highly coherent noise sources at continental scale using data collected by USArray seismic array. Then in the second part, we take the benefit of the entropy to propose an original equalization process based on the analysis of the covariance matrix to mitigate the effect a poorly diffuse noise field. The efficiency of the method is validated with several numerical tests. We apply the method to the data collected by the USArray, when a strong earthquake occurred. The method shows a clear improvement compared with the classical equalization to attenuate the highly energetic and coherent waves incoming from the earthquake, and allows to perform reliable travel-time measurement.

1:40

1pUWb2. Environmental seismology: What can we learn from ambient noise ? Eric Larose (ISTerre, CNRS & Univ. Grenoble-Alpes, CS 40700, GRENOBLE Cedex 9 38058, France, eric.larose@univ-grenoble-alpes.fr)

Environmental seismology consists in studying the coupling between the solid Earth and the cryosphere, or the hydrosphere, the anthropospher. In practice, we monitor the modifications of the wave propagation due to environmental forcing such as temperature and hydrology, using ambient seismic noise that constitute a continuous, cheap and relatively reproducible source of vibrations. Recent developments in data processing [1], together with increasing computational power and sensor concentration have led to original observations that allow for this new field of seismology. In this paper, we will review how we can track and interpret tiny changes in the subsurface of the Earth related to external changes from modifications of the seismic wave propagation, with application to geomechanics, hydrology, and natural hazard [2]. We will demonstrate that, using ambient noise, we can track: thermal variations in the subsoil, in buildings or in rock columns with application to damage estimation; the temporal and spatial evolution of a water table; the evolution of the rigidity of the soil constituting a landslide, and especially the drop of rigidity preceding a failure event. [1] Shapiro, N. M., Campillo, M., 2004. Geophys. Res. Lett. **31**, L7 614. [2] E. Larose *et al*.: J. Appl. Geophys. **116**, 62-74 (2015).

2:00

1pUWb3. Extracting changes in wave velocity from chaotic data. Roel Snieder (Colorado School of Mines, 1500 Illinois Str., Golden, CO 80401, rsnieder@mines.edu)

Using seismic interferometry it is possible to extract the Green's function from recorded measurements of noise or other incoherent signals, it is a way of creating order out off chaos. Since the noise is present at all times, this provides a way to measure seismic velocity changes over time. The seismic velocity in the subsurface, and in buildings, is not constant in time. I will present measurements taken during, and after, the 2011 Tohoku-Oki earthquake to show that deconvolution interferometry can be used to monitor the seismic velocity in the near surface, with a great temporal resolution. The recovery of the seismic velocity typically varies as log-time, which can be related to a spectrum of relaxation processes in the earth.

2:20

1pUWb4. Imaging subsurface structures using reflections retrieved from seismic interferometry with sources of opportunity. Deyan Draganov, Yohei Nishitsuji, Boris Boullenger, Shohei Minato, Kees Wapenaar, Jan Thorbecke (Dept. of GeoSci. and Eng., Delft Univ. of Technol., Stevinweg 1, Delft 2628CN, Netherlands, d.s.draganov@tudelft.nl), Elmer Ruigrok (GeoSci., Utrecht Univ., Delft, Netherlands), Charlotte Rowe (Geophys. Group, Los Alamos National Lab., Los Alamos, NM), Bob Paap, Arie Verdel (TNO, Utrecht, Netherlands), and Martin Gomez (CNEA, Buenos Aires, Argentina)

The reflection seismic method is the most frequently used exploration method for imaging and monitoring subsurface structures with high resolution. It has proven its qualities from the scale of regional seismology to the scale of near-surface applications that look just a few meters below the surface. The reflection method uses controlled active sources at known positions to give rise to reflections recorded at known receiver positions. The reflections' two-wave travel time is used to extract desired information about and image the subsurface structures. When active sources are unavailable or undesired, one can retrieve body-wave reflections from application of seismic interferometry (SI) to sources of opportunity—quakes, tremors, ambient noise, or even man-made sources not connected to the exploration campaign. We show examples of imaging of subsurface structures using reflections retrieved from quakes and ambient noise. We apply SI by autocorrelation to global earthquake to image seismic and aseismic parts of the Nazca plate and the Moho at these places, SI by multidimensional deconvolution to P-wave coda from local earthquakes to image the Moho and the crust at the same places, and SI by autocorrelation to deep moonquakes to image the lunar Moho and to ambient noise to monitor CO_2 sequestration.

2:40

1pUWb5. Passive elastography: A shear wave tomography of the human body. Stefan Catheline (INSERM U1032, 151 cours albert thomas, Lyon 69003, France, stefan.catheline@inserm.fr)

Elastography, sometimes referred as seismology of the human body, is an imaging modality recently implemented on medical ultrasound systems. It allows to measure shear waves within soft tissues and gives a tomography reconstruction of the shear elasticity. This elasticity map is useful for early cancer detection. A general overview of this field is given in the first part of the presentation as well as latest developments. The second part, is devoted to the application of time reversal or noise correlation technique in the field of elastography. The idea, as in seismology, is to take advantage of shear waves naturally present in the human body due to muscles activities to construct shear elasticity map of soft tissues. It is thus a passive elastography approach since no shear wave sources are used.