

## 温度变化对我国GPS台站垂直位移的影响

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## Thermal effects on vertical displacement of GPS stations in China

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摘要

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### 摘要

地表温度变化可以引起GPS台站上安装GPS天线的地表水泥墩内部温度变化, 还可以通过热传导的方式引起GPS台站基岩从而引起GPS台站垂直位移变化. 在中国区域, 由GPS台站基岩温度变化引起GPS台站垂直位移变化的周年振幅最大可以达到: 在长江以北地区, 此周年振幅一般大于0.5 mm. 在我国地壳运动观测网络中的23个GPS基准站中, 温度变化对GPS台站垂响的周年振幅最大值为2.8 mm, 其中13个GPS基准站垂直位移的周年振幅变化大于1 mm. 因此, 温度变化是引起GPS台周年变化的一个不可忽视因素.

关键词: 温度变化 GPS 垂直位移 地表流体质量变化 周年振幅

### Abstract:

The temperature of GPS concrete pillar can be influenced by the surface air temperature changes. For ground and underground parts of the GPS concrete pillar, both inner temperatures vary with the surface temperature changes by heat conduction effects. The temperature change of GPS concrete pillar will induce the vertical displacement of the GPS antenna. The annual amplitude of GPS vertical displacement induced by the temperature change of underground concrete pillar can reach to 1 mm in China, and exceeds 0.5 mm in the north of Changjiang River. The maximum annual amplitude of GPS vertical displacement induced by the temperature change in both above- and under-ground parts of GPS concrete pillar is 2.8 mm for the stations of the Crustal Movement Observation Network of China (CMONOC). Meanwhile, the annual amplitude of 13 GPS stations exceed 1 mm in the 23 GPS stations of the CMONOC. Thus, thermal effects on the GPS vertical displacement are a very important factor to explain the annual variations of GPS vertical displacement.

Keywords: [Temperature changes](#) [GPS](#) [Vertical displacement](#) [Mass change of surface geophysical fluid](#) [Annual amplitude](#)

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