



Climatological features on the decrease in the heavy rainfall days around Western Japan in the mature stage of the Baiu season after 2000

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A significant rainy season called “Baiu (in Japan)/Meiyu (in China)” appears before the midsummer in East Asia and the heavy rainfall events frequently occur there, especially around the western Japan and Central China (from late June to early July), due to the huge moisture transport from the tropics or subtropics. The present study examined the synoptic features and the recent long-term change in the Baiu precipitation around Kyushu District (western Japan) based on the daily precipitation data and NCEP/NCAR Re-analysis data during 1971~2008. We paid special attention to the relation among the appearance frequency of “heavy rainfall days” (with more than 50mm/day), the location of the surface front, the meridional extension of the “heavy rainfall area” and its synoptic conditions.

It was pointed out that the total precipitation in June decreased greatly after ~2000 in the mainland of Kyushu except for its southern part, especially decreased in the northwestern Kyushu (Otani and Kato, EGU2010). Although the appearance frequency of the surface front around the southern Kyushu (30~32N) was nearly the same in both periods (1971~2000 and 2001~2008), the total precipitation and the contribution of the heavy rainfall days at Nagasaki (northwestern part of Kyushu) decreased after ~2000, with its increase at Kagoshima (southern part of Kyushu). It is also noted that the mean precipitation at Nagasaki did not increase when the front is located to the north of Nagasaki after ~2000, in spite of the increase in the appearance frequency of the front there.

Climatologically, the baroclinicity around the Baiu front in the east of Japan is not so small. However, the weak baroclinic zone extended further westward to the East China Sea area (the narrow meridional width) in relatively many cases when the heavy rainfall days appeared around the northwestern part of Kyushu. The synoptic fields of air temperature were not so different from the heavy rainfall days and the non-heavy rainfall days around the northwest Kyushu when the surface front located around there (31.5~33.5N). On the other hand, it had been a meso- α - or synoptic- scale low pressure was located to the west of Kyushu in the heavy rainfall days, and the low-level southerly winds from the tropics or subtropics could penetrate to the frontal zone compared with the non-heavy rainfall days. According to the surface weather maps, an anticyclone was found around the Japan Sea area, in the northeast quadrant of that disturbance in many cases. In other words, the synoptic situation with the low-level strong southerly wind with the high equivalent potential temperature across that baroclinic zone might be one of the important patterns which bring the heavy rainfall around the northwestern part of Kyushu. It is necessary to examine how the appearance tendency of such synoptic situation feasible for bringing the heavy rainfall events changed after 2000 in the future.