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Velocity variations in Volcán de Colima associated with the 2003 MW = 7.4 Tecomán earthquake, Mexico

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We present measurements of temporal variations of seismic velocity at Volcán de Colima using seismic noise correlation techniques. About 13 years of continuous recording, mainly from the four short-period stations of the monitoring network, were processed. The daily cross-correlation functions obtained between pairs of stations present high degree of stability over the period of study. This allowed the use of the stretching method to estimate relative velocity variations in the structure. After correcting for the effect of variations of the sampling frequency of the recording system, small velocity fluctuations are obtained that are poorly correlated with the effusive and explosive activity of the volcano. However, a large velocity drop of 1 to 2 % occurred on January 22, 2003 during the MW = 7.4 Tecomán earthquake the epicentre of which is located offshore at about 100 km SW from the volcano. The velocity progressively recovered its initial value in about 6 years. No similar velocity variations could be detected for stations pairs outside the volcanic structure and closer to the rupture zone. Interestingly, the effusive activity that began on May 2001 stopped 10 days after the earthquake and the velocity drop.