sites are relative to the horizontal outcrop spectra of the seismological bedrock. First we check the average vSAF at YMGH01 relative to the reference RMS spectra. We found that the vSAF at YMGH01 is close to one and has small fluctuations with respect to frequency, about ±30%, except for the frequency higher than 15 Hz. When we compare the vSAF at YMGH01 with the theoretical prediction based on DFC, which is a frequency independent value of 0.76, we found that it is very close to the lower bound of the average. We then check the variability of the vSAFs at all the sites that we analyzed and found that the vSAFs are closer to each other than the hSAFs. This is because the P-wave velocity contrasts at most of the sites tend to be smaller than the S-wave velocity contrasts. If the water level is shallow, then P-wave velocity of saturated soil would be no less than 1.5 km/s and so the maximum contrast should be no more than 4. Thanks to the relative stability of the vSAFs, we can correct EHVRs at the target sites with vSAFs to obtain hSAFs. If we use observed vSAF, the operation is circular, but if we replace vSAF with the averaged vSAF for categorized sites with different predominant frequency in EHVRs as done in Mori et al. (2018) for MHVRs, then we can obtain pseudo hSAFs. As long as the site-specific variation in vSAF is much smaller than that of hSAF, the pseudo hSAF can be conveniently derived from EHVRs without doing tedious GIT analysis. The advantage of this approach is that we need no P- and S-wave velocity structures at the target site (no Vs30, either). We can directly evaluate the S-wave site amplification factor for frequency range from 0.1 to 15 Hz, as long as we have small numbers of weak-motion data at the target site. Once we get the site amplification factor, then we can use it for the site categorization. If we want to start from MHVRs, we can first transform them in to pseudo EHVRs through EMR (Mori et al., 2018). We are planning to extend the dataset to California and Europe to see the regional differences in vSAF and EMR if any.

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SITE AND SEISMIC STATION CHARACTERIZATION: AN EUROPEAN INITIATIVE

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Site characterization is a key input in seismic hazard and risk assessment (e.g. Ground Motion Prediction Equation, microzonation studies, damage scenarios) and seismic design (building codes, critical facilities). Although the number of strong-motion stations in free-field and engineering structures has largely increased over the world in the last twenty years, only a limited number of sites includes detailed site condition indicators: mostly geology and EC8 soil class, more rarely shear-wave velocity (Vs) information (e.g. Vs30 and Vs profiles), without proper documentation and quality assessment in most cases. This lack of information is a critical issue, e.g. for deriving reference rock/soil velocity profiles for region-specific GMPEs, site-specific hazard assessment, vs-kappa adjustments, seismic response of engineering infrastructures, risk modeling at urban or regional scale. Within the framework of the SERA "Seismology and Earthquake Engineering Research Infrastructure Alliance for Europe" Horizon 2020 Project, a networking activity has been set up to propose a comprehensive European strategy and standards fostering site characterization of seismic stations in Europe. We will present the status of this networking activity that focuses on several issues. The first target is to evaluate the most relevant site characterization scalar, depth and frequency-dependant indicators (e.g. Vs30, resonance period, velocity profiles, kappa, amplification factors and functions, etc.) for seismic hazard purposes and, thereafter, to propose best practice for site characterization together with standards for overall quality metrics on site characterization. The second target focuses on disseminating, within the broader seismological and engineering community, site characterization metadata developed within the EU NERA and EPOS-IP projects in order to validate and/or further develop metadata format schemes for wide use. Based on available site characterization information in Europe and considering the research and engineering needs, the third target proposes to set up a road map to prioritize strong motion site characterization in Europe for the next decade. Finally, a task is dedicated to investigate relevance of new site condition and amplification proxies (for example combining resonance frequency, local slope and other parameters, proxy for non-linear effects, wavelength-scaled curvature and topographic position index position as proxies for topographic effects, aggravation factor for basin effects, etc.) and their implementation at the European scale and into site characterization metadata.

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STRONG MOTION MONITORING AND DATASETS IN CANADA AND SOME CHALLENGES FOR REGIONS THAT EXPERIENCE LARGE EARTHQUAKES (BUT LACK RECORDINGS OF LARGE EARTHQUAKES)

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In this presentation, we outline the history of Canada's strong ground monitoring program (including current upgrades that are underway), summarise the existing Canadian strong motion data set, and discuss some of the challenges in regions that experience large, infrequent earthquakes and therefore lack "strong motion" recordings. Canada spans a variety of tectonic and geological settings, including an active plate boundary (with active subduction as well as divergent and transcurrent plate motions), a stable craton with the oldest rocks on earth, and an ancient passive margin. As the second largest country in the world, and with such a variety of tectonic settings, understanding strong ground motions from rare, large earthquakes is a challenging endeavour. The first strong motion instruments were deployed in Canada in 1963. The goal of this monitoring program was (as it is today) to obtain strong ground motion recordings on a variety of environments (bedrock, soft soil, firm soil, basins, etc.) By 1968, 14 accelerographs (and 48 seismoscopes) were deployed in the seismically active regions of coastal British Columbia. Over the years this network expanded across Canada, by 1999 including more than 70 instruments. Starting in 2002 a modern, digital "internet accelerometer" network with more than 100 instruments was deployed to take advantage of low-cost instrumentation, on-site computation, and internet communications. Beginning in 2017, as a part of the modernisation of the Canadian National Seismograph Network (CNSN), more than 100 broadband seismic sites will have Nanometrics "Titan" accelerometers added. These standard CNSN sites are all situated on bedrock. Ongoing questions and discussions include the adaptation and validation of GMPEs developed with data from elsewhere around the world, site effects, basin effects, non-linear effects, and more. In the current National Building Code, subduction earthquake GMPE's are dominated by recordings of the Tohoku earthquake, with corrections made for geological differences between Japan and Canada's west coast. Many of these topics are also relevant for seismic hazard evaluations in Europe and elsewhere in the world.

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FEEDBACK FROM THE CHARACTERIZATION OF THE SITE CONDITIONS OF STATIONS OF THE FRENCH ACCELEROMETRIC NETWORK (RAP) LOCATED IN NORTH-WEST FRANCE

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The previous estimations of site conditions (soil class, VS30) of the French accelerometric network (RAP) stations located in North-West France were only based on geological map interpretation. In order to provide more reliable estimation for these stations located in an area where significant historical and instrumental earthquakes occurred and were seismic hazard cannot be neglected; a geophysical survey was organized in July 2017. This survey consisted in surface wave-based methods involving both active (Multichannel Analysis of Surface Waves: MASW) and passive methods (Ambient Vibration Array: AVA) using array from 10 m up to 1 km of aperture. Thanks to the availability of a quite large number of seismometers, it was possible to record several circle-shape arrays at once, which allowed long duration recording time for larger aperture arrays