

Influence of local weather condition on the fluctuation of baseline lengths measured on the VLBI network around the Tokyo metropolitan area

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Since 1995, VLBI measurements using fixed four VLBI stations (Kashima, Koganei, Miura and Tateyama) around the Tokyo metropolitan area have been continually producing data of station positions and baseline lengths. Continuous improvement both in system hardware and in the observation method have resulted in a remarkable improvement in measurement accuracy. Repeatability of baseline length, which is conventionally defined as a standard deviation of those obtained by five continuous sessions, reached about a 2-mm level in baseline length in our VLBI network in October, 1997. However the repeatability tends to be degraded in summertime. To investigate the cause of this degradation, a correlation analysis between measured baseline lengths and station weather data was carried out. As the VLBI network is very compact (the longest distance between any two KSP stations is about 135 km), Kashima weather data are used as a representative of the stations. The correlation relations between baseline lengths and the daily averages of temperature, pressure, humidity, wind direction, and wind speed are investigated. Results show that a good correlation can be seen only for the relation between Kashima related baselines and temperature. The results are well understood by assuming that the only Kashima position is affected by temperature change in summertime. Further investigation is being carried out on the basis of assumption that the location of Kashima will explain the cause.