The revolution of the Earth around the Sun causes the vortex-induced vibration of south-north trending bridges and impacts seismic activities

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Abstract:

The vortex-induced vibration in east-west trending Humen Bridge in Guangdong, China is related to the self-rotation of the Earth, whereas the south-north trending Wuhan Parrot Island Bridge is more likely to be triggered by the revolution of the Earth around the Sun. In the early summer, the northern bank of Yangtze River is subjected to solar pull and decelerates more slowly towards the river with low density water. In late summer, the southern bank of the Yangtze River decelerates more slowly towards the river. These factors jointly contribute to the shortening of the distance between the piers of the bridge and trigger shaking of the bridge. Seismic activities are influenced by both self-rotation and revolution of the Earth.

Keywords:

vortex-induced vibration; south-north trending; Wuhan Parrot Island Bridge; potential energy; low density water; slower deceleration of larger mass

Recently, the shaking of south-north trending Wuhan Parrot Island Bridge in Hubei, China causes concern among the public. Due to the presence of potential energy on the surface of Earth, slower decelerations of large mass or/and faster accelerations of smaller mass bring about earthquake, volcanoes, sand and dust storms, petroleum fields, hot springs, etc.¹⁻¹¹

The vortex-induced vibration in east-west trending Humen Bridge in Guangdong, China is related to the self-rotation of the Earth, whereas the south-north trending Wuhan Parrot Island Bridge is more likely to be triggered by the revolution of the Earth around the Sun.¹¹⁻¹² In the early summer, the northern bank of Yangtze River is subjected to solar pull and decelerates more slowly towards the river. In late summer, the southern bank of the Yangtze River decelerates more slowly towards the river. Collectively, these forces shorten the distance between the piers of the bridge and trigger shaking of the bridge.

Likewise, the northeastward drifting of Tibetan plateau is triggered by both the self-rotation and revolution of the Earth¹¹, leading to the drifting to the east and to the north respectively, which causes intensive and extensive seismic activities in Sichuan Province, China.

Other types of bridges with non-strict south-north or east-west trending are influenced by both the self-rotation and revolution of the Earth.

Conflict of interest statement

The authors declare no conflict of interests.

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