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Evidences for higher nocturnal seismic activity at the Mt. Vesuvius

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We analyze hourly seismic data measured at the Osservatorio Vesuviano Ovest (OVO, 1972–2014) and at the Bunker Est (BKE, 1999–2014) stations on the Mt. Vesuvius (Italy). The OVO record is complete for seismic events with magnitude M $\geq$ 1.9. We demonstrate that before 1996 this record presents a daily oscillation that nearly vanishes afterwards. To determine whether a daily oscillation exists in the seismic activity of the Mt. Vesuvius, we use the higher quality BKE record that is complete for seismic events with magnitude M $\geq$ 0.2. We demonstrate that BKE confirms that the seismic activity at the Mt. Vesuvius is higher during nighttime than during daytime. The amplitude of the daily oscillation is enhanced during summer and damped during winter. We speculate possible links with the cooling/warming diurnal cycle of the volcanic edifice and with external geomagnetic field. We find that the amplitude of the seismic daily cycle changes in time and has been increasing since 2008. Finally, we propose a seismic activity index to monitor the 24-hour oscillation that could be used to complement other methodologies currently adopted to determine the seismic status of the volcano to prevent the relative hazard.

Reference:
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