

INDIA METEOROLOGICAL DEPARTMENT

2009 : THE WARMEST YEAR SINCE 1901

HIGHLIGHT OF TEMPERATURES DURING THE YEAR 2009

In 2009, annual mean temperature averaged over the country as a whole was $+0.913^{\circ}\text{C}$ above the 1961-1990 average [Fig. 1(a)]. The annual average for the country is 24.64°C . The year 2009 was the warmest year on record since 1901. The other warmer years on record in order are 2002(0.708), 2006(0.6), 2003(0.560), 2007(0.553), 2004(0.515), 1998(0.514), 1941(0.448), 1999 (0.445), 1958(0.435), 2001(0.429), 1987(0.413) and 2005(0.410). Monthly mean and seasonal mean temperatures for the country as a whole are given in Appendix.

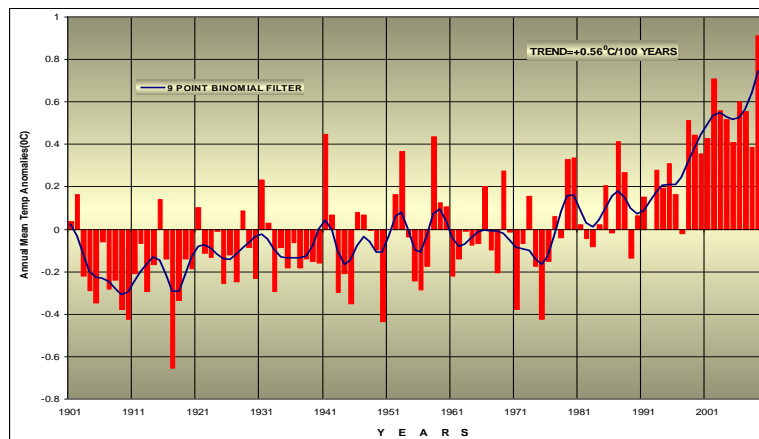
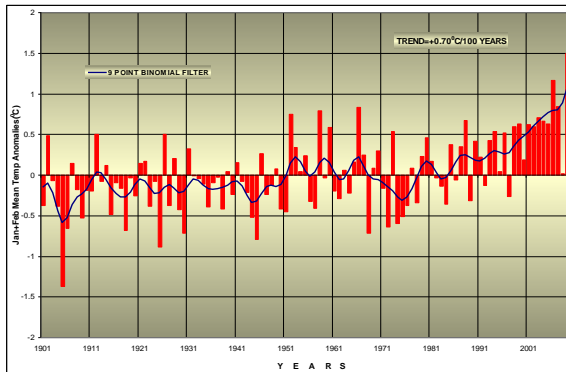


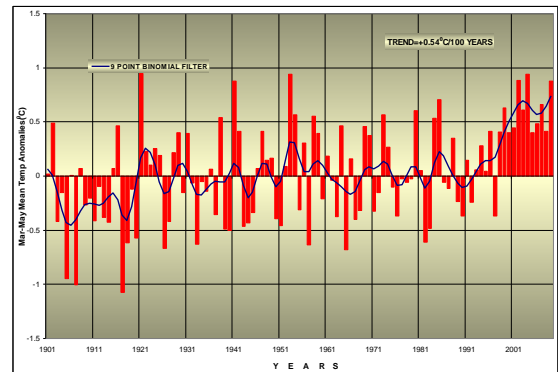
FIG.1 ANNUAL MEAN TEMPERATURE ANOMALY

Trends in mean temperature for different seasons viz. winter (Jan to Feb), pre-monsoon (Mar to May), monsoon (June to Sept) and post-monsoon (Oct to Dec) season are shown in following Figs. **Winter and Monsoon seasons in 2009 were the warmest.**

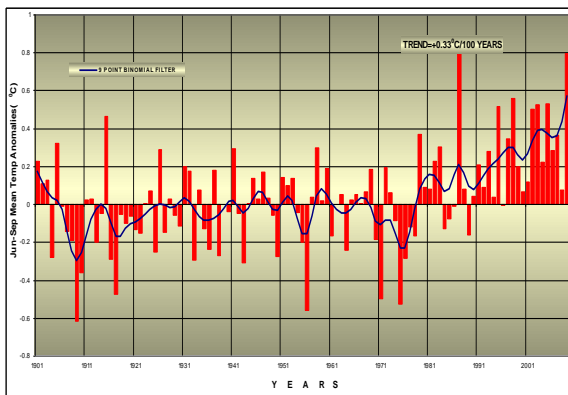
WINTER



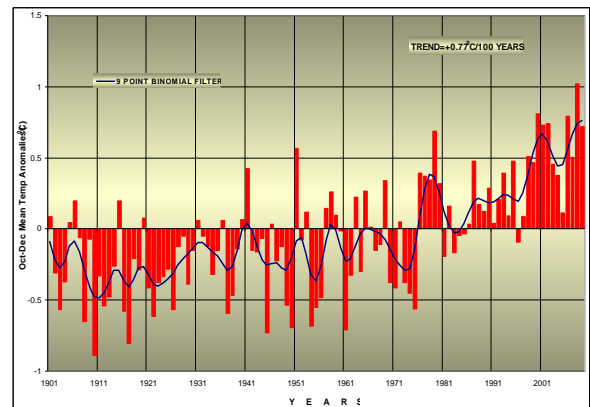
PRE-MONSOON



MONSOON



POST-MONSOON



As for as monthly temperature is concerned, mean monthly temperature over the country as a whole was the highest since 1901 for January (1.43°C) and August (1.00°C) 2009 and the second highest for February, September and December 2009 months.

Spatial pattern

Spatial pattern of trends in mean annual temperature anomalies [Fig.2] suggests significant positive (increasing) trend over most parts of the country except over some parts of Rajasthan, Gujarat and Bihar, where significant negative (decreasing) trends were observed.

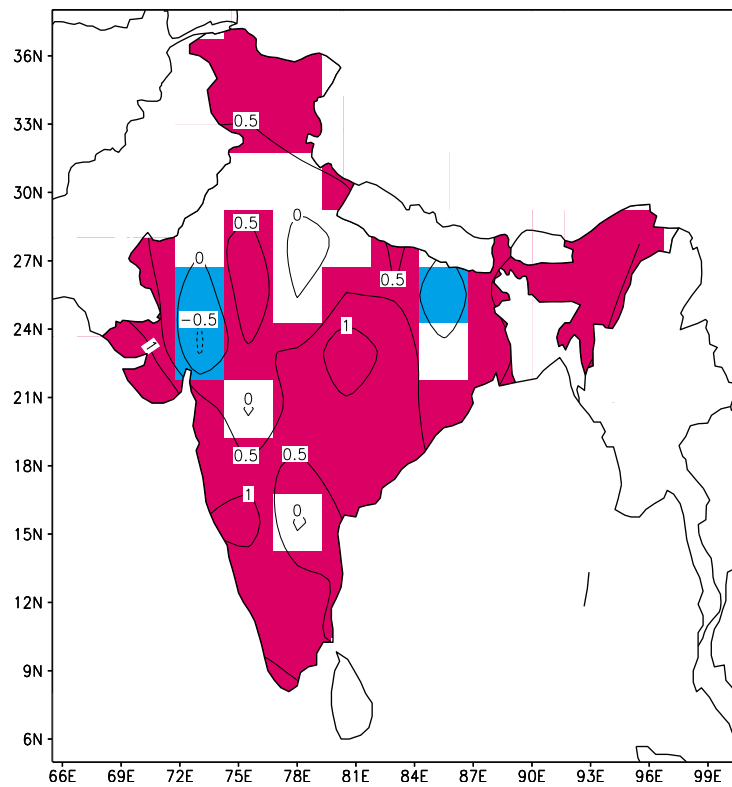


FIG.2: ANNUAL MEAN TEMPERATURE TREND (1901-2009)

Fig.3 shows the mean monthly minimum and maximum temperature anomalies for the country as a whole for the past five years, 2005-2009. It may be seen that positive anomaly in both the maximum and minimum temperature was highest in the five years for January, August and September 2009.

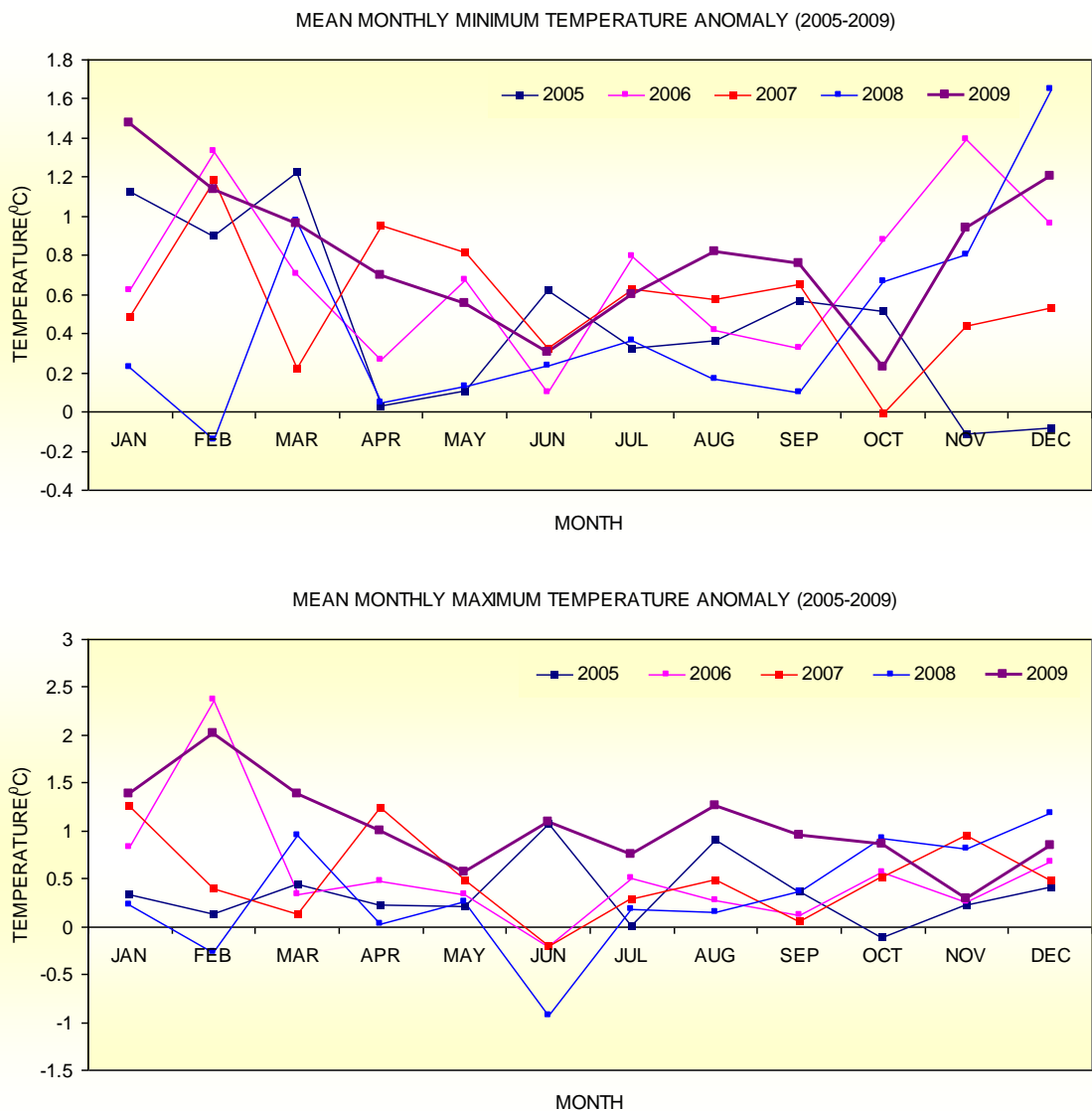


FIG.4

EXTREME TEMPERATURE EVENTS (2009)

Abnormally warm conditions prevailed over major parts of the country during the winter season. Temperature over hilly regions of the western Himalayas was 3 to 5°C above normal in the second fortnight of January, while in February; mean temperature over almost throughout the country, was above normal. However, there were cold wave conditions on few occasions in Uttar Pradesh In January, causing approximately 80 lives.

Heat wave conditions on many occasions (maximum temperature exceeding the normal by 5°C) prevailed over the peninsular/ central parts during the first three weeks of March, and over different parts of the country during April and second and third week of May. There were approximately 150 deaths due to the heat wave in May, mainly in Andhra Pradesh.

Appendix

MONTHLY AND SEASONAL TEMPERATURE NORMAL BASED ON DATA 1961 – 1990

	JAN	FEB	MAR	APR	MAY	JUN
MEAN	18.93	20.74	24.04	27.09	28.62	28.46
MAXIMUM	24.56	26.46	29.86	32.66	33.86	32.95
MINIMUM	13.33	15.03	18.24	21.56	23.40	23.98
	JUL	AUG	SEP	OCT	NOV	DEC
MEAN	27.28	26.88	26.47	25.04	22.28	19.82
MAXIMUM	30.95	30.46	30.61	30.11	27.82	25.32
MINIMUM	23.63	23.33	22.24	19.99	16.76	14.31
	ANNUAL	JAN-FEB	MAR-MAY	JUN-SEP	OCT-DEC	
MEAN	24.64	19.84	26.58	27.26	22.38	
MAXIMUM	29.61	25.50	32.13	31.22	27.75	
MINIMUM	19.68	14.19	21.06	23.32	17.02	