

Statistical analysis of shear line and torrential rain over Yangtze-Huaihe river region in China during June-July 1981-2013

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Abstract: Using ERA-Interim wind data and China's 756 meteorological station daily precipitation data, the shear line days, torrential rain days and shear line torrential rain days during June-July over Yangtze-Huaihe river region in 1981-2013 have been selected by 3 criteria, meridional shear of zonal wind, relative vorticity , zero line of zonal wind. It is shown that during June and July(61days) from 1981 to 2013,30.2 days (nearly 1 month) are torrential rain days, 33.2 days are shear line days,22.0 days are shear line torrential rain days. Shear line torrential rain days has accounted for nearly 2/3 of shear line days and nearly 3/4 of torrential rain days. The numbers of the shear line days, torrential rain days during June-July are on insignificant annual increase, the increase rate of which is one order of magnitude larger than that of shear line torrential rain days, which is basically unchanged in the past 33 years. Earlier than 2000, there are more frequency fluctuations of shear line day, torrential rain day and shear line torrential rain day compared with that later than 2000. There are some similar decadal variances in torrential rain days,shear line days and shear line torrential rain days over Yangtze-Huaihe river region, and those decadal variances of the 3 series are also similar with the decadal variance of precipitation amount over Yangtze-Huaihe river region in the period of 1981-2007. Shear line torrential rain mostly occur between late June and early July, the Meiyu period. The number of shear line torrential rain days during June-July shows 2-3 year period prior to 1995 and no significant period later than 1995. Climatologically, the numbers of shear line torrential day show 2-4 day period in early-middle June and middle-late July, while it shows no significant period from late June to early July, indicating that shear line torrential rain day maintain a stable frequency during that period ,and precipitation caused by shear line makes up most of the Meiyu precipitation.

Key words Yangtze-Huaihe river region, Shear line, Torrential rain, Shear line torrential rain, Statistics