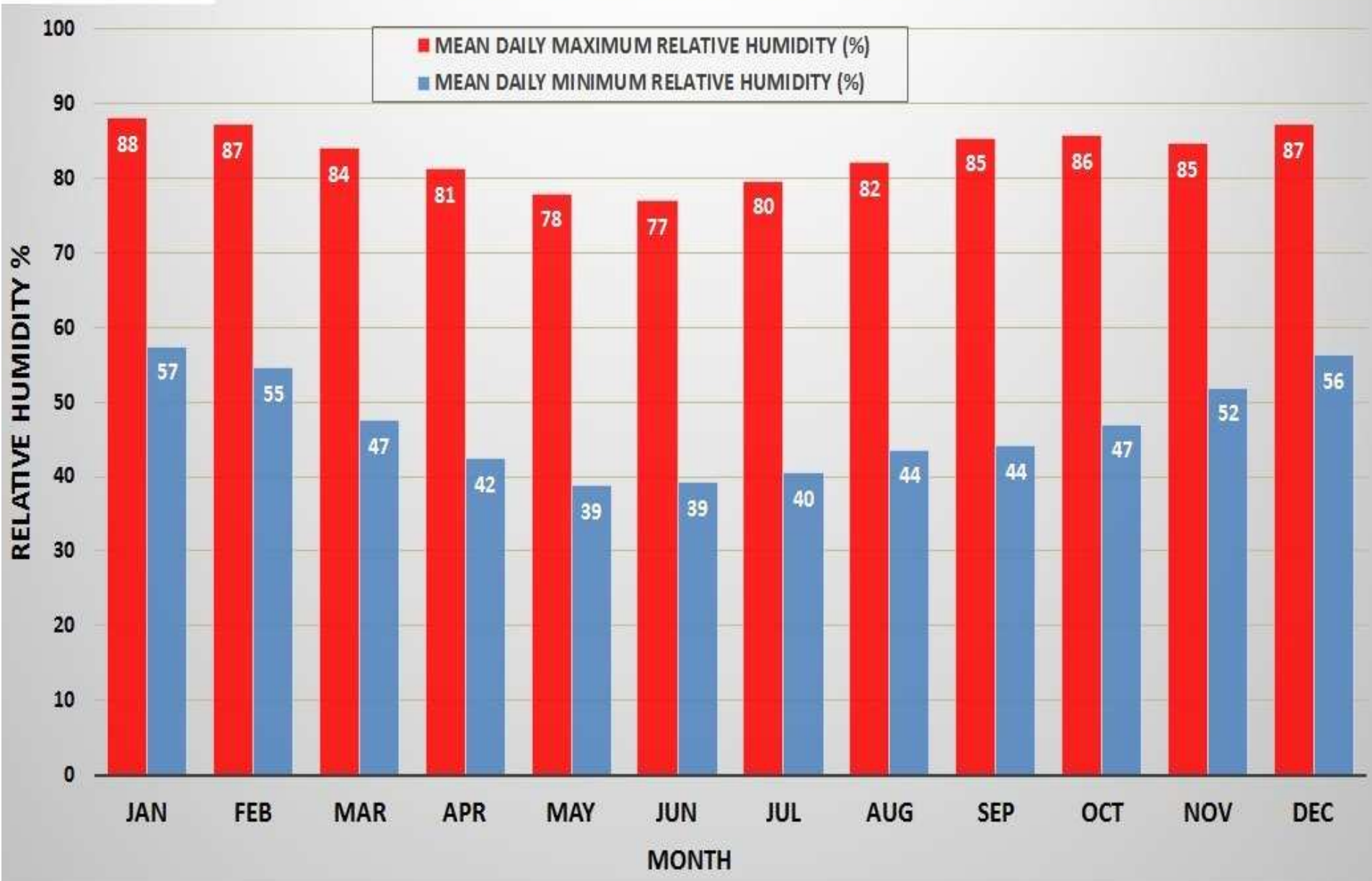
وزارة المواصلات
MINISTRY OF TRANSPORTATION

الطيران المدني
CIVIL AVIATION





Meteorological Directorate Climate and Observation Section Maximum and Minimum Relative Humidity



The appearance of meteorological Bahrain

- * 1902 formation of the first weather station.
- * 1943 began of meteorological services of the Kingdom of Bahrain and its existence officially.
- * 1972 moved under the supervision of Civil Aviation Affairs.
- * 1979 Bahrain entered into the League of Arab States (LAS).
- * 1980 entered into the World Meteorological Organization.
- * 2011 Bahrain entered to the Permanent Meteorological Committee of the GCC.

CLIMATE SECTION

- * Climatology was introduced as a unit in 1980.
- * Climatology Mission: Is to provide quality climate services to all sectors of the Kingdom of Bahrain's economy whose operations are sensitive to , and depend on climate in order to maximize their resource utilization for the benefit of the people of Bahrain as well as the international community as a whole, both present and future generations.

Automatic Weather Observation System (AWOS) VAISALA



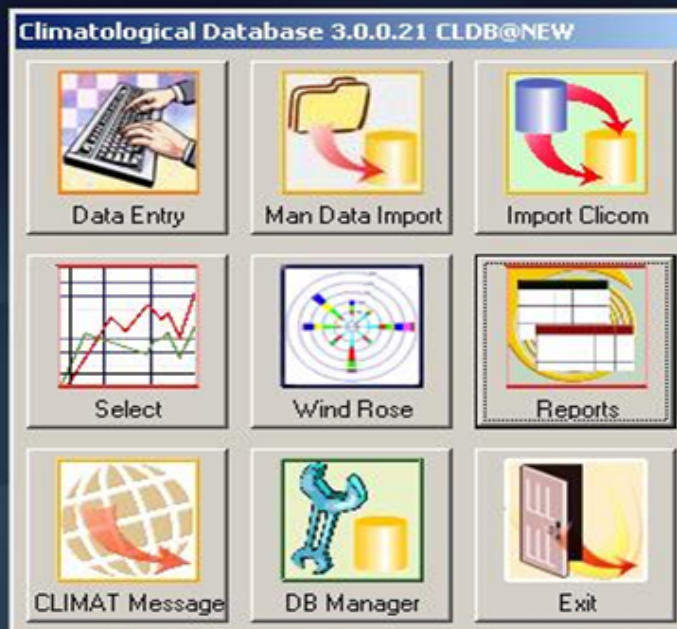
METAR COR OBBI 220600Z 30015KT CAVOK 15/05 Q1021 NOSIG

Database System

- * Implementation of (CLICOM) automated Climate Database Management Systems 1988 to 2004.
- * Installation new system called (CLDB) to manage the climate database taking into account the future needs and taking advantage of all the techniques and methods used in the system in order to reach a comprehensive and integrated approach to ensure the safety and maintenance of databases.

THE DATABASE USE IN CLIMATE SECTION(CLDB)

- * Universal and Reliable Climate Database Management System.
- * Developed by Microstep-Mis of Slovak Republic.
- * Designed for the Oracle database
- * To replace the old CLICOM.



Commands Settings

Surface data

Region: Bahrain
 Station: Bahrain Int. Airport
 Entry form: Observer

Date: Friday, April 26, 2013

Data set: Climatic observations

Options: OBS

historical unchecked
 changed invalid
 warning

Column MAX
 Column MIN
 Column SUM

Hourly data

Hour	Wind.Dir	Wind.Speed	Wind.Gust.Speed	Visibility	Weather	Clouds.Amount	Clouds.Amount.Low	Press.QFF	Press.Station	Temp
00:00	350	06	08	12.000	00	5	0	1012.1	1011.9	24.0
01:00	330	07	09	12.000	00	5	0	1012.6	1012.4	24.0
02:00	340	05	06	12.000	00	5	0	1012.8	1012.6	24.0
03:00	330	03	04	15.000	00	7	0	1013.5	1013.3	24.0
04:00	340	03	05	15.000	00	8	0	1013.8	1013.6	25.0
05:00	300	03	05	18.000	00	8	0	1014.9	1014.7	25.0
06:00	280	04	05	18.000	00	8	0	1015.5	1015.3	25.0
07:00	270	05	07	18.000	00	8	0	1015.6	1015.4	25.0
08:00	290	06	09	18.000	00	7	0	1015.6	1015.4	26.0
09:00	260	07	11	18.000	00	7	0	1015.5	1015.3	27.0
10:00	280	06	10	18.000	00	8	0	1015.1	1014.9	27.0
11:00	270	07	09	18.000	00	8	0	1014.5	1014.3	27.0
12:00	280	04	07	18.000	00	8	0	1013.5	1013.3	27.0
13:00	230	04	07	18.000	00	8	0	1012.8	1012.6	27.0
14:00	210	05	07	18.000	00	7	0	1012.8	1012.6	27.0
15:00	220	03	05	16.000	00	8	0	1012.8	1012.6	26.0
16:00	200	03	05	16.000	00	8	0	1013.1	1012.9	26.0
17:00	260	05	07	12.000	00	8	0	1013.6	1013.4	25.0
18:00	240	04	07	12.000	00	7	0	1013.9	1013.7	25.0
19:00	270	04	07	12.000	00	6	0	1014.0	1013.8	25.0
20:00	270	07	10	12.000	00	6	0	1014.0	1013.8	24.0
21:00	290	08	12	12.000	00	7	0	1013.5	1013.3	24.0
22:00	270	07	11	12.000	00	7	0	1013.5	1013.3	24.0
23:00	280	06	10	12.000	00	8	0	1013.9	1013.7	24.0

Daily observations

Observation time	Wind.Gust.Speed.Dly	Wind.Gust.Dir.Dly	Temp.Dry.Max.Dly	Temp.Dry.Min.Dly	Temp.Ground.Min.Dly	Evaporation.Sum.Dly	Prec.Sum.Dly	Sun.Duration.Sum.Dly	Temp.Apparent.Max.
00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
Value	12	290	28.2	23.7	20.7	16.7	000.0	00.8	26.4

CLDB Reports 3.4 [CLDB@NEW]

DB Reports Options

Report categories

- Custom
 - Summary
 - General summary
 - Hourly summary
 - Daily summary
 - Monthly summary
 - Annual summary
 - Long term summary
 - Extremes conditions
 - User assigned
 - Custom hourly
 - Extended custom hourly
 - Extended custom daily mean
 - Extended custom daily mean II
 - Extended custom daily min
 - Extended custom daily max
 - Extended custom monthly mean
 - Extended custom monthly min
 - Extended custom monthly max
 - Custom daily
 - Custom long term
 - Temperatures
- Probabilities
 - Temperatures
 - Mean values met or exceeded
 - Mean values below
 - Extreme max values
 - Extreme min values
 - Extreme gust wind met or exceeded
- Rainfall
 - Values met or exceeded
 - Extreme 24h values
 - Days with precipitation
 - Days with measurable rainfall
- Standard
 - Quality control

Regions

- Bahrain
- Foreign countries

Stations

- Bahrain Int. Airport
- Bahrain Int. Airport (Old Location)
- Bahrain International Circuit
- Hawar Island
- Jabal Al Dukhan
- Jaradah
- Jarim
- King Fahad Causeway
- Muharraq
- Ras Al Bar

All Invert Clear

All Invert Clear

Predefined period: From: Tuesday, January 01, 2013 To: Thursday, January 31, 2013

Month Data aggregated by: Day

Separated export files:

General climatological summary (humidity, temperature, wind, sun, rain, evaporation, pressure)

Export

Print

Preview

Day	Temperatures (°C)									Relative Humidity (%)			Pressure (hPa)			Evap (mm)	Wind (knot)			Gust (knot)		Sun (Hrs) Sum	Rain (mm) Sum	
	Dry Bulb			Wet Bulb			Apparent			Max	Min	Mean	Max	Min	Mean		Mean	Prvln drn	Mean spd	Max drn	Max spd			Max drn
	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min							Max						Min	Mean	
1-Mar-2013	21.6	25.6	19.0	17.9	19.1	15.2	20.2	24.9	17.9	80	49	70	1018	1015	1016	19.5	120	11.4	100	17.0	100	21.0	10.4	0.0
2-Mar-2013	23.5	30.4	20.4	18.5	19.7	17.3	22.6	28.9	19.8	83	25	63	1018	1015	1017	18.0	120	9.0	140	14.0	160	21.0	10.2	0.0
3-Mar-2013	23.5	30.4	20.0	18.8	20.6	17.6	23.4	29.8	20.6	83	32	65	1020	1017	1018	14.1	090	5.7	130	9.0	120	14.0	10.0	0.0
4-Mar-2013	24.4	30.0	19.1	17.7	19.5	16.2	23.8	28.4	19.9	82	23	54	1019	1013	1016	17.5	120	5.4	110	10.0	110	12.0	10.8	0.0
5-Mar-2013	26.5	33.1	22.4	17.8	19.2	17.0	25.2	31.3	22.4	65	19	43	1014	1008	1011	19.2	180	8.5	140	15.0	140	23.0	10.7	0.0
6-Mar-2013	23.8	26.9	20.7	17.6	19.4	15.6	22.4	25.8	16.3	76	38	54	1013	1008	1010	19.9	150	10.2	320	24.0	320	33.0	1.2	0.0
7-Mar-2013	19.5	21.8	16.3	12.7	15.8	9.3	15.8	20.7	15.0	61	33	45	1020	1013	1018	21.2	330	19.4	340	22.0	350	32.0	10.1	0.0
8-Mar-2013	17.8	20.2	16.2	11.3	12.8	10.0	15.0	19.6	15.0	52	35	44	1022	1018	1020	20.4	330	15.0	320	20.0	320	27.0	11.0	0.0
9-Mar-2013	19.0	21.7	15.8	14.3	16.3	11.3	17.6	21.2	15.0	72	44	59	1019	1012	1016	19.8	270	7.8	130	12.0	130	14.0	10.7	0.0
10-Mar-2013	22.2	24.6	19.5	17.3	18.9	15.7	21.0	23.8	17.6	76	42	61	1012	1007	1009	20.4	120	9.5	130	15.0	130	26.0	2.5	0.6
11-Mar-2013	21.4	23.9	19.1	14.8	17.0	13.2	18.3	23.0	16.5	64	34	49	1016	1010	1014	17.0	330	13.6	330	21.0	320	27.0	10.6	TR
12-Mar-2013	20.9	24.0	18.6	14.9	16.0	13.5	17.8	22.9	16.3	62	40	51	1018	1015	1016	18.5	300	13.8	320	20.0	320	26.0	11.2	0.0
13-Mar-2013	22.1	25.7	19.1	15.3	16.4	14.1	19.6	24.6	15.6	62	29	48	1018	1014	1016	15.1	300	11.8	300	15.0	320	20.0	11.0	0.0
14-Mar-2013	24.3	30.0	19.9	15.2	17.0	14.2	22.5	28.0	18.6	59	16	37	1017	1014	1015	14.1	300	7.0	300	13.0	300	18.0	10.5	0.0
15-Mar-2013	24.5	29.9	19.1	14.9	17.4	13.5	23.0	27.8	20.1	64	13	35	1017	1015	1016	15.1	270	5.7	010	9.0	340	13.0	10.9	0.0
16-Mar-2013	23.6	31.0	18.5	16.7	19.1	13.8	22.8	29.0	18.0	76	13	50	1017	1013	1015	16.7	090	5.5	090	12.0	090	15.0	11.2	0.0
17-Mar-2013	25.8	34.4	20.4	17.9	20.6	15.8	24.6	31.8	20.3	75	11	49	1014	1010	1012	19.2	150	8.4	080	12.0	160	20.0	11.0	0.0
18-Mar-2013	25.4	32.0	21.3	18.1	19.6	15.4	24.8	30.2	21.4	81	15	50	1013	1007	1010	15.8	150	6.1	060	11.0	060	15.0	4.0	0.0
19-Mar-2013	21.9	24.8	20.0	16.6	19.3	15.4	19.5	23.9	17.0	82	41	58	1014	1009	1012	18.0	330	13.9	350	20.0	350	31.0	9.1	TR
20-Mar-2013	21.5	23.2	20.0	16.2	17.5	15.2	19.0	22.6	16.6	64	48	57	1014	1011	1013	17.8	360	13.2	330	18.0	020	28.0	3.4	TR
21-Mar-2013	21.4	23.4	19.9	16.5	18.3	14.0	19.3	22.9	16.5	77	44	61	1016	1012	1014	18.4	330	11.6	330	17.0	330	22.0	8.4	0.0
22-Mar-2013	21.7	25.6	18.4	14.5	15.5	12.8	19.4	24.3	16.4	65	22	45	1015	1010	1013	16.0	330	10.2	310	16.0	310	21.0	11.5	0.0
23-Mar-2013	22.9	29.1	16.3	14.9	17.2	12.3	21.6	27.1	16.6	69	14	44	1012	1008	1010	18.0	270	5.6	310	11.0	310	15.0	8.5	0.4
24-Mar-2013	23.6	28.0	20.6	17.8	19.0	15.6	23.0	27.1	20.5	71	35	57	1014	1009	1012	14.1	330	6.1	330	11.0	290	16.0	10.6	TR
25-Mar-2013	21.2	23.5	19.3	14.9	17.6	12.3	17.5	22.5	15.4	73	35	50	1018	1013	1015	20.4	330	15.8	330	24.0	330	31.0	8.8	0.0
26-Mar-2013	20.7	23.9	18.8	13.9	15.0	12.5	17.1	22.6	15.1	58	31	46	1017	1013	1014	16.7	300	13.6	320	21.0	320	27.0	11.7	0.0
27-Mar-2013	22.6	28.0	17.9	13.8	16.3	12.5	21.0	26.2	16.3	72	14	38	1015	1012	1013	14.5	360	5.4	300	11.0	300	14.0	11.8	0.0
28-Mar-2013	23.8	29.4	17.3	15.8	18.8	12.7	22.7	27.9	16.3	65	22	43	1014	1011	1012	14.9	120	5.8	090	11.0	070	14.0	11.4	0.0
29-Mar-2013	25.0	28.0	20.8	16.0	18.6	13.3	24.0	26.8	20.8	73	19	39	1015	1012	1013	14.6	090	4.5	090	9.0	090	12.0	9.8	0.0
30-Mar-2013	25.5	29.3	21.6	17.1	18.1	15.3	24.6	28.0	21.2	66	27	42	1015	1012	1013	14.5	330	5.7	320	9.0	310	19.0	10.5	0.0
31-Mar-2013	25.6	28.8	22.5	17.5	18.8	16.4	24.4	27.4	22.6	62	27	44	1015	1012	1013	15.7	300	8.5	320	18.0	320	23.0	7.8	TR
	Prevailing wind															330	Total					291.3	1.0	
Mean	22.8	27.1	19.3	16.0	17.9	14.2	21.1	25.8	18.0	70	29	50	1016	1012	1014	17.3		9.5	228	15.1		21.0	9.4	0.0
Max	26.5	34.4	22.5	18.8	20.6	17.6	25.2	31.8	22.6	83	49	70	1022	1018	1020	21.2	330	19.4	350	24.0	320	33.0	11.8	0.6
Min	17.8	20.2	15.8	11.3	12.8	9.3	15.0	19.6	15.0	52	11	35	1012	1007	1009	14.1	090	4.5	10	9.0	110	12.0	1.2	0.0

METEOROLOGICAL DIRECTORATE
CLIMATE & OBSERVATION SECTION
LONGTERM NORMALS

Bahrain Int'l Airport (Lat 26 16N Long 50 39E Height 2m)

Period: 1961 - 1990

Element	Month											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Mean temperature (°C)	17.0	17.9	21.0	25.0	29.8	32.4	33.9	34.0	32.4	29.2	24.3	19.2
Mean daily max temperature (°C)	20.0	21.2	24.7	29.1	34.1	36.4	38.0	38.0	36.5	33.1	27.7	22.3
Mean daily min temperature (°C)	14.1	14.9	17.8	21.5	26.0	28.8	30.4	30.5	28.6	25.5	21.2	16.2
Mean max wet bulb (°C)	15.9	16.5	18.7	21.7	25.3	27.4	29.1	29.8	28.8	26.2	22.1	17.9
Mean daily apparent temp. (°C)	16.0	16.4	19.5	24.8	32.0	37.2	42.0	43.8	39.7	32.6	24.4	18.0
Mean daily max apparent temp. (°C)	19.4	21.1	23.1	30.1	37.6	44.8	49.2	51.3	45.8	37.7	27.8	22.3
Mean daily max relative humidity (%)	88	87	84	81	78	77	80	82	85	86	85	87
Mean daily min relative humidity (%)	57	55	47	42	39	39	40	44	44	47	52	56
Mean daily station pressure (hPa)	1019.1	1017.0	1014.1	1010.9	1006.9	1001.0	997.6	999.4	1005.3	1012.3	1016.8	1018.9
Mean daily vapour pressure (hPa)	14.5	14.9	16.6	19.6	24.2	27.6	31.4	33.4	31.6	27.1	21.1	16.3
Prevailing wind (deg.)	360	360	360	330	330	330	330	330	330	330	360	300
Mean daily wind speed (Knots)	10.3	10.5	10.5	9.6	9.7	11.1	9.2	8.4	7.4	7.6	9.2	10.0
Mean daily hours of sunshine	7.4	7.8	7.7	8.6	10.1	11.3	10.8	10.6	10.4	9.7	8.8	7.3
Mean total precipitation (mm)	14.5	16.2	14.0	10.0	1.1	0.0	0.0	0.0	0.0	0.5	3.8	10.9
Mean number of rain days (>1mm)	2.0	1.9	1.9	1.4	0.2	0.0	0.0	0.0	0.0	0.1	0.7	1.6
Mean number of days per month with:												
Fog (visibility less than 1km)	1.8	1.1	0.4	0.0	0.1	0.1	0.1	0.0	0.4	0.7	0.8	1.0
Dust (visibility less than 1km)	0.3	0.3	0.5	0.6	0.3	0.7	1.0	0.3	0.1	0.1	0.1	0.2
Thunderstorm	1.0	0.8	1.7	1.8	0.7	NIL	NIL	NIL	NIL	0.2	0.6	0.8

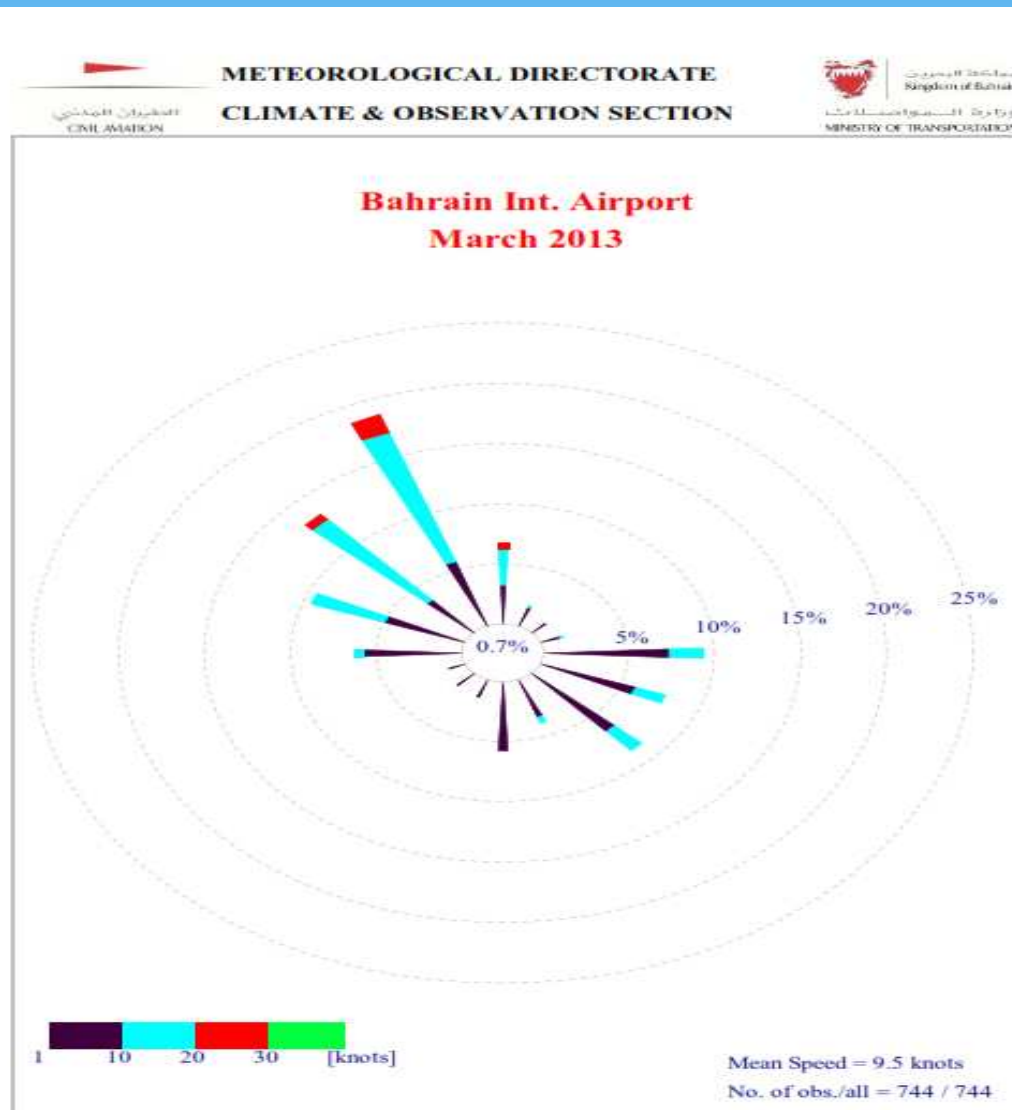
0.0 - less than 0.05mm but more than zero

blank space - NIL, no values in database

Period: 1946-2012

Element	Month												Years
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
Highest max. temperature (°C)	31.7	34.7	38.1	41.7	46.7	46.6	47.4	45.7	45.0	42.8	37.2	30.6	47.4
Day / Year	23 / 1953	22 / 1973	29 / 1998	20 / 1949	29 / 1972	20 / 2010	13 / 2010	9 / 1993	11 / 2008	1 / 2001	1 / 1999	15 / 2001	13-Jul-2010
Lowest min. temperature (°C)	2.7	7.2	7.8	14.2	18.7	22.7	25.2	26.0	23.5	18.8	12.1	6.4	2.7
Day / Year	20 / 1964	8 / 1950	1 / 1959	4 / 1967	1 / 1967	14 / 1967	19 / 1991	31 / 1997	26 / 1995	30 / 1975	29 / 2011	25 / 1967	20-Jan-1964
Warmest month: Mean max. temp. (°C)	23.1	25.2	28.8	33.1	37.9	40.2	41.4	41.0	38.7	35.6	29.9	26.3	41.4
Year	2004	1963	1969	2000	2012	1999	2002	1998	2008	2006	2004	2001	Jul-2002
Warmest month: Mean temp. (°C)	19.6	21.5	24.2	27.4	32.8	35.2	36.0	36.5	34.5	31.2	25.9	22.5	36.5
Year	2004	1963	1969	2000	2012	2009	2012	1998	1998	2012	1994	2001	Aug-1998
Coollest month: Mean temp. (°C)	13.3	15.6	17.4	22.7	27.1	30.4	32.1	32.3	30.3	27.2	21.7	15.9	13.3
Year	1964	1989	1992	1954	1956	1956	1991	1991	1959	1964	1982	2006	Jan-1964
Coollest month: Mean min. temp. (°C)	10.8	12.2	14.5	19.7	23.9	27.3	28.3	28.6	27.4	23.6	18.6	13.0	10.8
Year	1964	1989	1992	1997	1991	1991	1991	1991	1997	1975	1982	2006	Jan-1964
Highest max. wet bulb temp. (°C)	22.1	22.2	25.1	28.2	30.6	33.7	33.6	34.0	32.3	31.0	27.7	24.5	34.0
Day / Year	10 / 2004	25 / 1963	31 / 1960	28 / 2002	29 / 1972	5 / 1979	18 / 1978	8 / 1998	1 / 1986	1 / 1979	4 / 2006	10 / 2001	8-Aug-1998
Highest daily rainfall (mm)	49.1	40.9	67.9	63.1	9.2	TR	TR	1.0	TR	8.9	57.6	41.6	67.9
Day / Year	22 / 1959	24 / 1988	12 / 1995	7 / 1961	20 / 1977	9 / 1986	28 / 2008	7 / 1998	3 / 1986	31 / 1969	19 / 2000	10 / 1974	12-Mar-1995
Highest monthly rainfall (mm)	135.9	106.8	139.2	69.9	11.9	TR	TR	1.0	TR	8.9	101.6	119.6	139.2
Year	1959	1988	1995	1961	1957	1979	1995	1998	1986	1969	1997	2006	Mar-1995
Highest wind gust (Knots)	51.0	60.0	47.0	60.0	58.0	53.0	45.0	39.0	38.0	44.0	62.0	45.0	62.0
Day / Year	24 / 1974	28 / 1959	12 / 1993	19 / 1967	30 / 1987	10 / 1962	5 / 1968	4 / 1968	16 / 1959	16 / 1974	19 / 2000	20 / 1974	19-Nov-2000
Max. station pressure (hPa)	1031.6	1029.2	1027.4	1024.6	1019.8	1012.1	1005.7	1008.3	1016.0	1022.1	1027.5	1030.1	1031.6
Day / Year	5 / 1992	16 / 1991	9 / 1959	1 / 1989	5 / 1978	1 / 1968	7 / 1982	31 / 1979	29 / 1962	21 / 1984	19 / 1982	27 / 1972	5-Jan-1992
Min. station pressure (hPa)	1000.1	999.1	1000.3	997.5	996.2	989.8	991.1	986.1	994.4	1002.6	1007.8	1007.2	986.1
Day / Year	10 / 1965	13 / 1971	16 / 2007	30 / 1981	13 / 2004	26 / 2007	10 / 2000	10 / 2006	7 / 2007	2 / 1975	11 / 2009	8 / 2009	10-Aug-2006

WIND ROSE





الطيران المدني
CIVIL AVIATION

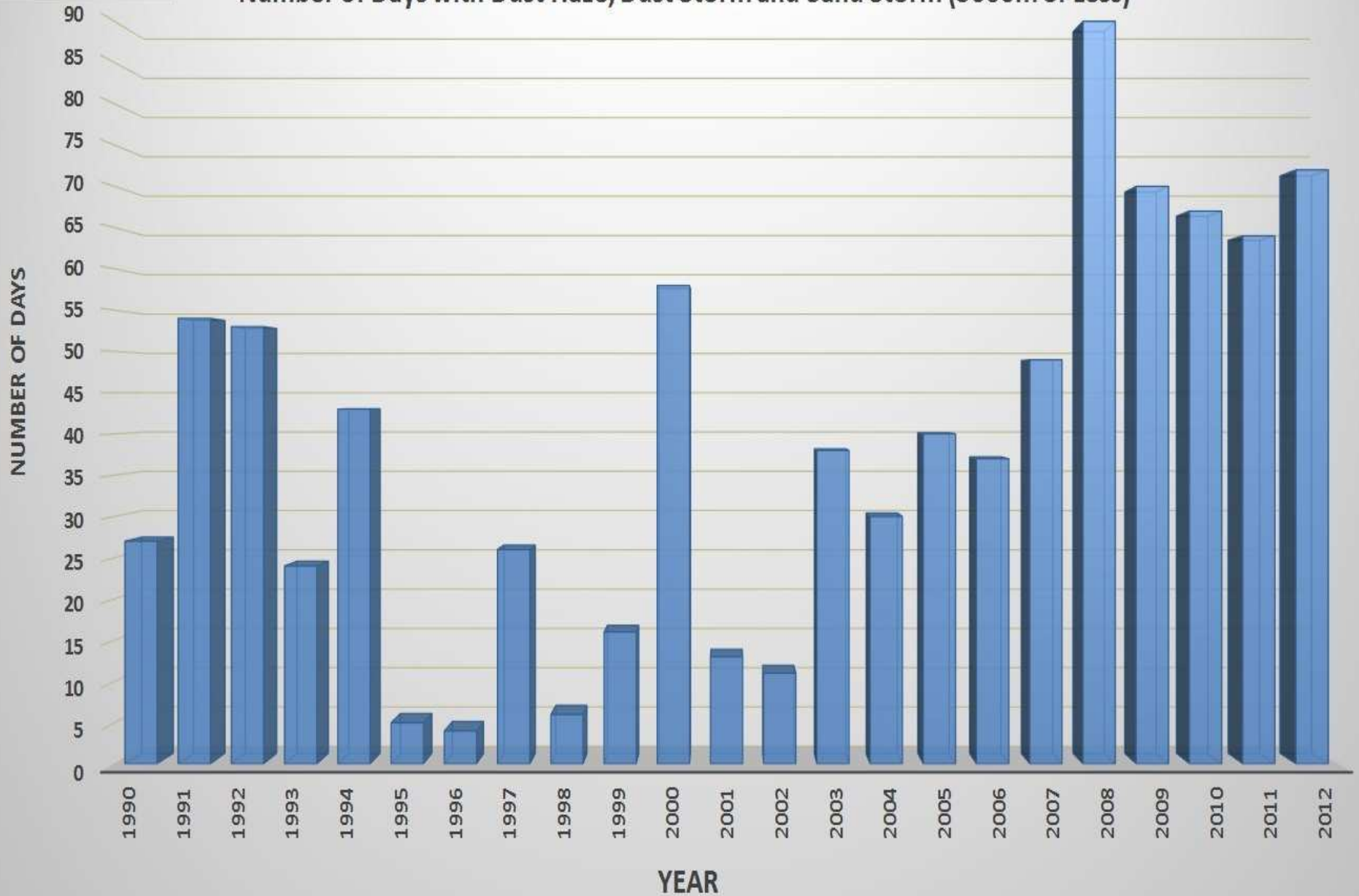
Meteorological Directorate Climate and Observation Section



مملكة البحرين
Kingdom of Bahrain

وزارة المواصلات
MINISTRY OF TRANSPORTATION

Number of Days with Dust Haze, Dust Storm and Sand Storm (5000m or Less)





Meteorological Directorate
Climate and Observation Section

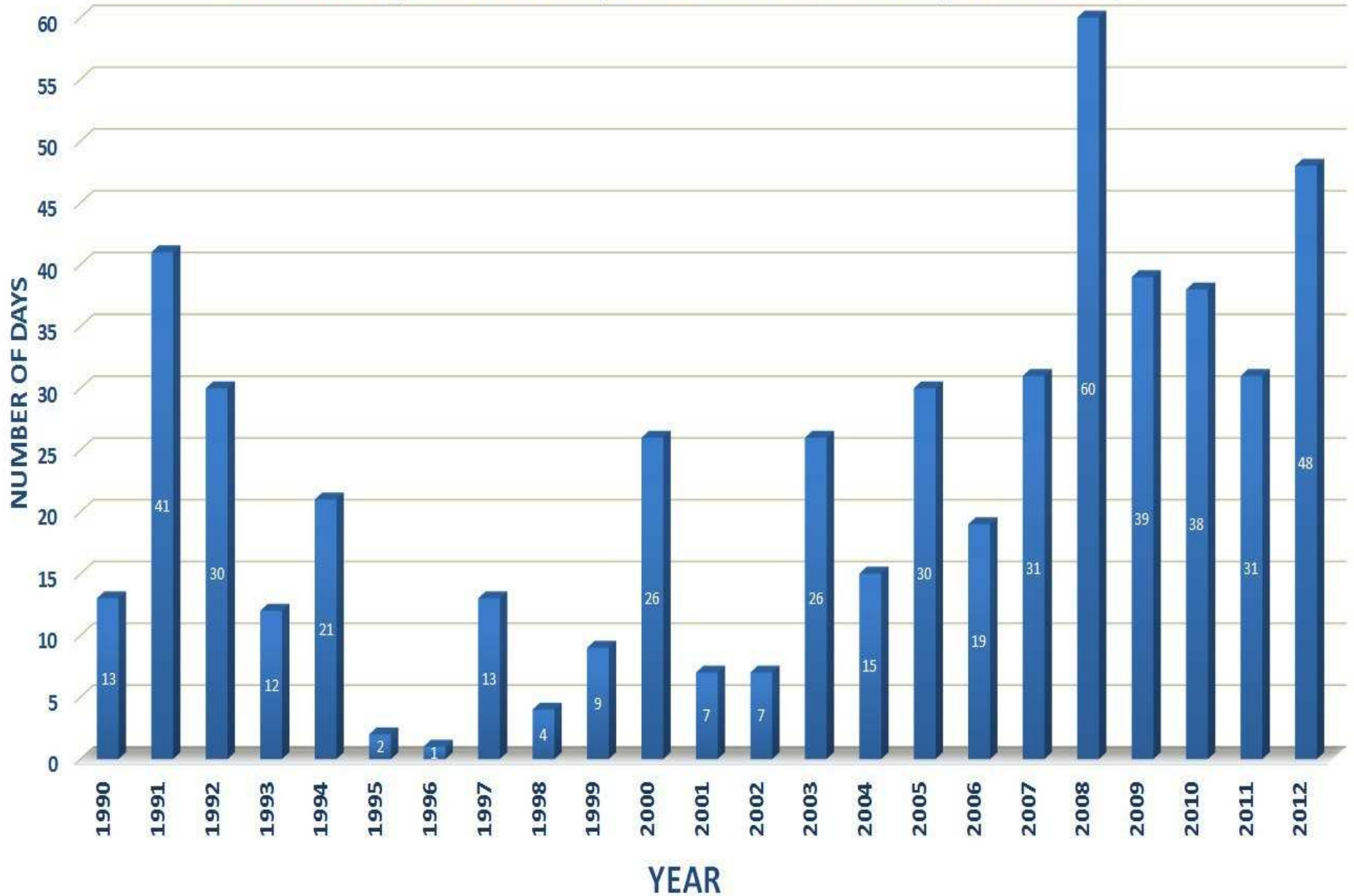


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MINISTRY OF TRANSPORTATION

الطيران المدني
CIVIL AVIATION

Number of Days with Dust Haze, Dust Storm and Sand Storm (3000m or Less)





Meteorological Directorate Climate and Observation Section

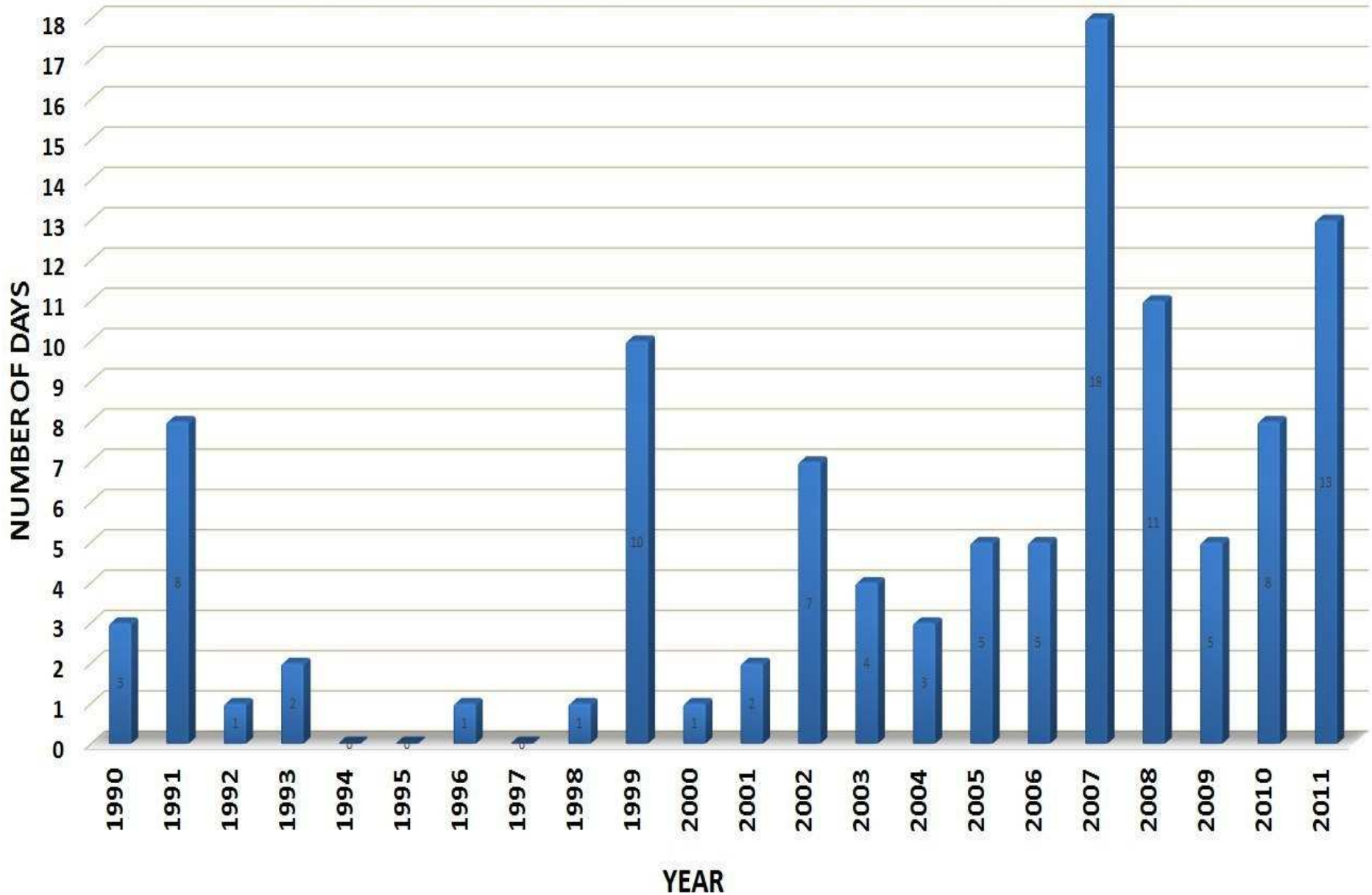


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الطيران المدني
CIVIL AVIATION

وزارة المواصلات
MINISTRY OF TRANSPORTATION

Number of Days with Dust Haze, Dust Storm and Sand Storm (1000m or Less)





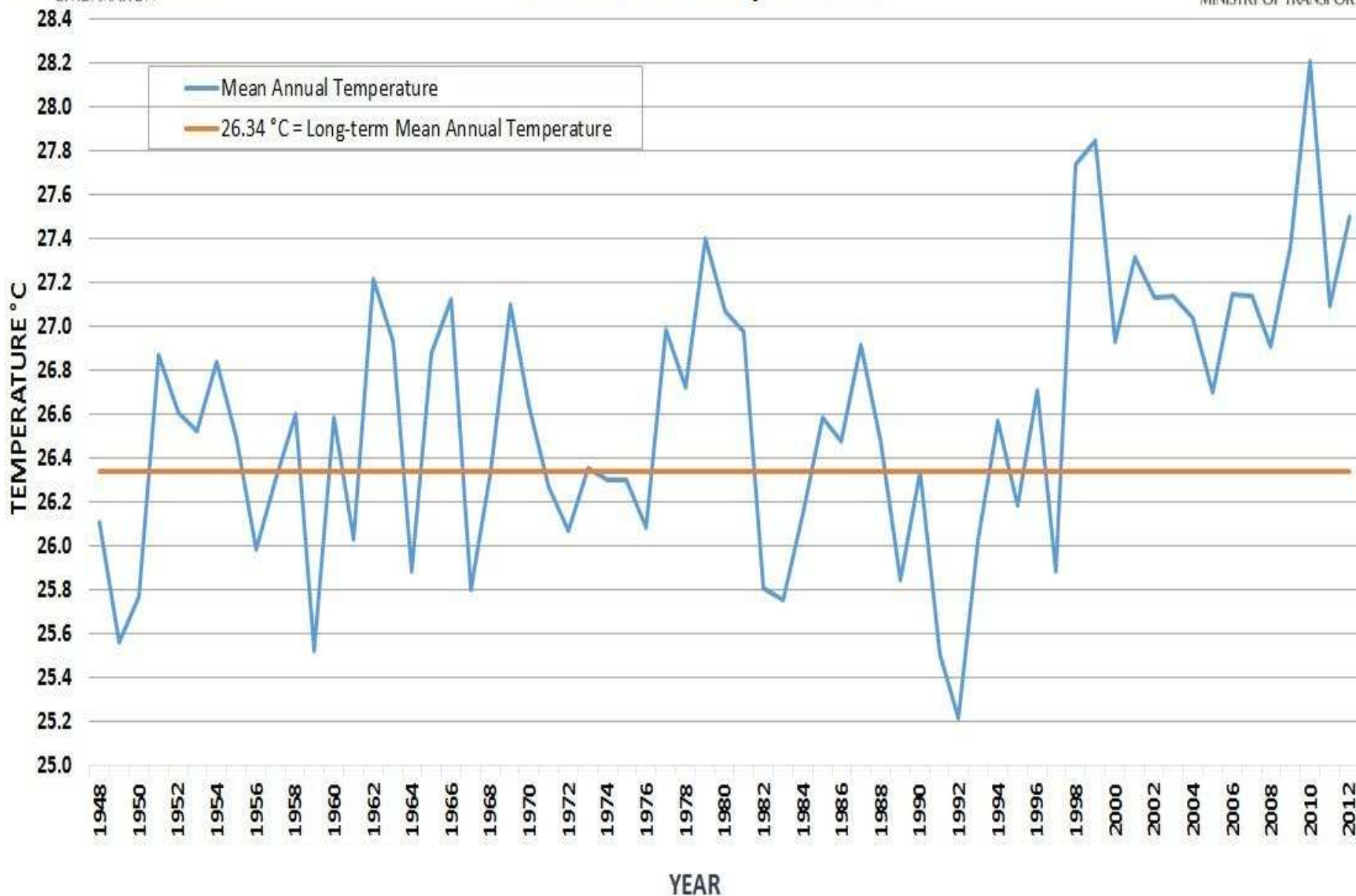
الطيران المدني
CIVIL AVIATION

Meteorological Directorate Climate and Observation Section Mean Annual Temperature °C



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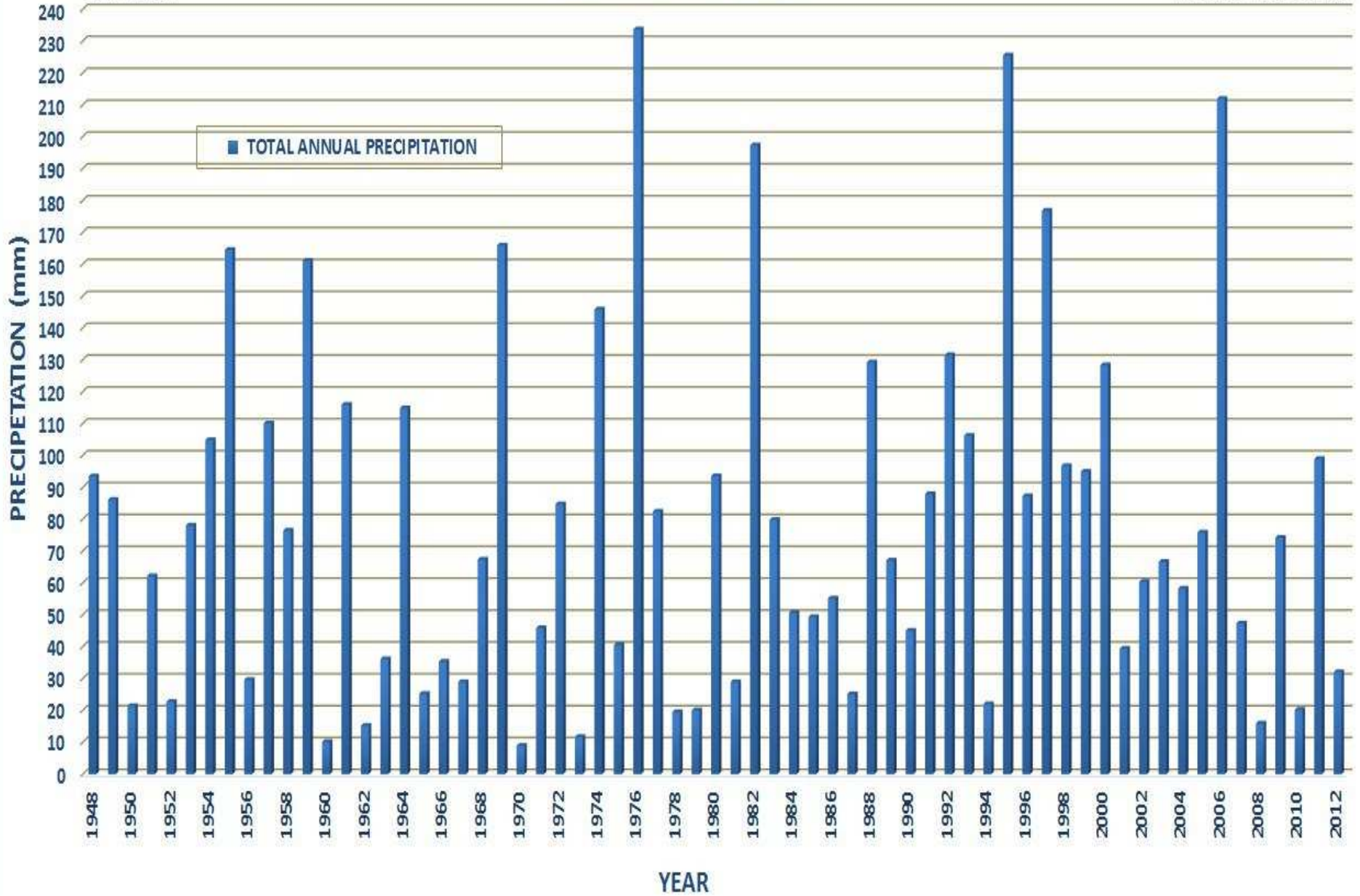
Meteorological Directorate
Climate and Observation Section
Total Annual Precipitation



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CIVIL AVIATION



Thank You

