



Impact of Taipei urbanization on temperature, rainfall and GNSS precipitable water vapor

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In the process of urbanization in Taiwan, the high temperature in the urban areas has led to heat island, which changes the rainfall strengths and raining zones. By the high development of GNSS system, Precipitable Water Vapor (PWV) can be calculated from the GNSS signals. PWV is the early indicator of the rainfall, and affected by the level of the temperature. Therefore, the purpose of this study is to investigate the performance of three orientations - temperature, PWV and rainfall. The above parameters are divided into summer and winter, to obtain the influence of urbanization in Taipei from 2006 to 2015. The results showed that there surely has heat island in Taipei. The phenomenon performed much obvious in summer than that in winter. The former reached 1.2 degree (in Celsius) and the latter reached only 0.8 degree. Nonetheless, the warming phenomenon reflected differently in summer and winter. The former's temperature rose 0.8 degree and the latter dropped about 0.5 degree. Not only the hot and cold area expanded within ten years, the heat island but also increased as time goes on. The PWV increased within ten years reached about 8.8 mm. Under the influence of heat island and global warming, the PWV performed evidently in summer. With the increments of the PWV, despite the weather and the areas, the rainfall increased 50.9 mm overall. The wet and dry areas also expanded along the time. The correlation coefficient of the temperature, PWV and rainfall achieved larger than 0.3. The correlation coefficient between the PWV and rainfall was even clearer. To face the heatwave and flooding caused by the climatic change in the future, the government needs to pay more attention on disaster prevention, avoid causing irreparable mistakes and damages.