

Impact of climate change on rainy days in Bangladesh during 1950-2009

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1. INTRODUCTION

The impact of climate change on annual rainy days has received a great deal of attention by scholars worldwide. In Bangladesh, the agricultural economy with large growing population is closely linked with the behavior of rainfall distribution. The inter-annual variability of rainfall is very high, which significantly affects the agricultural activities and other water based enterprises in Bangladesh. Abnormalities of rainfall may be manifest in several forms like as less rain, rain not commencing in time due to delay in the onset of summer monsoon or early cessation due to early withdrawal of monsoon season. Timely and well-distributed rainfall is essential for better crop production while the erratic behavior of rainfall has an adverse effect. Still to date it is not clear the long term variability of rainy days and extreme rainy days which are the indicators to monitor climate change impact in Bangladesh.

2. DATA AND METHODS

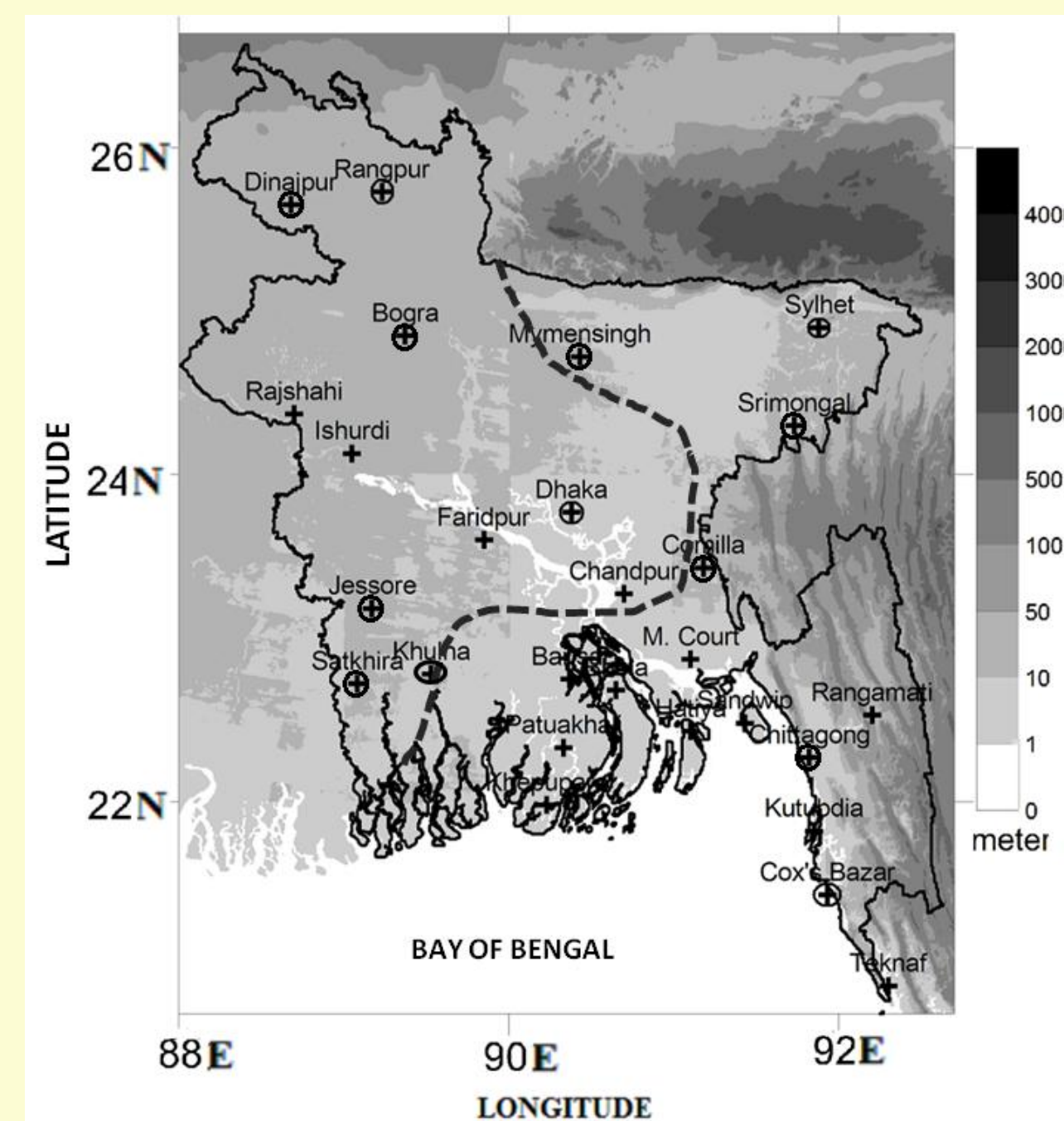
Data: Bangladesh Meteorological

Department (BMD) daily rainfall

Study period: 1950-2009

Study area: shown in Fig.1

Figure 1. The names of the BMD observational site over Bangladesh are shown above the station location (plus mark). The circles with plus mark indicate the stations which are used in detail study, and left side of dash line is dry region and right side is wet region. Topography is shown by grey shading.



Rainy days is defined as **rainfall > 01 mm** in 24 hours. According to BMD, the moderated heavy rain is defined as **22 mm < M. Heavy Rain ≤ 44mm**. The heavy rain is defined as **45mm < Heavy Rain ≤ 88mm** and the very heavy rain is defined as **V. Heavy Rain >88 mm** rain in 24 hours. The whole country was divided into two regions named: wet and dry regions (Fig. 1), based on humidity anomalies as proposed by Islam and Uyeda [*Remote Sensing of Environment*, 108:264-276, 2007].

3. RESULTS

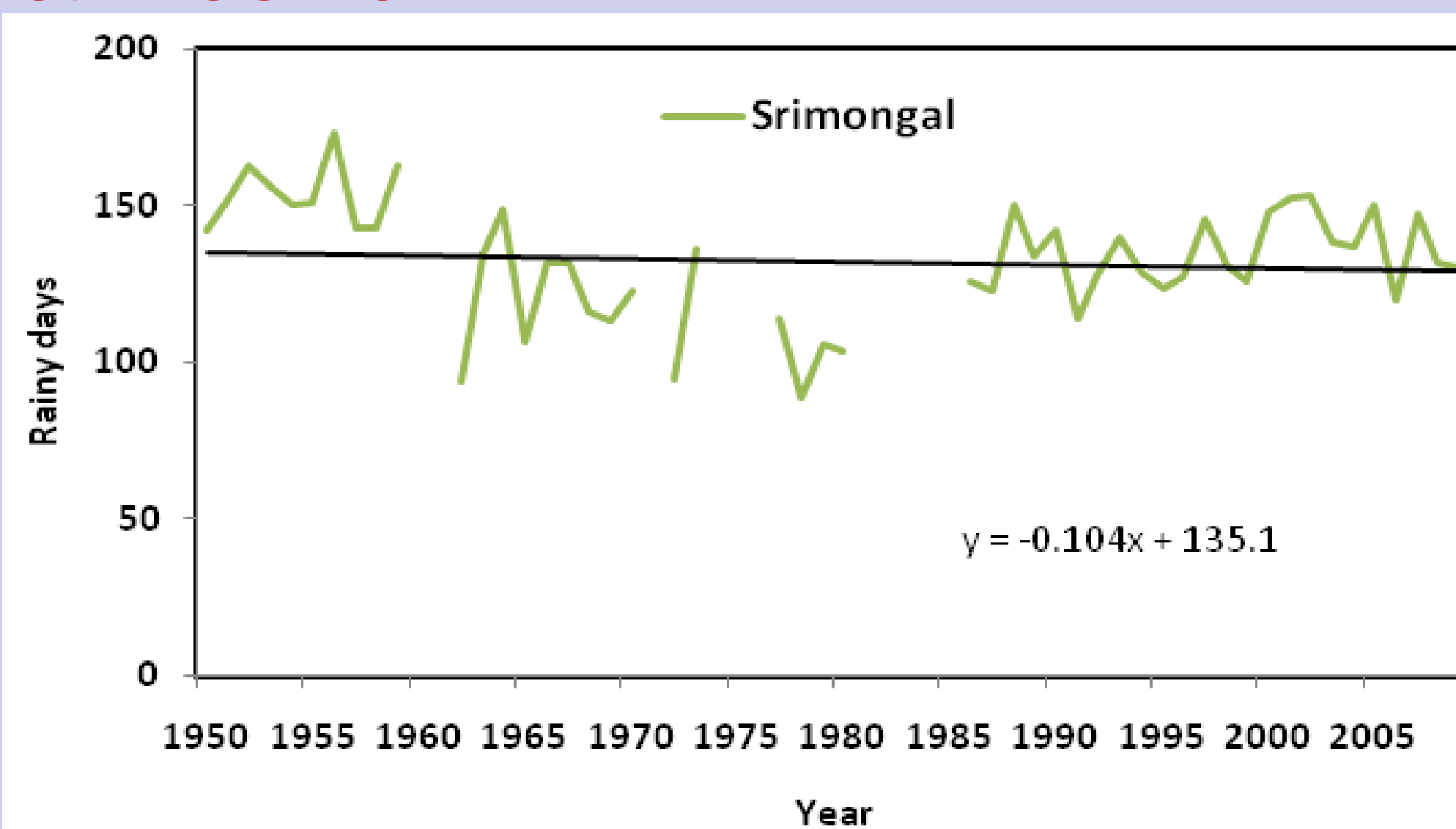


Figure 1. Yearly variations of rainy days for Srimongal stations during 1950-2009.

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4. SUMMARY

All the stations showed positive trend of rainy days except Srimongal (situated in the northeastern part of Bangladesh). Seasonal trend of rainy days also showed positive trend during 1950-2009. About 03.54, 20.35, 68.14 and 08.85 % of total yearly rainy days are found during the winter, pre-monsoon, monsoon and post-monsoon seasons, respectively. About 04.44, 25.00, 63.11 and 16.39 % of total seasonal days are found rainy during the winter, pre-monsoon, monsoon and post-monsoon periods, respectively. The moderated heavy, heavy and very heavy rainy days are also showed positive trend. The wet (dry) region showed negative (positive) trend of rainy days during 1950-1979 whereas wet (dry) region showed positive (negative) trend of variation of rainy days during 1980-2009. The country's averaged rainy days showed negative trend during 1950-1979 and positive trend during 1980-2009. The yearly averaged increase of rainy days was 0.35 days/year. **It is apparent that rainy days are changing in different seasons, most of the stations, regions and country's averaged show positive trend which lead to change our climate.**

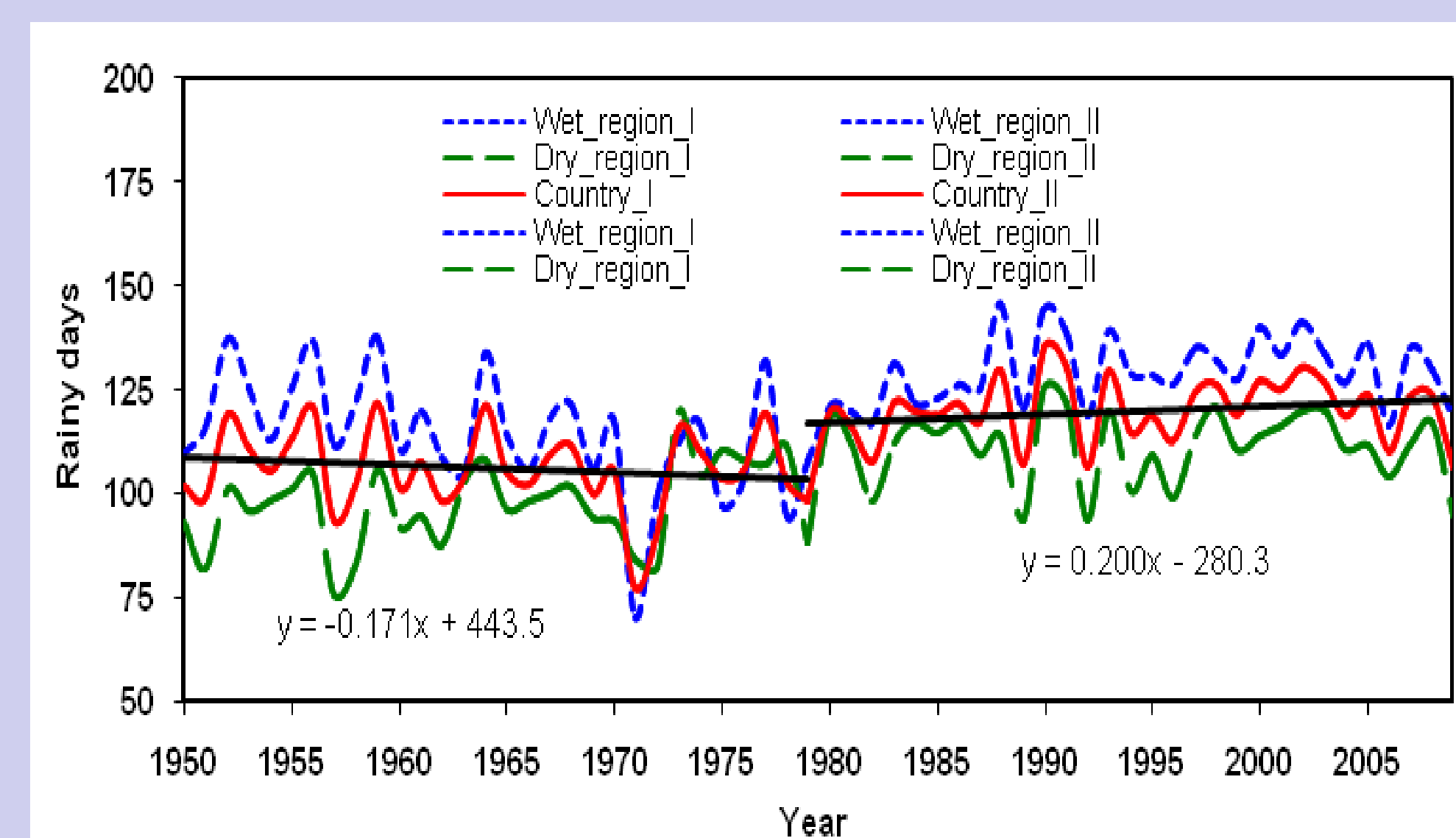


Figure 4. Variation of rainy days for wet and dry regions, and country's averaged during the period 1950-1979 (phase I) and 1980-2009 (phase II).

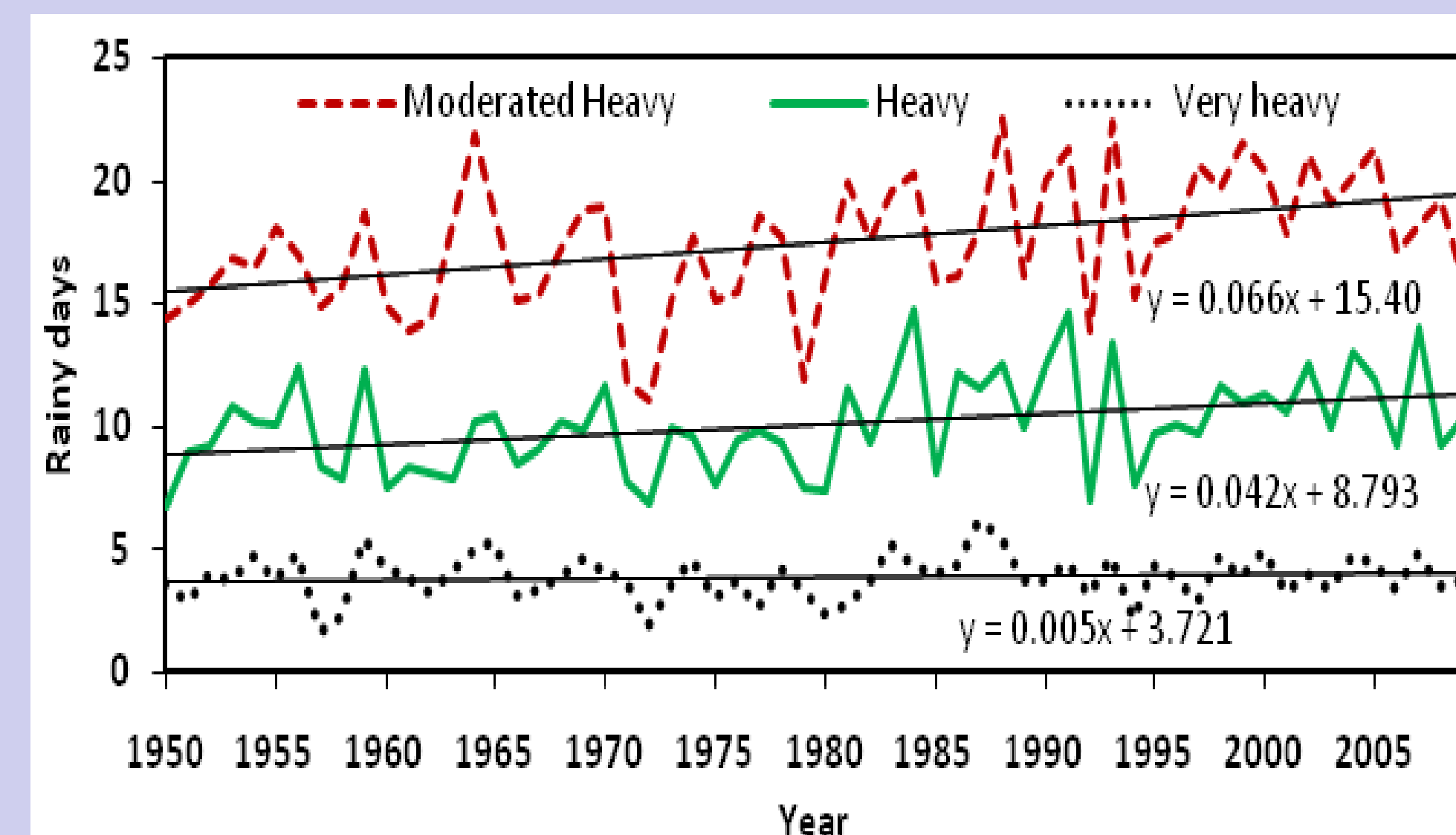


Figure 3. Yearly variation of rain days for moderated heavy, heavy and very heavy.

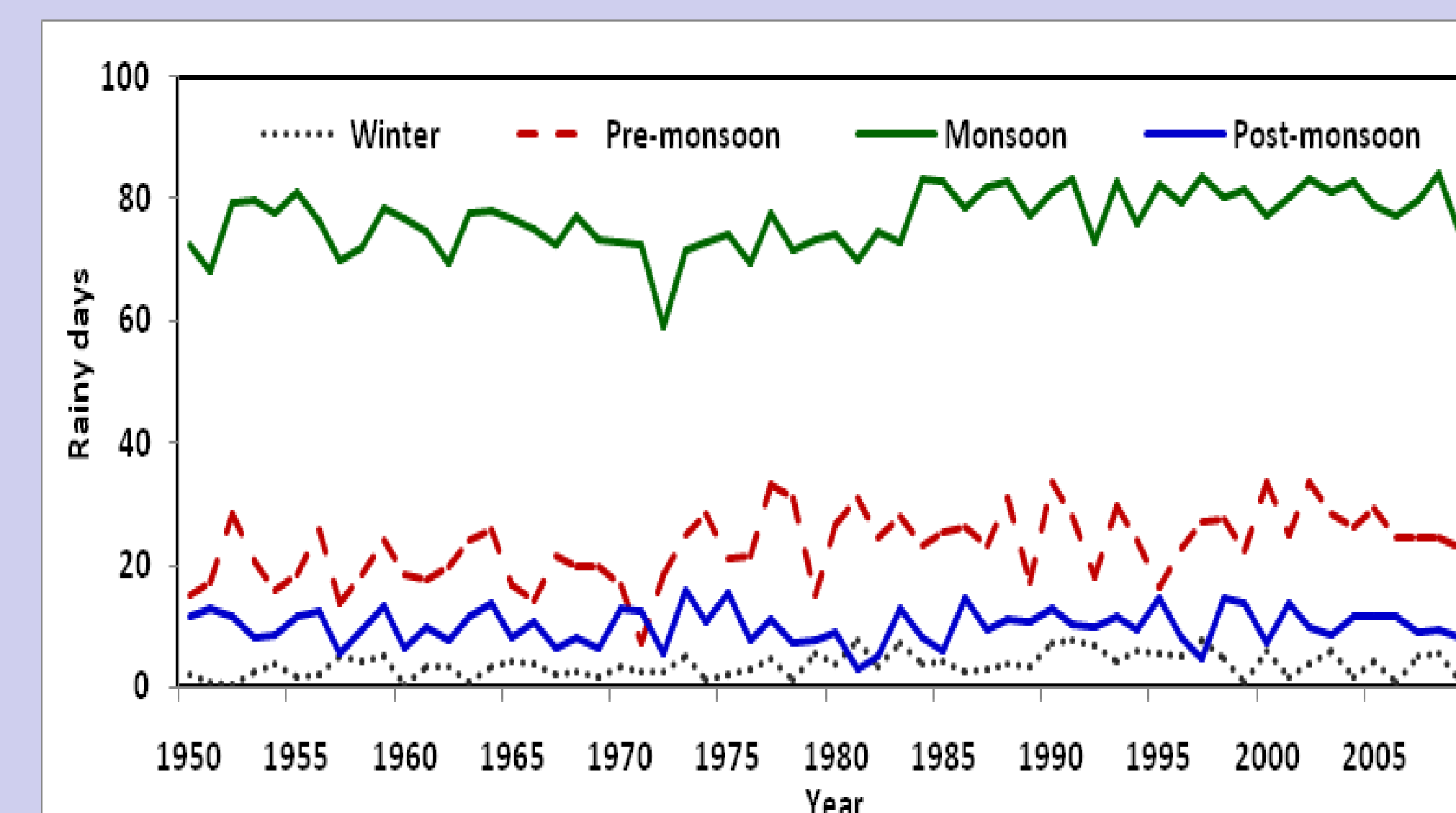


Figure 2. Seasonal variation of rainy days during 1950-2009.

The wet and dry regions showed negative and positive trend of rainy days during the period 1950-1979, respectively. Whereas the wet and dry regions showed positive and negative trend of rainy days during the period 1980-2009, respectively.

The country's averaged three threshold rainy days showed positive trend. The highest increasing trend is found for moderated heavy rainy days whereas lowest increasing trend is found for very heavy rainy days.

Rainy days showed positive trend for all seasons. The seasonal average rainy days of 04, 23, 77 and 10 are found in winter, pre-monsoon, monsoon and post-monsoon seasons, respectively.

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