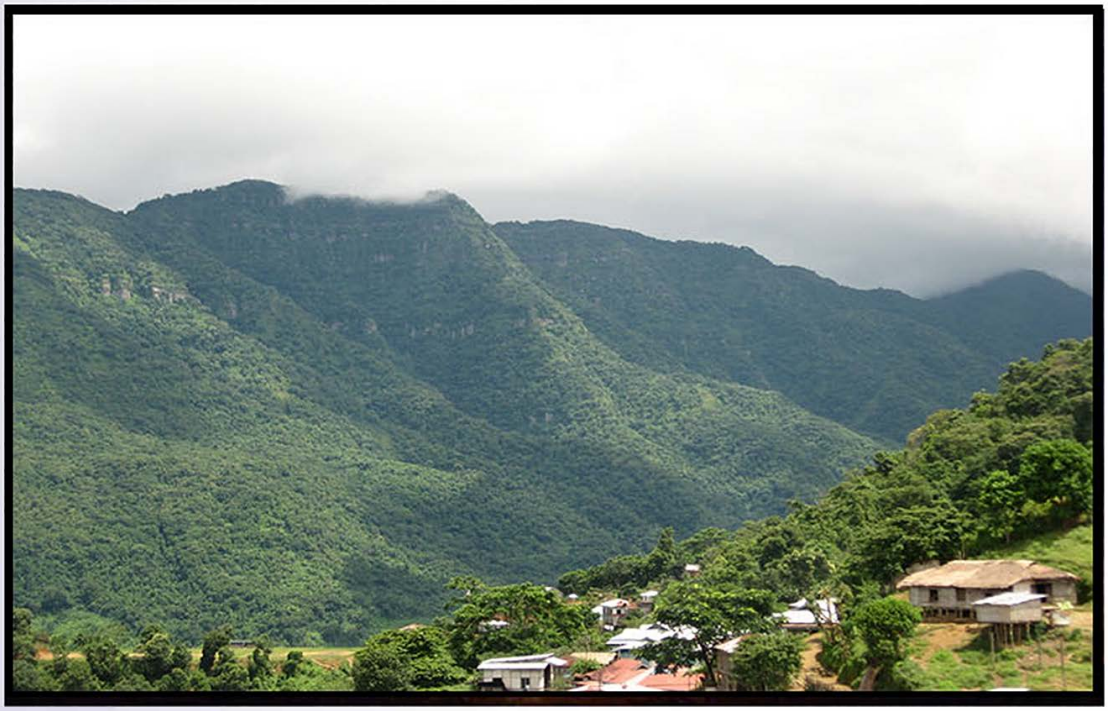
A publication by Mizoram State Climate Change Cell



Climate Profile of Mizoram

A tabular and graphical representation of meteorological data of eight district of Mizoram

MISTIC
MIZORAM

ABOUT STATE CLIMATE CHANGE CELL

The Mizoram State Climate Change Cell (SCCC) in Mizoram was established in late 2014 through the National Mission for Sustaining the Himalayan Ecosystem (NMSHE), by Department of Science and Technology, Government of India, New Delhi. It was established under Mizoram Science, Technology and Innovation Council (MISTIC). Directorate of Science and Technology, Govt. of Mizoram. Since then, several activities have been taken following the objectives of the project (which is the nature of the SCCC) in line with the objectives of the NMSHE. The NMSHE is one of the eight Major Mission of the National Action Plan on Climate Change (NAPCC), Govt. of India. The Mizoram SCCC is also responsible for implementing the project objectives of the Strategic Knowledge Mission (SKM) of the Mizoram State Action Plan on Climate Change (2012 - 2017)

Project team

Name	Designation
Dr. R.K. Lallianthanga	Chief Scientific Officer & Member Secretary, MISTIC and Project Investigator
Mr. Samuel Lalmalsawma	Senior Scientific Officer, MISTIC and CO- PI
Dr. James Lalnunzira Hrahsel	Project Scientist, SCCC
Mr. Lalthanpuia	Project Scientist, SCCC

Published by

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2018

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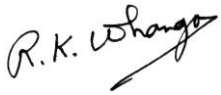
PREFACE

Climate Profile of Mizoram *is compiled by the State Climate Change Cell under Mizoram Science, Technology and Innovation Council (MISTIC), Directorate of Science & Technology, Government of Mizoram covering the climate pattern of the last thirty-two years, i.e. 1986 – 2017 recorded at various locations within the state. This booklet is an updated and summarized version of* ***Meteorological Data of Mizoram*** *published by State Meteorological Centre, Directorate of Science and Technology, Government of Mizoram in 2016. The data from the previous booklet are re-assessed and refined. New data for the years 2016 and 2017 are collected from different local sources and incorporated. Among such data, rainfall and temperature profile of 8 districts are presented in this booklet in a tabular and graphical form to represent the state of Mizoram. However, readers may note that the availability of data may not be uniform within all the districts, where in some districts may have good data, while other may have fair to poor data availability.*

It is the duty of the State Climate Change Cell to provide baseline data such as meteorological data presented in this booklet, so that it may be useful for policy makers and planners in their process of planning developmental activities whether it may be climate change programme of the government or other infrastructure and economic developments. We also believed that it will be useful for line departments, scientists, research scholars, students, organizations, etc for climate related study.

I would like to thank Pu K. Lalrammuana, Scientific Officer and Pi Lalhmunsiami, Field Assistant, State Meteorological Centre, Directorate of Science and Technology, Government of Mizoram for their work in collection and monitoring of meteorological data. I would also like to thank the organizations from where data have been collected, such as Department of Agriculture, Government of Mizoram, Department of Economics and Statistics, Government of Mizoram and Border Road Organization (BRO); Project Pushpak, Zemabawk, Aizawl, Mizoram and 74 RCC, Champhai, Mizoram.



Dated Aizawl
The 4th April, 2018.

(Dr. RK LALLIANTHANGA)
Chief Scientific Officer & Member Secretary
Mizoram Science, Technology & Innovation Council
Directorate of Science and Technology

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INTRODUCTION

Mizoram is one of the seven sister states of the north east India. It is located within a geographical coordinates 21° 58' & 24° 35' N latitude and 92° 15' & 93° 29' E longitude, in the southern most landlocked state sharing borders with Tripura, Assam and Manipur. The state also shares 722 kilometers border with the neighboring countries of Bangladesh and Myanmar. Mizoram falls within a region which receives heavy rainfall with an average of 2500 mm to 3000 mm every year. The topography of the land is hilly with rugged terrain with an altitude ranging from 50 to slightly above 2000 m above sea level. Singh et. al (2002) describe the vegetation types of Mizoram based on altitude and rainfall broadly into Tropical Wet-evergreen forest, Montane Sub-tropical forest and Temperate forest. The climate is also quite pleasant with an average of 11° to 21° C during winter and 20° to 30° C during summer.

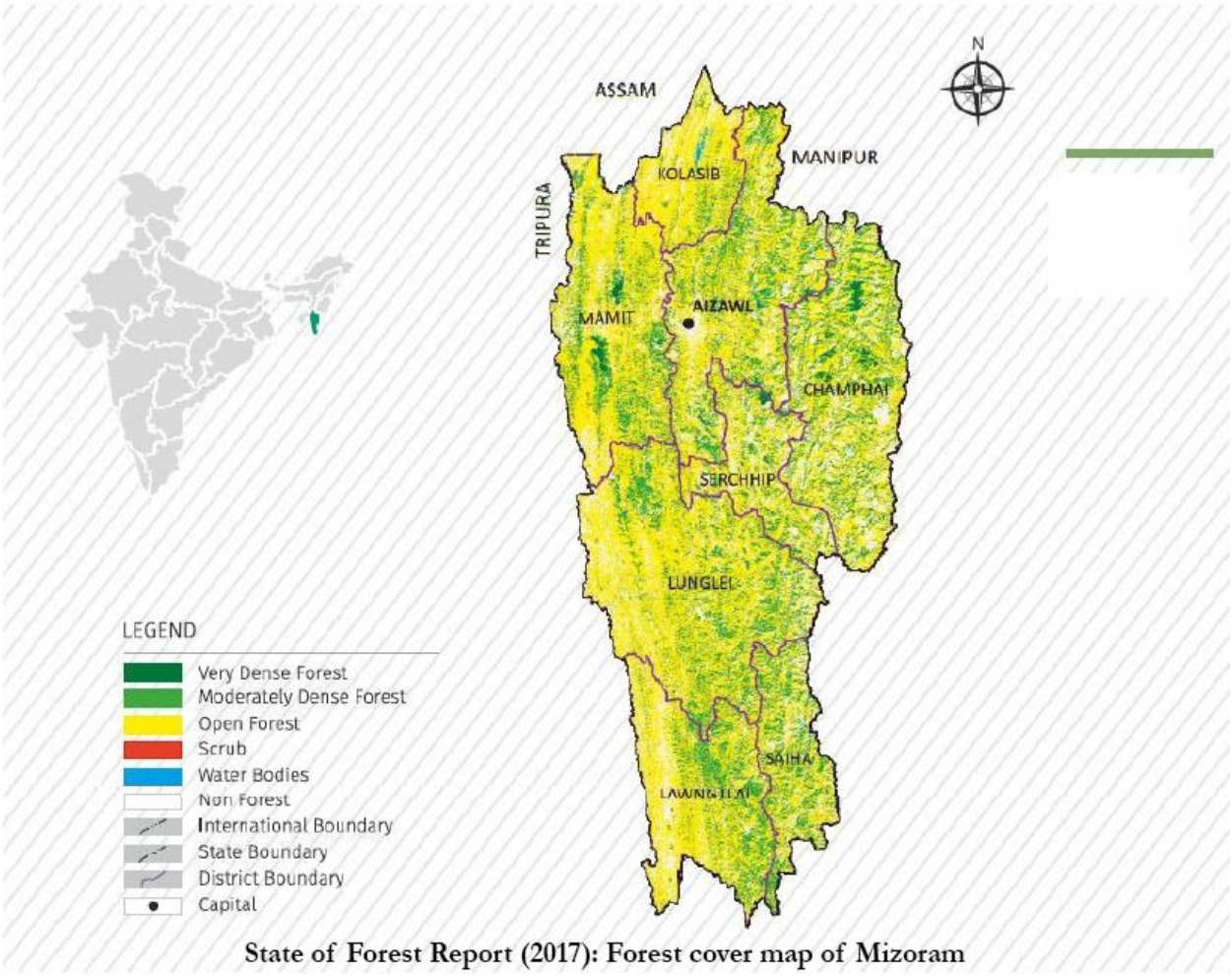
The total geographical area of Mizoram is 21,087 sq. kms which is divided into 8 administrative districts. The table below shows a brief district wise population structures of Mizoram: -

District	Population			Density (per Sq Km)	Sex Ratio	Literacy %
	Male	Female	Total			
Mamit	44567	41190	85757	28	924	60
Kolasib	42456	40598	83054	60	956	94.54
Aizawl	201072	202982	404054	113	1009	98.50
Champhai	63299	62071	125370	39	981	93.51
Serchhip	32824	32051	64875	46	976	98.76
Lunglei	79252	74842	154094	34	944	89.40
Lawngtlai	60379	57065	117444	46	945	66.41
Saiha	28490	27876	56366	40	978	88.41
MIZORAM	**552339**	**538675**	**10,91,014**	52	875	**91.85**

The Indian State of Forest Report 2017 states that of the total geographical area, forest covers 86.27 %, of which very dense forest accounts for 131 sq. kms, and the rest are moderately dense and open forest. The report also states that there is a decrease of 531 sq. kms since 2015 assessment which can be attributed to shifting cultivation and other developmental activities.

More than 70% of the population depend on agriculture for their livelihood and majority of them are practicing shifting cultivation. In addition to this, due to the topography and amount of rainfall received, the whole state of Mizoram is inclined to suffer heavily if there are

abnormal changes in climate variability as well as long term climate pattern. Climate related hazard can cause tremendous effect on each and every sector of the state as the socio-economic condition of the state is quite backward compared to the other state of the country. Significant portion of the urban population and majority of the rural population depends on agriculture and its allied sectors which are very prone to abnormal climate variability as well as change in long term climate pattern. These can in turn lead to several problems such as alteration of field preparation timing, sowing time, harvest and yield, etc. Other climate related hazards such as landslide, flash floods, etc. which are also very prone to occur in Mizoram are very detrimental for other developmental sectors as well.



State of Forest Report (2017): Forest cover map of Mizoram

The Intergovernmental Panel on Climate Change (IPCC) on its fifth assessment report (AR5) 2014 shows that the global climate is changing drastically since the past century and the past 50 years has witness the rate of change doubling of the previous decades. Increase greenhouse concentration has resulted in increased rate of global warming which influences all

the bio-geochemical cycles of the earth. Increasing temperature, abnormal precipitation, decline in ice cover, sea level rise, etc. are having unwanted result in all aspects of life.

In the remote corner of the world, in the north eastern India, Mizoram also cannot escape the global phenomena of climate change whether the magnitude of change we witness may or may not be severe in compared to other parts of the world. Even so, it has been obvious even for the general public that our climate is changing since the past decades. We have been experiencing abnormal change in climate variability, high temperature that we are not familiar with, abrupt change in spatial and temporal distribution of rainfall which often cause hazards during the recent years. But, worst of all, we have very little knowledge on the extent of changing climate because we have limited baseline information. Good meteorological data are very much needed to conduct scientific assessment of climate related issues. They are needed to be prepared readily available for planners and policy makers for any developmental planning.

Keeping in mind of the above, we have collected data from different sources within the states to update the data of the booklet *Meteorological Data of Mizoram* published by State Meteorological Centre, Directorate of Science and Technology, Government of Mizoram in 2016. We have compiled such data (rainfall and temperature) in this booklet and presented in tabular and graphical form to represent the climate pattern of 8 districts so that it represents the climate profile of Mizoram.

Table 1.1: District wise total annual rainfall (in mm) of Mizoram from 1986 to 1996

DISTRICT	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Aizawl	2486	2251	2461	2641	2630	2406	2480	2750	1721	2817	2255
Kolasib	2489	2433	2989	2650	2557	2755	2176	2724	2662	3091	3380
Champhai	2482	2604	2842	2514	2217	2155	2236	2182	1608	2110	1926
Mamit											
Serchip	2648	2538	2796	2560	2842	2900	2716	2988	1867	2539	2740
Lunglei	2207	2476	3150	2635	2989	2979	2827	2986	1800	2584	3809
lawngtlai	2594	2419	2474	2478	2886	3000	2491	2718	1863	2486	1977
Siaha	2361	2300	2483	2314	2382	2894	1862	2695	2121	2650	2446
Mizoram	**2467**	**2432**	**2742**	**2542**	**2643**	**2727**	**2398**	**2720**	**1949**	**2611**	**2648**

Table 1.2: District wise total annual rainfall (in mm) of Mizoram from 1997 to 2007

DISTRICT	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Aizawl	2553	2129	2563	2746	2401	2568	2815	2584	1839.3	2113.5	2485.5
Kolasib	4187	2808	2223	2716	4204	3117	2866	2830	2721.1	2537.8	3104.2
Champhai	2240	2116	2196	1985	1632	1842	1764	2032	1732	1650	2438
Mamit			2335	3001	2317	2703	2513	2828	2030.5	2056	2979.4
Serchip	2646	2262	2350	2862	2253	2506	2746	2588	2211	1424.4	2968
Lunglei	4872	3821	3763	5554	3641	3505	3382	4076	3211.9	2773.5	4437.4
lawngtlai	2677	2946	2762	2751	2144	3203	2771	2440	2136	2461.2	2832.1
Siaha	2388	2143	2365	2867	2140	2762	2501	2570	2757	2437	3730.3
Mizoram	**3080**	**2604**	**2570**	**3060**	**2592**	**2776**	**2670**	**2744**	**2329.9**	**2181.7**	**3121.9**

Table 1.3: District wise total annual rainfall (in mm) of Mizoram from 2008 to 2017

DISTRICT	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Aizawl	1569.5	1591.8	2777.3	2155.9	2544	2078.2	1913.7	2551.3	2856.3	2905.3
Kolasib	2467.7	1781.0	3048.9	2348.0	2740	2859.1	2516.5	2444.9	3103.4	2659.0
Champhai	1996.0	1865.5	2725	2072.5	1883	2201.3	1534.6	2011.5	2987.7	3393.1
Mamit	3359.8	3740.8	2331.6	2187.8	2237	2332.9	1805.6	1955.9	3262.4	4361.6
Serchip	1884.4	1493.7	2494.1	1953.2	2163	1952.7	1811.0	2207.6	1620.6	2292.6
Lunglei	1742.5	2005.6	2860.1	3164.0	3822	4151.6	2485.2	3080.4	2722.0	3039.2
lawngtlai	1871.6	2471.2	2041.0	1893.5		1918.5	1541.3	1673.4	1168.9	2106.0
Siaha	2590.3	1752.0	2809.6	2714.1	1596	3571.9	1886.7	2230.8	2614.5	2635.3
Mizoram	2185.2	2087.7	2636.0	2311.1	2426	2633.3	1936.8	2269.5	2542.0	2924.0

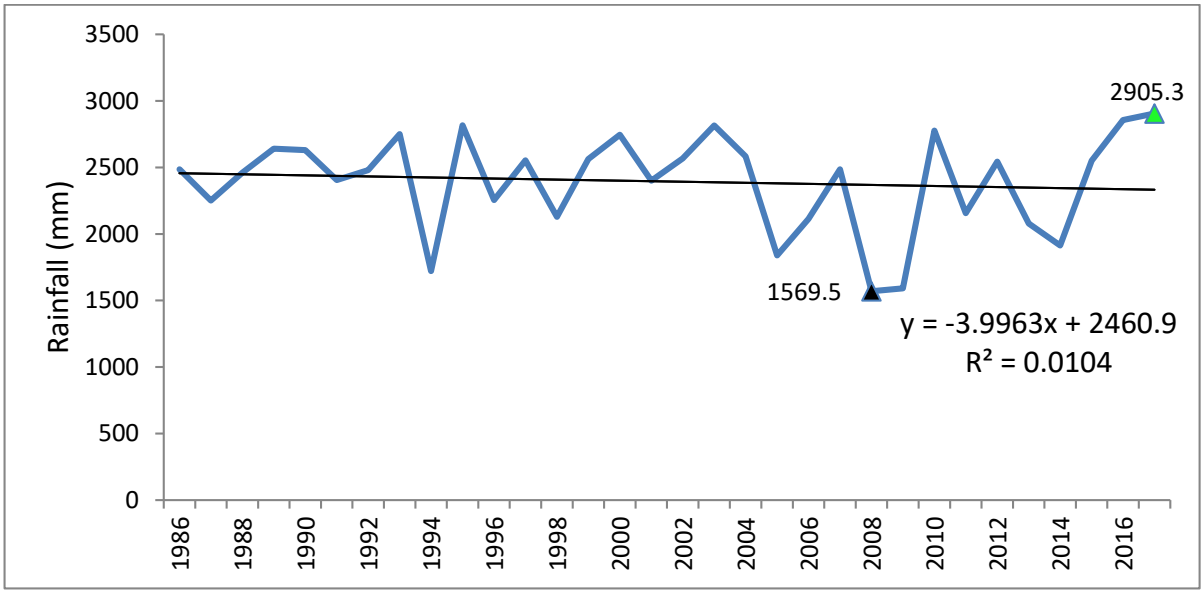


Figure 1.1: Trend of Total Annual Rainfall of Aizawl (in mm) 1986 - 2017. The total amount of rainfall decrease at the rate of 3.99 mm per year. During the period of 32 years, total annual rainfall is highest in 2017 (2905.3 mm) and lowest in 2008 (1569.5 mm). The average annual rainfall received every year is 2394.96 mm.

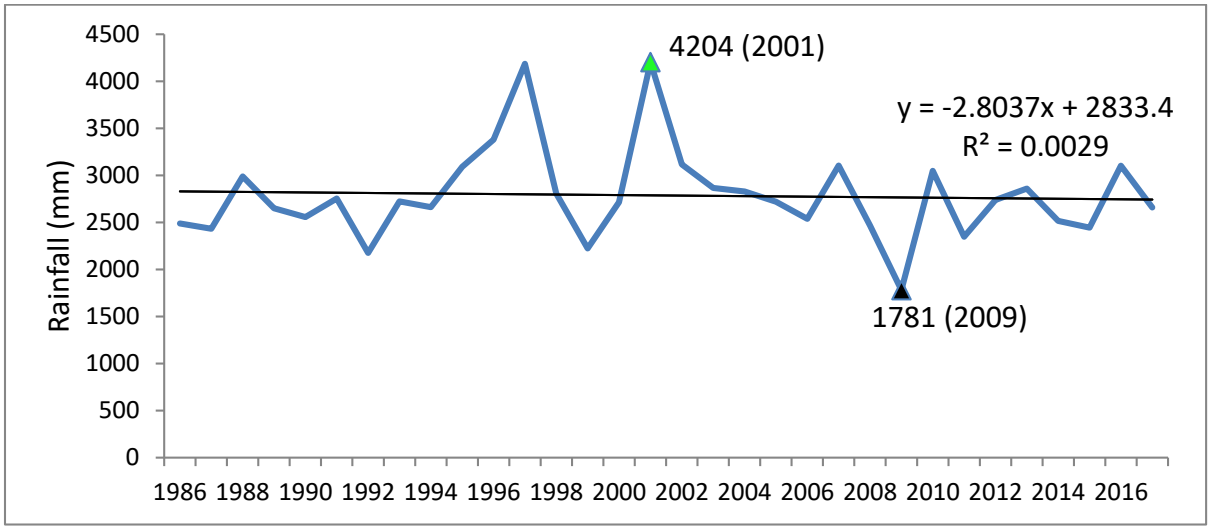


Figure 1.2: Trend of Total Annual Rainfall of Kolasib (in mm) 1986 - 2017. The total amount of rainfall decrease at the rate of 2.8 mm per year. During the period of 32 years, total annual rainfall is highest in 2001 (4204 mm) and lowest in 2009 (1781 mm). The average annual rainfall received every year is 2787.14 mm.

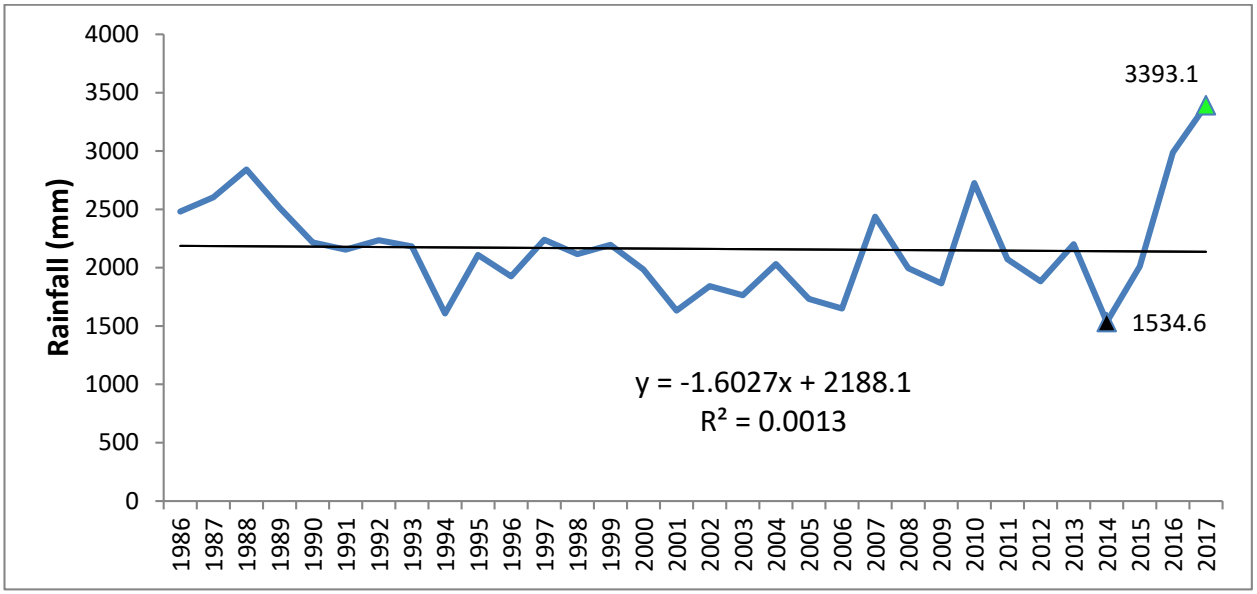


Figure 1.3: Trend of Total Annual Rainfall of Champhai (in mm) 1986 - 2017. The total amount of rainfall decrease at the rate of 1.6 mm per year. During the period of 32 years, total annual rainfall is highest in 2017 (3393.1 mm) and lowest in 2014 (1534.6 mm). The average annual rainfall received every year is 2161.66 mm.

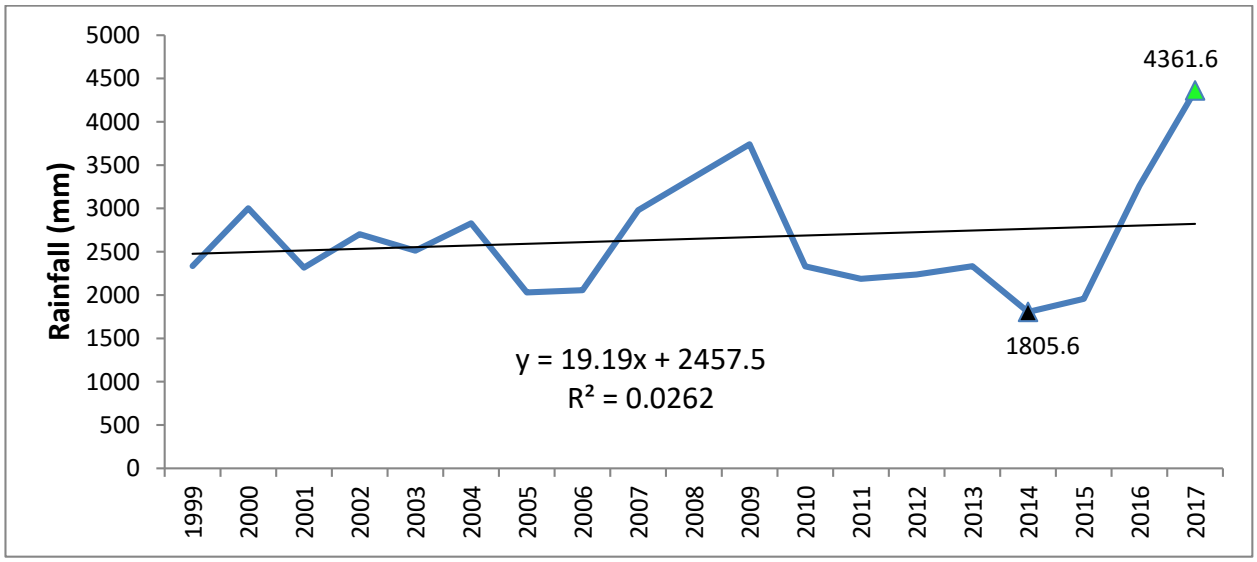


Figure 1.4: Trend of Total Annual Rainfall of Mamit (in mm) 1999 - 2017. The total amount of rainfall increase at the rate of 19.19 mm per year. During the period of 19 years, total annual rainfall is highest in 2017 (4361.6 mm) and lowest in 2014 (1805.6 mm). The average annual rainfall received every year is 2649.38 mm.

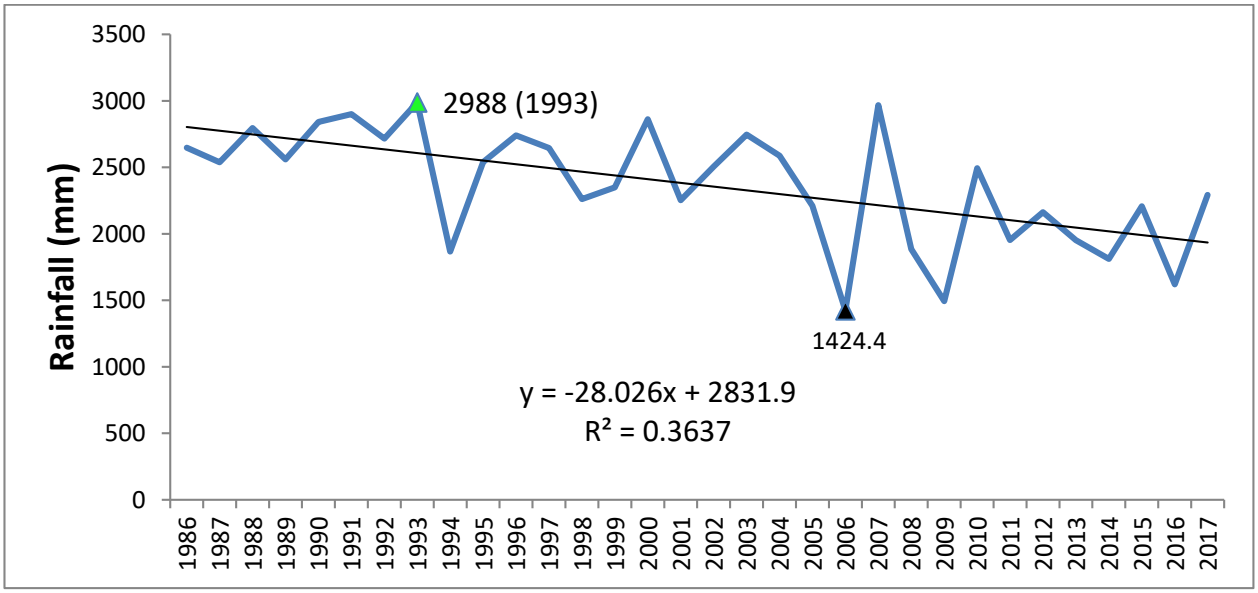


Figure 1.5: Trend of Total Annual Rainfall of Serchhip (in mm) 1986 - 2017. The total amount of rainfall decrease at the rate of 28.03 mm per year. During the period of 32 years, total annual rainfall is highest in 1993 (2988 mm) and lowest in 2006 (1424.4 mm). The average annual rainfall received every year is 2369.48 mm.

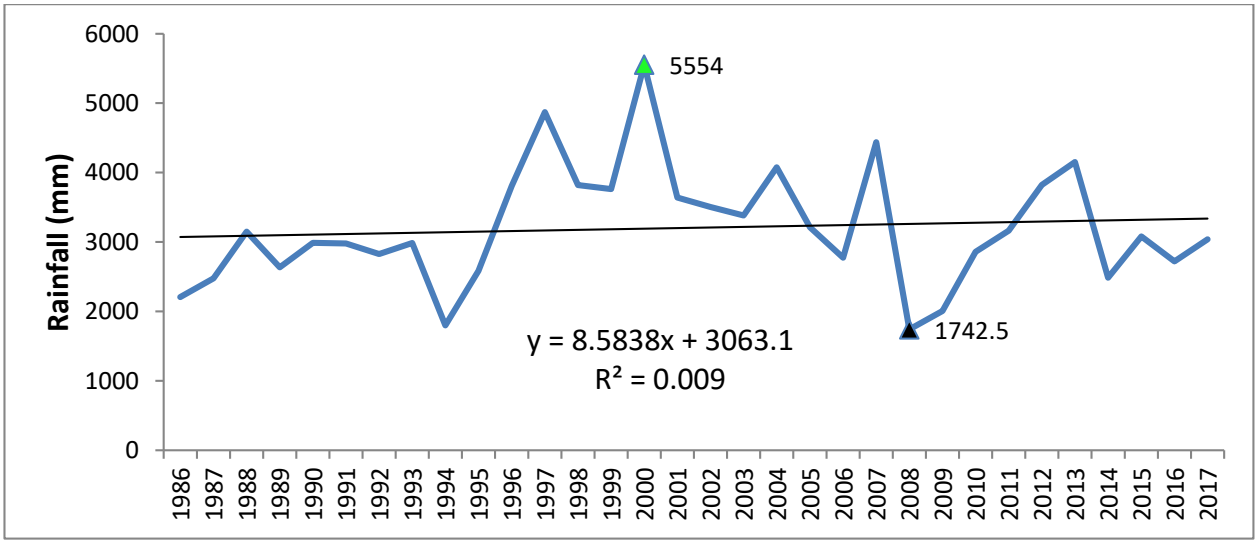


Figure 1.6: Trend of Total Annual Rainfall of Lunglei (in mm) 1986 - 2017. The total amount of rainfall increase at the rate of 8.53 mm per year. During the period of 32 years, total annual rainfall is highest in 2000 (5554 mm) and lowest in 2008 (1742.5 mm). The average annual rainfall received every year is 3204.73 mm.

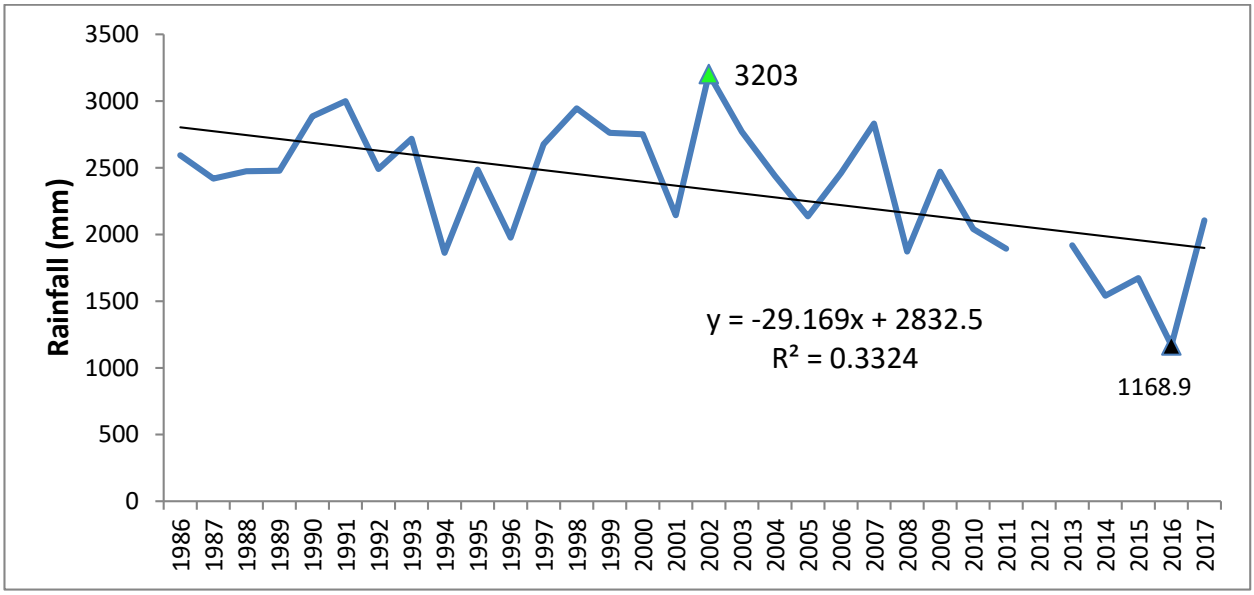


Figure 1.7: Trend of Total Annual Rainfall of Lawngtlai (in mm) 1986 - 2017. The total amount of rainfall decrease at the rate of 29.17 mm per year. During the period of 32 years, total annual rainfall is highest in 2002 (3203 mm) and lowest in 2016 (1168.9 mm). The average annual rainfall received every year is 2361.12 mm.

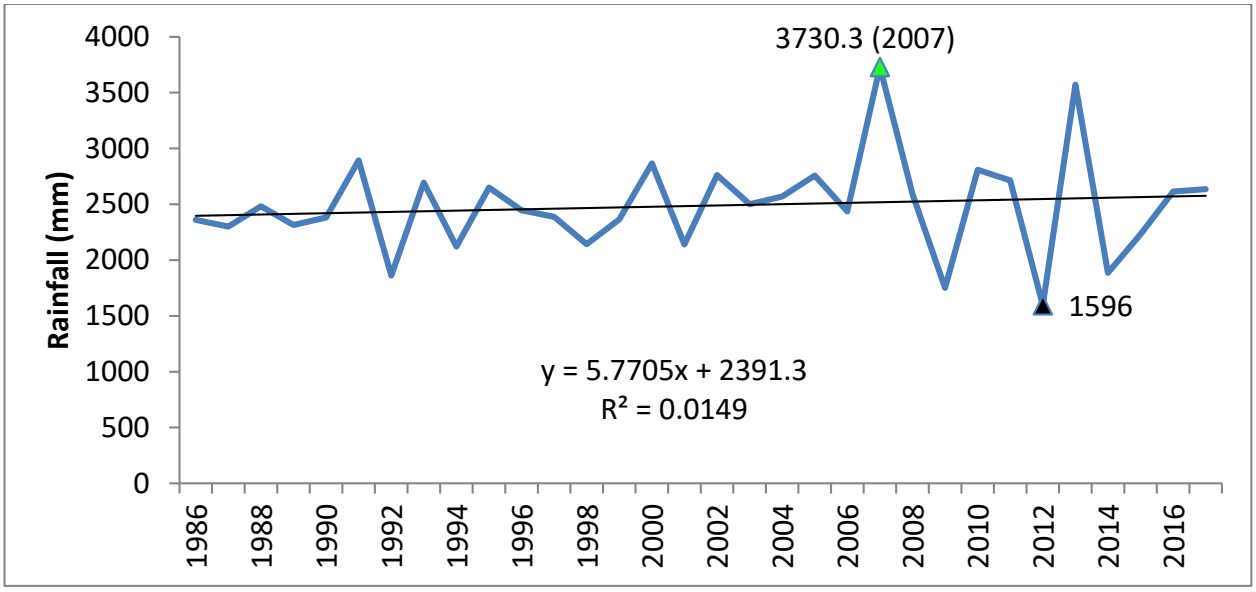


Figure 1.8: Trend of Total Annual Rainfall of Siaha (in mm) 1986 - 2017. The total amount of rainfall increase at the rate of 5.77 mm per year. During the period of 32 years, total annual rainfall is highest in 2007 (3730.3 mm) and lowest in 2012 (1596 mm). The average annual rainfall received every year is 2486.55 mm.

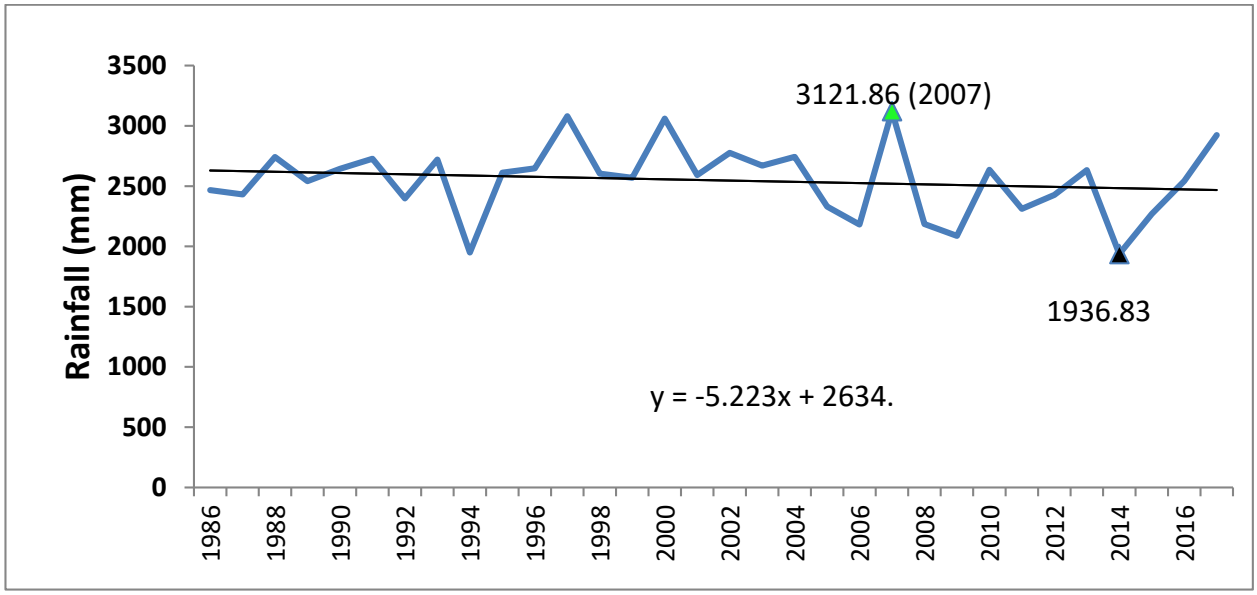


Figure 1.9: Trend of Total Annual Rainfall of Mizoram - district combined (in mm) 1986 - 2017. The total amount of rainfall decrease at the rate of 5.22 mm per year. During the period of 32 years, total annual rainfall is highest in 2007 (3121.86 mm) and lowest in 2014 (1936.83 mm). The average annual rainfall received every year is 2551.88

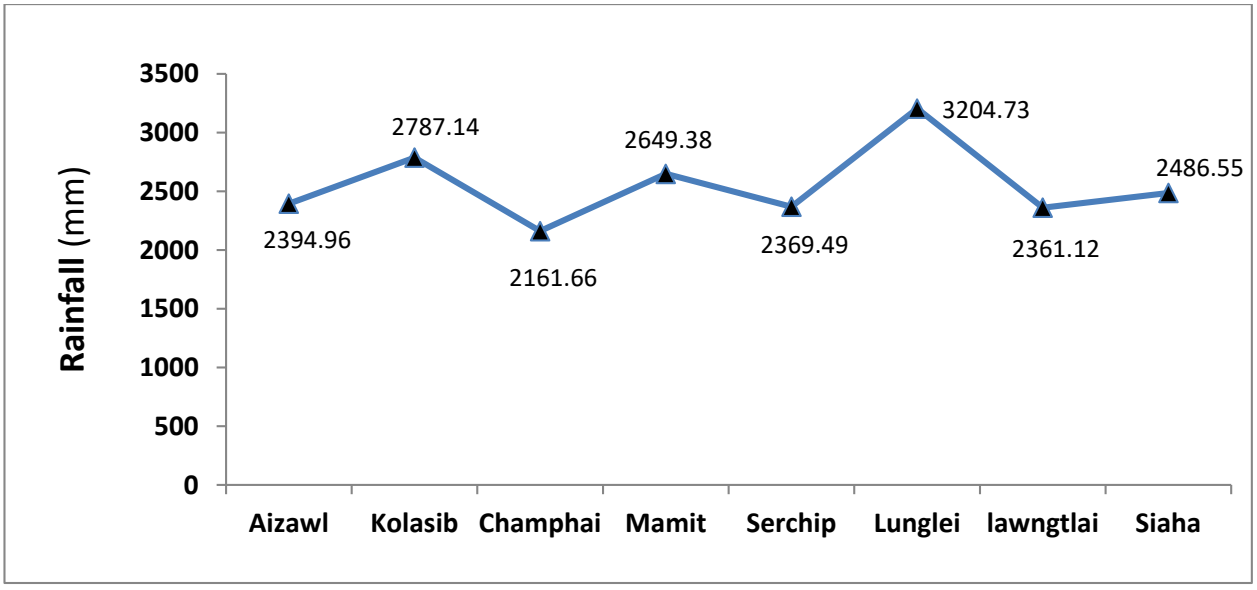


Figure 1.10: Comparison of Annual Average Rainfall of eight districts of Mizoram (in mm) 1986 - 2017. The average annual rainfall is highest in Lunglei (3204.73 mm) and lowest in Champhai (1534.6 mm).

Table 2.1: Average annual temperature of Aizawl (in ºC) from 1986 to 2017

Year	Max avg	Mean	Min avg		Year	Max avg	Mean	Min avg
1986	29.98	21.73	13.48		2002	30.14	22.25	14.35
1987	29.89	21.10	14.10		2003	29.68	22.30	14.93
1988	29.52	22.23	14.95		2004	29.67	21.92	14.18
1989	29.44	22.05	14.66		2005	30.15	21.98	13.80
1990	27.97	20.99	14.00		2006	30.98	22.65	14.33
1991	29.50	21.68	13.87		2007	30.46	22.63	14.80
1992	29.97	21.73	13.48		2008	30.55	21.93	13.31
1993	29.50	21.57	13.64		2009	31.01	23.23	15.46
1994	30.90	22.89	14.88		2010	30.47	22.83	15.19
1995	30.77	23.88	16.98		2011	30.86	22.88	14.91
1996	26.68	23.79	20.91		2012	26.42	21.79	17.16
1997	29.09	21.73	14.37		2013	26.85	21.81	16.77
1998	26.22	21.91	17.60		2014	27.71	21.06	14.41
1999	27.39	22.77	18.14		2015	26.61	19.70	12.80
2000	26.27	21.21	16.16		2016	27.42	19.24	11.07
2001	27.08	21.90	16.73		2017	28.76	20.10	11.44

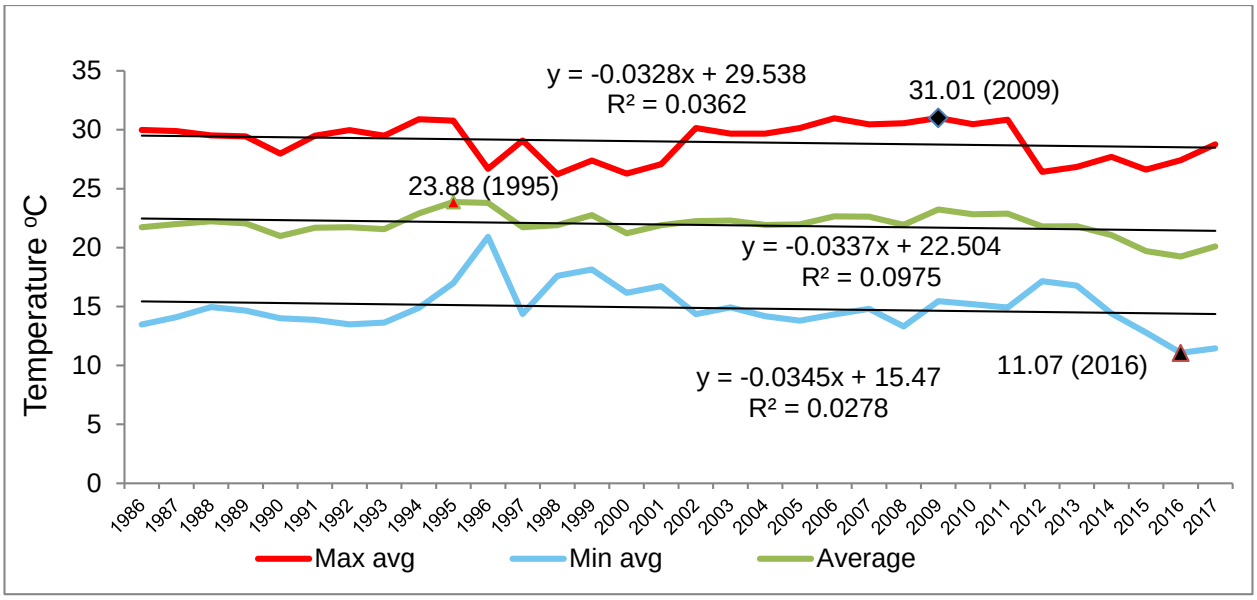


Figure 2.1: Trend of average annual maximum, mean and minimum temperature of Aizawl (in ºC) from 1986 to 2017. Over the period of 32 years, the average maximum trend shows decrease at the rate of 0.03 ºC per year, the average mean trend shows decrease at the rate of 0.03 ºC per year and the average minimum trend shows decrease at the rate of 0.03 ºC per year.

Table 2.2: Average annual temperature of Kolasib (in °C) from 1986 to 2011

Year	Max Avg	Mean Avg	Min Avg		Year	Max Avg	Mean Avg	Min Avg
1986	28.05	23.41	18.76		1999	28.27	23.53	18.79
1987	28.58	23.81	19.03		2000	26.81	23.46	20.12
1988	28.35	23.86	19.37		2001	26.86	23.94	21.02
1989	27.23	22.98	18.73		2002	29.80	24.27	18.74
1990	27.53	23.20	18.86		2003	26.18	23.23	20.28
1991	26.31	22.84	19.36		2004	25.90	23.49	21.08
1992	26.21	23.23	20.26		2005	27.30	24.45	21.61
1993	24.99	23.28	21.58		2006	27.18	24.57	21.97
1994	26.64	24.13	21.61		2007	26.43	23.37	20.32
1995	26.88	24.27	21.66		2008	28.48	25.10	21.72
1996	26.87	24.12	21.37		2009	26.99	23.82	20.65
1997	27.70	23.01	18.33		2010	26.49	24.48	22.47
1998	26.65	22.65	18.66		2011	27.91	24.21	20.52

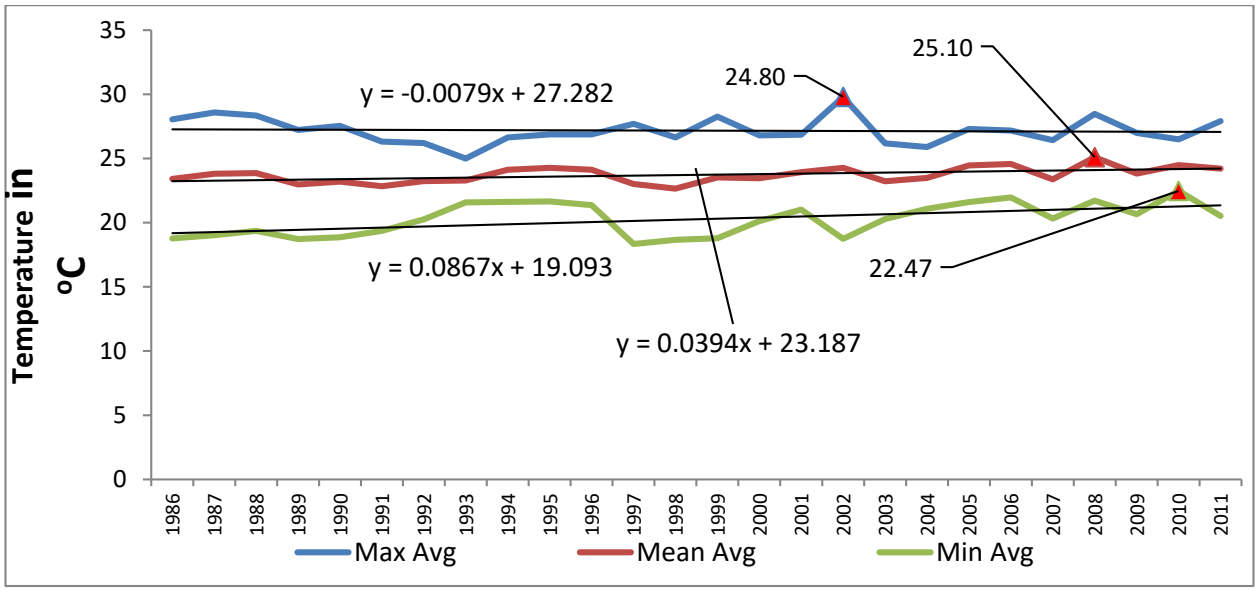


Figure 2.2: Trend of average annual maximum, mean and minimum temperature of Kolasib (in °C) from 1986 to 2011. Over the period of 26 years, the average maximum trend shows decrease at the rate of 0.01 °C per year, the average mean trend shows increase at the rate of 0.04 °C per year and the average minimum trend shows increase at the rate of 0.09 °C per year.

Table 2.3: Average annual temperature of Champhai (in °C) from 2010 to 2017

Year	Max Avg	Mean Avg	Min Avg
2010	26.74	21.28	15.82
2011	26.01	20.58	15.15
2012	24.20	18.52	12.84
2013	25.24	20.43	15.63
2014	28.23	23.51	18.80
2015	26.61	20.41	14.21
2016	24.40	18.90	13.40
2017	23.09	17.55	12.01

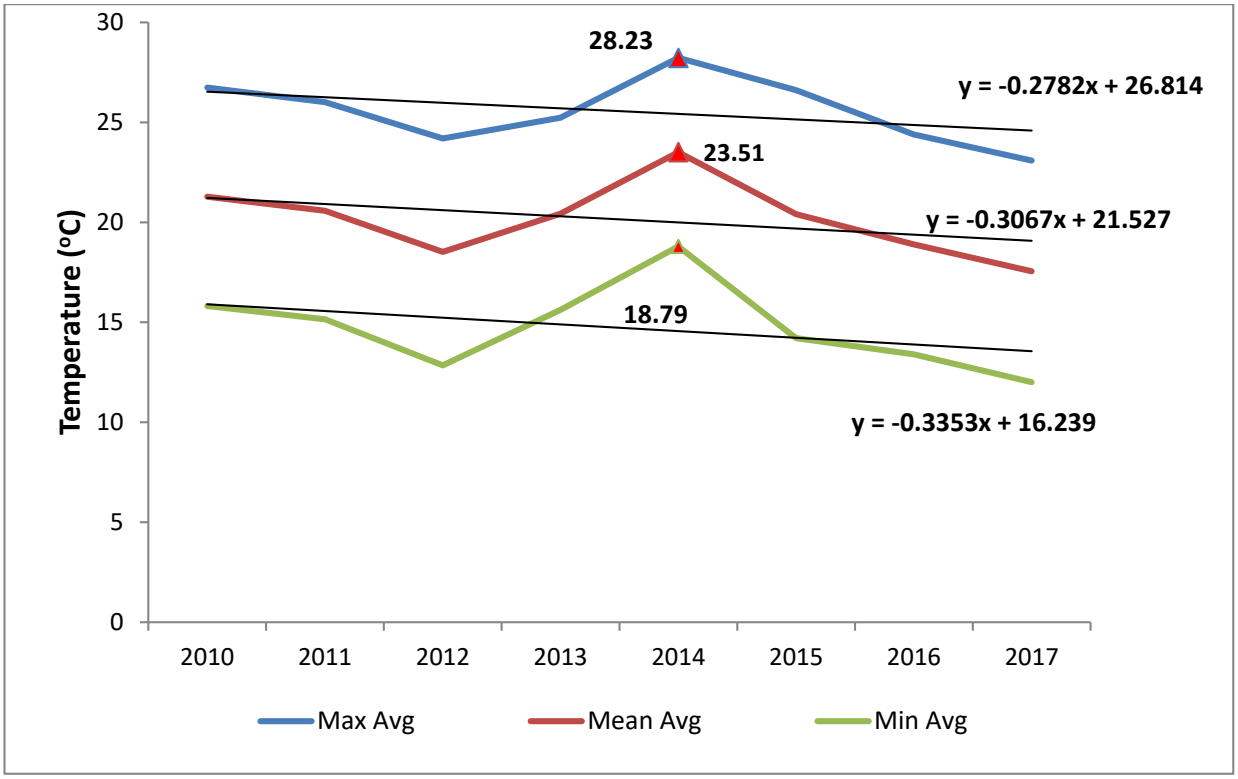


Figure 2.3: Trend of average annual maximum, mean and minimum temperature of Champhai (in °C) from 2010 to 2017. Over the period of 8 years, the average maximum trend shows decrease at the rate of 0.28 °C per year, the average mean trend shows decrease at the rate of 0.31 °C per year and the average minimum trend shows increase at the rate of 0.34 °C per year.

Table 2.4: Average annual temperature of Mamit (in °C) 2010 single year

2010												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Max	26.1	26.0	32.2	32.5	30.6	30.3	29.4	40.0	30.7	29.4	27.1	25.3
Avg. Mean	18.7	19.1	23.7	24.4	24.2	24.0	25.0	30.4	26.1	25.9	21.1	18.0
Avg. Min	11.2	12.1	15.1	16.3	17.8	17.8	20.6	20.8	21.5	22.3	15.0	10.6

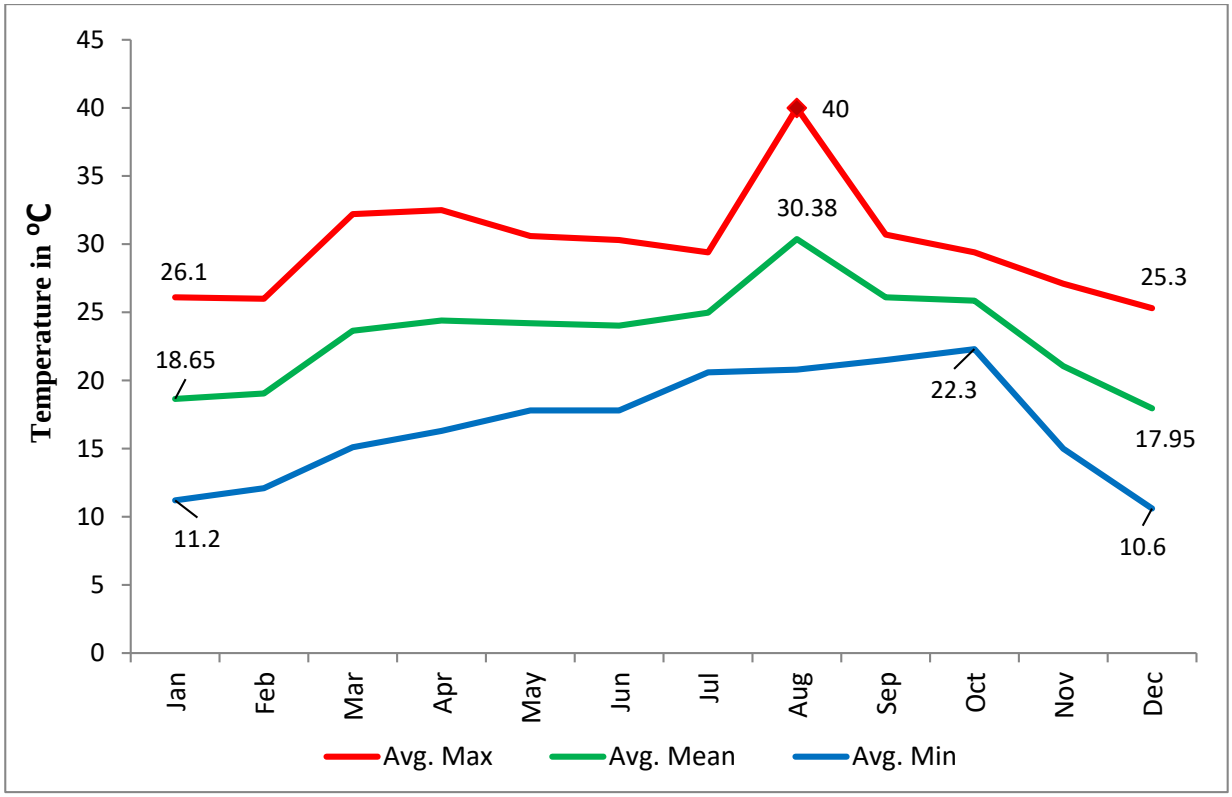


Figure 2.4: Monthly average of maximum, mean and minimum temperature of Mamit (in °C) during 2010. The average maximum, mean and minimum shows that December is the coldest month during the year. The hottest month can be seen at the month of August.

Table 2.5: Average annual temperature of Serchhip (in °C) 2011 single year

2011												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Max	24.8	28.9	32.2	32.8	33.8	32	31.9	30.8	31.6	32.7	30.2	25.3
Avg. Mean	19.5	22.8	27.0	28.2	29.7	29.5	29.3	28.6	28.9	28.9	24.6	20.2
Avg. Min	14.3	16.6	21.7	23.6	25.6	26.9	26.7	26.4	26.3	25.1	19.1	15.2

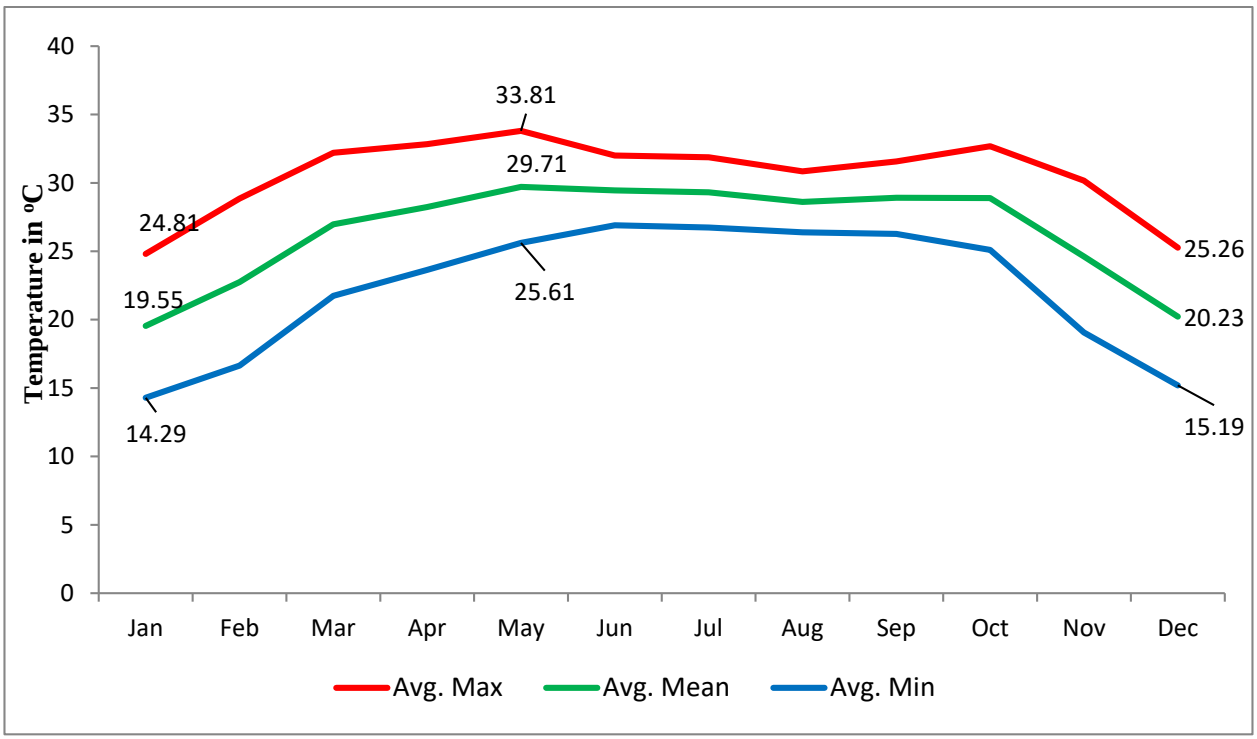


Figure 2.5: Monthly average of maximum, mean and minimum temperature of Serchhip (in °C) during 2011. The average maximum, mean and minimum shows that January is the coldest month during the year. The hottest month can be seen at the month of May.

Table 2.6: Average annual temperature of Lunglei (in °C) from 1996 to 2011

Year	Max Avg	Mean Avg	Min Avg
1996	32.83	24.50	16.17
1997	32.00	23.75	15.50
1998	32.79	24.85	16.92
1999	33.08	24.83	16.58
2000	32.58	23.58	14.58
2001	32.83	24.63	16.42
2002	32.33	24.33	16.33
2003	32.42	24.83	17.25
2004	32.50	23.88	15.25
2005	31.67	23.04	14.42
2006	31.58	24.42	17.25
2007	38.25	27.00	15.75
2008	31.83	23.71	15.58
2009	27.33	23.54	19.75
2011	34.00	26.29	18.58

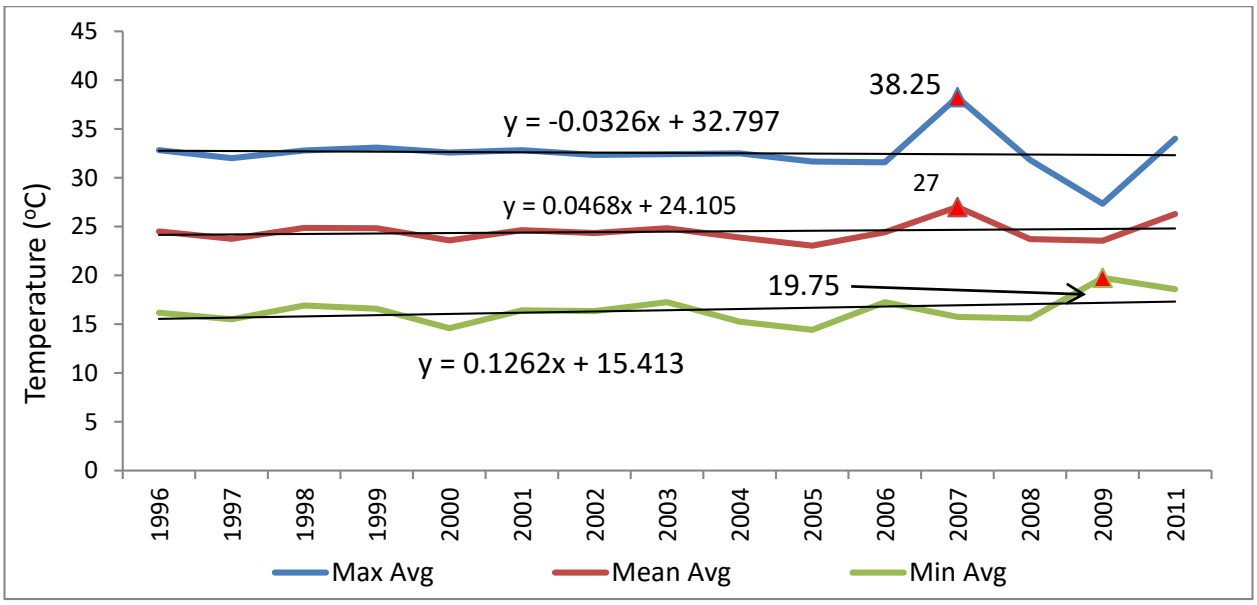


Figure 2.6: Trend of average annual maximum, mean and minimum temperature of Lunglei (in °C) from 1996 to 2011. Over the period of 15 years, the average maximum trend shows decrease at the rate of 0.03 °C per year, the average mean trend shows increase at the rate of 0.05 °C per year and the average minimum trend shows increase at the rate of 0.13 °C per year.

Table 2.7: Average annual temperature of Lawngtlai (in °C) from 1986 to 2011

Year	Max Avg	Mean Avg	Min Avg		Year	Max Avg	Mean Avg	Min Avg
1986	29.83	21.21	12.58		1999	29.42	22.17	14.92
1987	30.17	21.58	13.00		2000	29.92	23.13	16.33
1988	26.50	20.54	14.58		2001	30.92	23.63	16.33
1989	27.00	20.04	13.08		2002	30.08	22.33	14.58
1990	27.50	19.46	11.42		2003	28.17	21.25	14.33
1991	28.67	20.58	12.50		2004	28.25	20.79	13.33
1992	29.58	21.50	13.42		2005	29.42	21.79	14.17
1993	27.33	18.96	10.58		2006	30.00	22.75	15.50
1994	29.42	21.13	12.83		2007	29.25	21.92	14.58
1995	31.58	22.38	13.17		2008	28.83	21.21	13.58
1996	31.00	22.48	13.96		2009	27.50	22.75	18.00
1997	29.33	21.50	13.67		2010	30.33	24.00	17.67
1998	28.83	22.08	15.33		2011	28.83	22.29	15.75

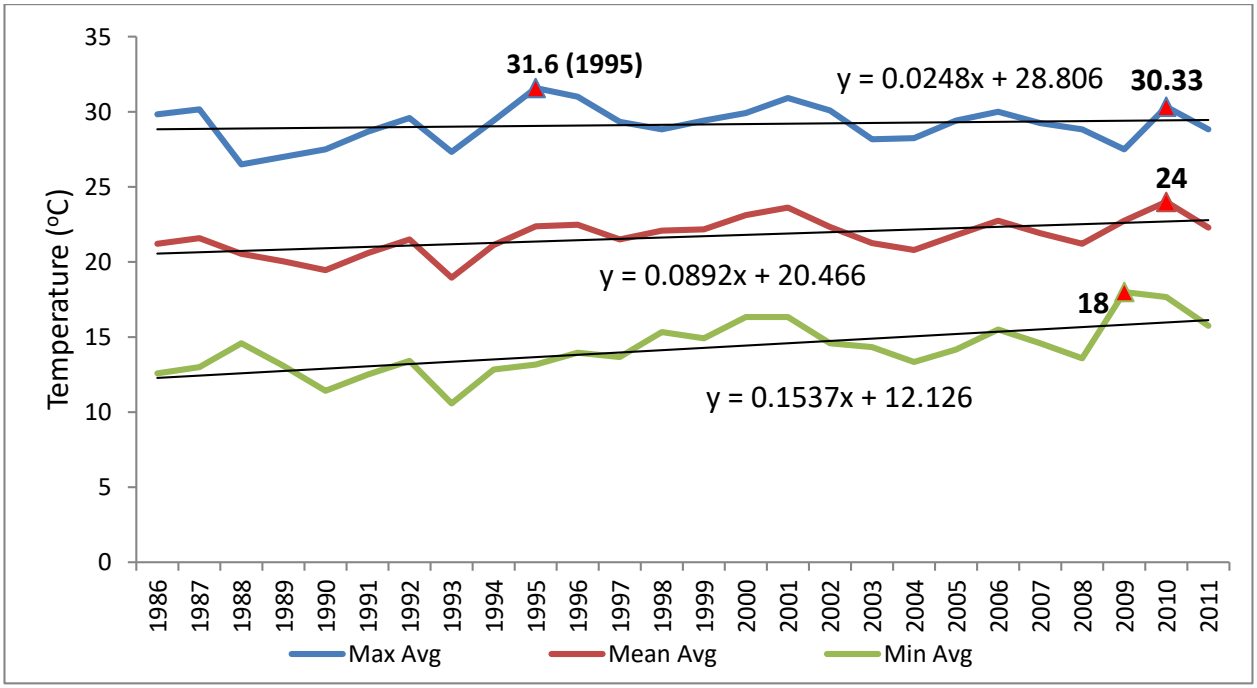


Figure 2.7: Trend of average annual maximum, mean and minimum temperature of Lawngtlai (in °C) from 1986 to 2011. Over the period of 26 years, the average maximum trend shows increase at the rate of 0.02 °C per year, the average mean trend shows increase at the rate of 0.09 °C per year and the average minimum trend shows increase at the rate of 0.15 °C per year.

Table 2.8: Average annual temperature of Siaha (in ºC) 2010 single year

	2010											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Max	26.3	28.6	33.0	33.8	33.4	29.7	27.3	23.7	30.7	30.3	27.4	28.1
Avg. Mean	18.7	20.2	23.8	25.5	25.2	24.2	21.0	19.4	26.9	24.4	20.6	19.3
Avg. Min	11.1	11.8	14.6	17.2	17.0	18.7	14.7	15.2	23.1	18.5	13.7	10.5

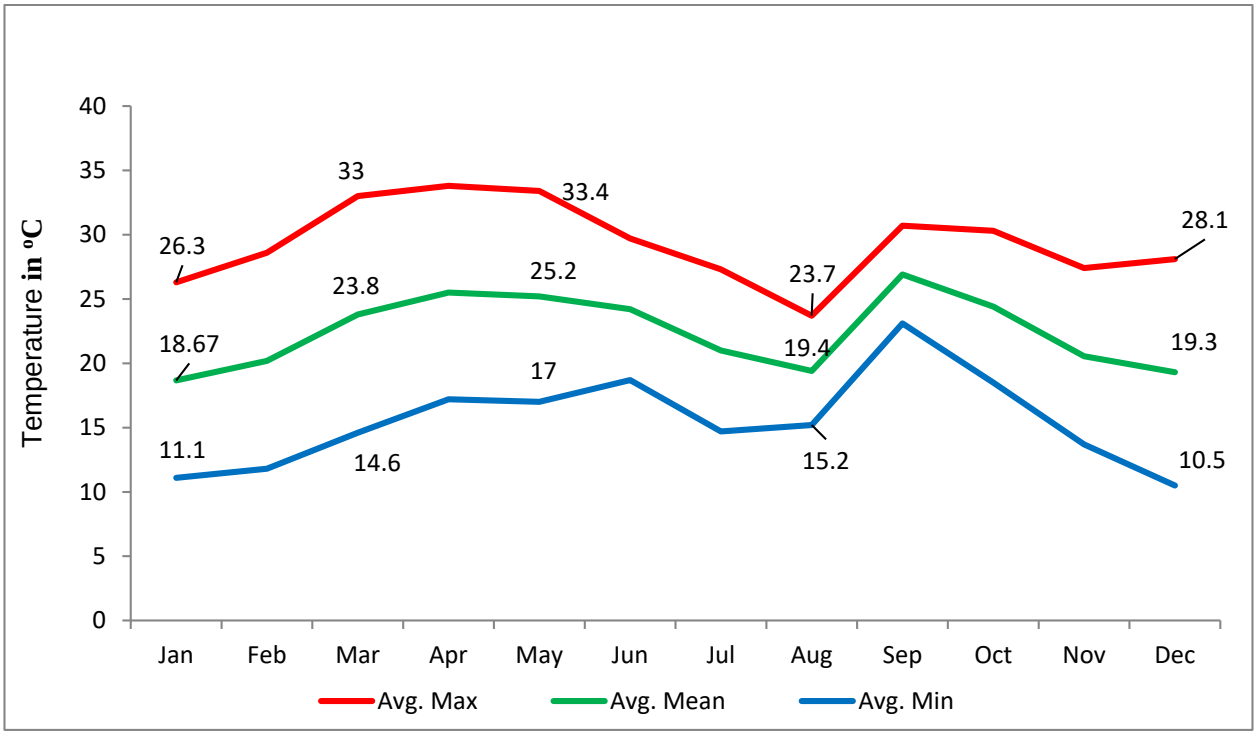


Figure 2.8: Monthly average of maximum, mean and minimum temperature of Siaha (in ºC) during 2010. The average maximum and average mean shows that January is the coldest month during the year. The hottest month can be seen at the month of May which is shown by the average maximum and average mean.