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Deformation of the Piton de la Fournaise volcano (La Réunion Island) monitored by the horizontal components of the broad-band GEOSCOPE RER station

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Examination of long period records of the broad-band Geoscope RER station, located at 8km north from the summit of the Piton de la Fournaise volcano (La Reunion Island, Indian Ocean), exhibits different types of signals that occurred during the seismic crisis preceding eruptions. Large excursions in the signal begin sometimes before the eruption onset and exceed the normal diurnal variation due to tide effects. Our challenge is to interpret these long-period signals in terms of tilt and displacement that may help to a better understanding of eruptive processes.

A large, ultra long-period signal is sometimes observed on both LH horizontal components. In order to avoid loosing significant signal by performing a band-pass filtering, we chose to compute the theoretical horizontal tidal components and to remove their effect (ETERNA program). Then we deconvolve the signals from the instrumental responses to obtain acceleration.
We focus our study on several eruptions that occurred in the 1986-2010 period range at Piton de la Fournaise volcano and particularly on the 2005 and 2007 sequences which exhibit significant features. We evidenced two types of events that we can relate to the eruptive process and to the dyke propagation.