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On the Characteristics of the hourly precipitation intensity variation according to climate change in the Korean peninsula

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In the present study, hourly precipitation data collected over 40 years (1970–2009) from 26 points throughout the country were used. Using those data, the changing trends in precipitation patterns and hourly precipitation intensities in relation to regional climate change were studied, in order to analyze the trend of events of heavy rain concentrated during several hours and the resulting increases in damage. Over the last 40 years, whereas the total annual amounts of precipitation in the Busan region increased slightly, the average hourly precipitation intensity (28.2%) increased much faster than the average daily precipitation intensity (5.0%). Although the frequency and amount of precipitation of 5 mm/h or lower hourly precipitation intensities decreased, those of 10 mm/h or higher hourly precipitation intensities increased, and those of 30 mm/h or higher hourly precipitation intensities increased greatly. Thus, as hourly precipitation intensities increased, their frequency and the amounts of precipitation increased particularly fast.
The amounts of precipitation, precipitation frequencies, and precipitation intensities at 26 points throughout the country were compared. The results showed that the amounts of precipitation and hourly precipitation intensities increased, along with frequencies, faster than daily precipitation intensities. Whereas the frequency and amount of precipitation of disaster-inducible localized heavy rain with daily precipitation exceeding 80 mm increased greatly, the number of days with precipitation and the amount of precipitation with low precipitation intensities increased only slightly, and the average precipitation intensity of such phenomena decreased. Therefore, the entire Korean Peninsula showed characteristics similar to those of Busan, although there were some differences between points.

Keywords: hourly precipitation intensity, daily precipitation intensity, climate change, heavy rain, meteorological disaster

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