Trends in frost days, late and early frost dates, the frost-free season over Iran during 1951-2005

Mohammad Rahimi[†]; [†] University of Semnan, Iran Leading author: mrahimi@sun.semnan.ac.ir

Iran contains different geographical and climatological regions. Each region has its specific geographic and climatologic properties and it has made agriculture of the country to be sensitive to temperature extremes. In the comprehensive and unique investigative study presented hereby the long term data of frost days, free frost period, dates of last spring and first fall frost in Iran during 1951-2003 span were studied in 45 meteorological stations. Based on the results of this study, the effects of global warming on forest events in Iran were also evaluated. Frost days trend in the period of 1951-2003 show significant variation. The mean amount of this trend is -2.6 day per decade. The most decreased amount is 13 days per decade and the most increased amount is 7.4 days per decade which has occurred in Northeast and West respectively. About 15% of area of the country has experienced increasing frost days, while 85% has experienced decreasing frost days. The trend of last spring frost variation averaged -0.6 days per decade, ranging +5 days per decade to -7 days per decade, which occurred respectively in West and Northeast of Iran. The dates of first fall frost has significant trend during period of 1951-2003. The most part of the country (about 95% of total area) have positive trend and about 5% has negative trends. The mean trend of free frost period is 1.8 days per decade and the most positive trend is 17 days per decade in Northeast and most negative trends is -10 days per decade in West of Iran. About 70 % of the country area has negative trend and 30% of the country has positive trend. The results of this comprehensive study on frost data of more than 50 years show significant positive and negative trends in minimum temperature, frost days. In west part of the country frost days has positive trends, first fall negative trends, last spring frost positive trend and free frost period negative trend. While in most parts of country minimum temperature has positive trend, first fall positive trend, last spring frost negative trend and free frost period positive trend. The absolute amount of extreme of trend of last spring frost date is more than in first fall frost. The results show the high affects of global warming on frost events in Iran, especially in Northeast and central parts.