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[Observing rainfall from the space]

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Characteristics of short-time heavy rainfall events

Global warming and flood disasters

In Japan, some recent flood disasters are caused by short-time heavy rainfall events (e.g. in Toga-river, Kobe; in sewer pipe in Tokyo).
Relations between short-time heavy rainfall events and global warming are under discussion.

Daily data analysis (Fig.1)

Relations between daily average temperature (T) and daily precipitation extremes (P_{1d}) are investigated using a global surface meteorological dataset (GHCN). P_{1d} increases along with T, but decreases when T increases beyond 25ºC.

(*) For each temperature bin, precipitation data is sorted and the highest 1 percentile value is regarded as an extreme value in this study.

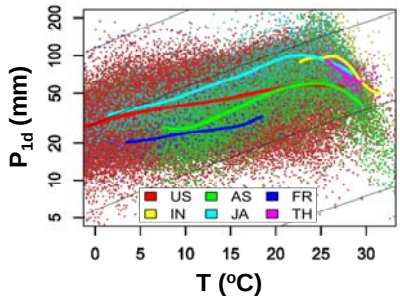

Figure 1 Results are shown for US(the United States), AS(Australia), FR(France), IN(India), JA(Japan), and TH(Thailand)

Short-time precipitation data (Fig.2)

The same analysis but with 10-min precipitation extremes (P_{10m}) is done for Japan by using AMeDAS. P_{10m} continues to increase even when T increases beyond 25ºC. Generally, the intensity of precipitation increases but the duration decreases when T increases beyond 25ºC.

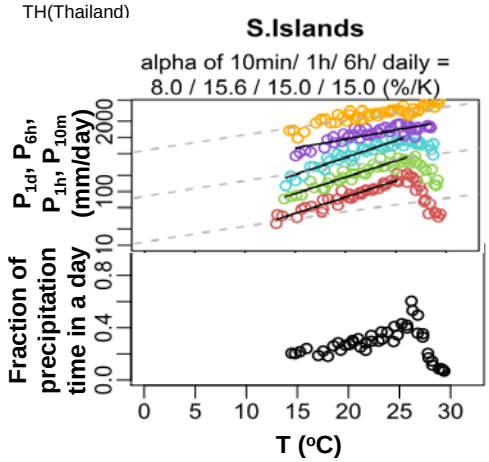

Figure 2 Red, Green, Blue, and Purple are for P_{1d}, P_{6h}, P_{1h}, and P_{10m}, respectively.

Space-borne precipitation radar (Fig.3)

Short-time precipitation dataset such as AMeDAS are not available in most other regions, but a space-borne precipitation radar (TRMM/PR) provides us with short-time precipitation estimates in any regions between 35S to 35N lat. In China, extremes of TRMM/PR precipitation estimates (P_{trmm}) do not decrease when T is beyond 25ºC.

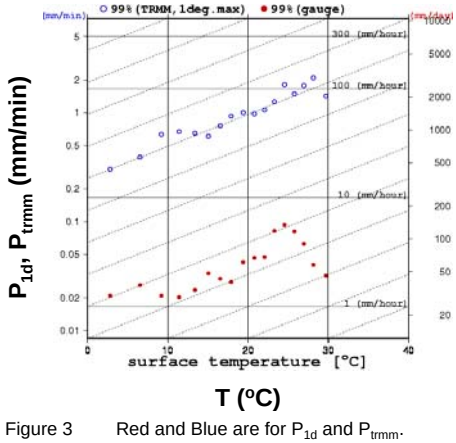

Figure 3 Red and Blue are for P_{1d} and P_{trmm}.