

Climate Change Corner

Is the Nathan Road station suitable for plotting temperature trends?

Hong Kong Observatory's headquarters (HKO) station near Nathan Road is strongly influenced by the urban heat island (UHI) effect. A comparison of the 1968-2010 record of annual mean temperatures between this station and the rural Waglan station reveals:

1. The average mean annual temperature of 23.14 deg C at HKO exceeded the 22.5 deg C at Waglan by 0.64 deg C.
2. The hottest mean annual temperature year of 24 deg C in 1998 at HKO differs from the 23.2 deg C in 2002 at Waglan.
3. The coldest mean annual temperature year of 22.5 deg C in 1976 at HKO Station differs from the 21.3 deg C in 1995 at Waglan.
4. The temperature range of 1.5 deg C at HKO differs from the 1.9 deg C of Waglan. This difference is attributed to the strong influence of UHI at the former location.
5. The ten years showing the greatest mean annual temperature difference between the two stations are in decreasing order 1997 (1.6 deg C), 1994 (1.5 deg C), 1995 (1.5 deg C), 1998 (1.3 deg C), 1996 (1.3 deg C), 2005 (1.1 deg C), 1999 (1 deg C), 2000 (0.9 deg C), 1991 (0.9 deg C) and 1970 (0.8 deg C). The explanation for the large difference during 1994-1999 is heat generation through major infrastructural development.
6. HKO's temperature record shows strongly positive linear regression ($r=0.79$) while Waglan is the least positive ($r=0.127$)*. This difference is explained by the increasing influence of UHI at the former location.
7. If a correction of 0.5 deg C for UHI is applied to HKO, the possible amount of warming for 1968-2010 is estimated to be <0.14 deg C or <25%.

A case exists for including heat generation in future environmental impact assessment of major infrastructural development. The use of the temperature record based on the HKO station alone to indicate temperature trends without correction for UHI is misleading. Comparison with the Waglan station is helpful to resolve this.

* Leung, Y K et al: "Climate Change in Hong Kong". Hong Kong Observatory Technical Note No 107, pg 41, 2004.

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