



Monitoring shear-wave velocity transients induced by activation of a high-rate wastewater disposal well in the Val D'Agri oilfield (Italy) from analysis of seismic noise

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The Val D'Agri oil field in the southern Apennines (Italy) is the largest hydrocarbon field in continental Europe, operating since 1998. From June 2006 the wastewater from oil extraction is re-injected into strongly fractured limestones of the hydrocarbon carbonate reservoir by a high-rate disposal well. Re-injection induces moderate seismicity (~237 small-magnitude events from 2006 to 2014), monitored by the oil company and the National Seismic Network of Istituto Nazionale di Geofisica e Vulcanologia. In January 2015, water injection stopped for technical operations and restarted two weeks later. During this time a temporary network of 5 short-period stations has been deployed within 10 km from the well, revealing distinct changes in seismicity rates along with interruption, first, and recovery, later, of injection. We analyse continuous seismic noise data from two temporary INGV networks around the well to reveal possible transients during the stop-and restart episode. Following a technique that in the last decade has been applied in different settings (mostly volcanoes and earthquake zones), we compute cross-correlations of background seismic noise recorded by all pairs of available stations, and then analyse how codas of such correlations (dominated by local scattering) vary with time. We compute all correlations from the 7 stations available in the 0.1-1 Hz frequency range, covering an area of approximately 400 km² around the injection well. Because of time limitations and glitches in operation of the stations, only limited time resolution can be achieved, but nonetheless moderate variations of medium properties can be detected.