
Crustal stresses induced by variations in land temperature and continental water storage

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Abstract

The role of short-term non-tectonic processes in triggering earthquakes in active tectonic settings or plate interiors, remains an open debate. Recently, a large effort has been made to establish the capacity for long-wavelength changes in, variations in continental water storage, mainly seasonal, to produce surface deformation measurable by GNSS, and to induce crustal stresses modulating regional seismicity rates. Here, we model strain and stress induced by a set of non-tectonic processes at a global and regional scales, including the elastic and poroelastic effects due to changes in continental water storage, and the thermoelastic effect due to variations in land temperature. We investigate the contribution of each effect, with time scales varying from seasonal to pluriannual signals, and possible correspondance with variations in regional earthquake rates, in both tectonic and non-tectonic settings.

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