

【Grant-in-Aid for Scientific Research (S)】

Integrated Disciplines (Complex systems)



Title of Project : Asian Monsoon Variability during the Past 120 Years

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Research Area : Geography

Keyword : Asian monsoon, climatic change, flood, extreme rainfall, data rescue

【Purpose and Background of the Research】

Recently, climate change issues such as global warming have become a vital societal concern. However, the climatic data utilised for climatic change studies are very limited prior to 1950 in the Asian monsoon region, except for in India, Korea, and Japan (Figure 1), and many data are stored in paper or image formats. More than 60% of world's population lives in the monsoon region of Asia. In particular, most of these people live in South and Southeast Asia and depend on agriculture, which is affected by climatic changes. To feed a growing population, the effects of climatic changes need to be minimised. Proper recognition of past climatic changes is also important for better climate prediction.

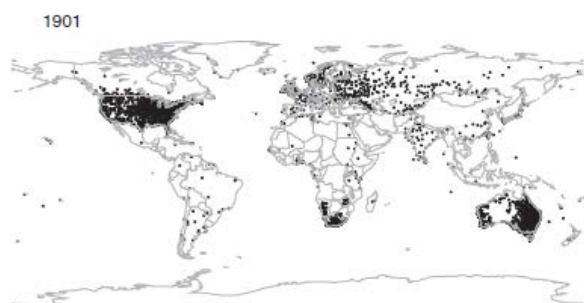


Figure 1 Distribution of stations where monthly rainfall data are available from the global GHCN-M data set for the year 1901

Our previous research found numerous climatic data stored in paper or image format. We intend to locate additional data from all over the world and digitise these as a data rescue activity. We then intend to utilise these data to reveal climatic changes in the Asian monsoon region through the past 120 years. The causes of these changes and the effects of global warming will also be analysed.

【Research Methods】

Most of the South and Southeast Asian countries became independent after World War II. Of these countries, we are planning to digitise the daily rainfall data of present-day Myanmar,

Bangladesh, and Pakistan listed in “Rainfall of India” and “Daily Rainfall of India”. We also plan to digitise data in China listed in the “Zi-Ka-Wei” and other data books published by Japan and data of the Spanish and American Philippines. Utilising these data, we will analyse long-term changes in rainfall intensity, onset and withdrawal dates of the rainy season, rainfall and its regional characteristics through the past 120 years. We will further discuss the causes and linkages with global warming of these variations by utilising various meteorological data, including typhoon track data.

【Expected Research Achievements and Scientific Significance】

In climate change research, past observation data are the most important first order material. Thus, we should be able to reveal long-term Asian monsoon activities by analysing the newly available data. Changes in the monsoon strongly affect Asian society, a society in which most people have primarily agricultural livelihoods. Our results will provide basic information useful for the prevention of flood disasters, water resource management, and minimising the effects of climate change on agriculture.

【Publications Relevant to the Project】

Villafuerte, M.Q.II, Matsumoto, J., et al. 2014. Long-term trends and variability of rainfall extremes in the Philippines, *Atmos. Res.* 137: 1–13.

Endo, N., Matsumoto, J., et al. 2009. Trends in precipitation extremes over Southeast Asia, *SOLA*, 5:168-171.

【Term of Project】 FY2014-2018

【Budget Allocation】 148,400 Thousand Yen

【Homepage Address and Other Contact Information】

<http://www.tmu.ac.jp/stafflist/data/ma/791.html>