

SONIC LOGGING FOR FRACTURE CHARACTERISATION

Context and objectives

Sonic logs are routinely run in deep exploration boreholes in order to measure the formation velocities and link wellbore data with other geophysical data (e.g. Vertical Seismic Profiling, or seismic surveys). The primary interpretation of the sonic signal is in term of wave travel time and velocity. However, other aspects of sonic data as for example the wave attenuation and the wave frequency content are not routinely analysed and these parameters could provide valuable information in terms of fracturing and fracture properties. Such information could be very valuable to extract from sonic data but a systematic methodology is missing.

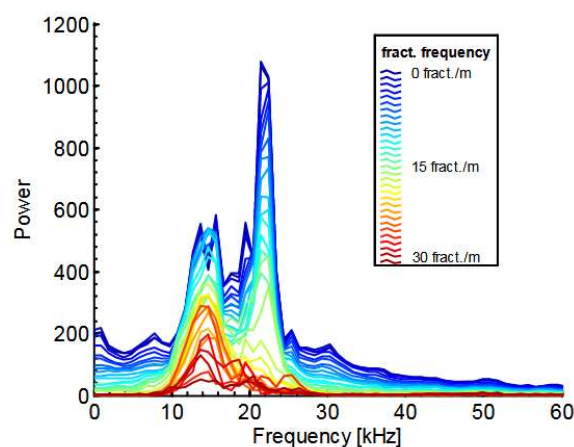
Methodology

Within this project sonic data will be acquired along multiple boreholes in various fractured formations (limestones, granites). Other information pertinent to fracture description including televiewers will also be acquired in these boreholes. A methodology to process the sonic full wave form data in order extract systematically attenuation and frequency content from these log will be developed. This new derived information will be compared with other data set (e.g. fracture mapping on televiewer data) in order to identify the processes influencing wave attenuation and frequency shift. Based on these results, a methodology to characterise fractured rock mass based on sonic log will be proposed.

Supervision and collaboration

The project will be supervised by Prof. Dr. B. Valley (CHYN, UniNE)

Contact : benoit.valley@unine.ch, bureau E212



Preliminary study on fracture-attenuation-frequency relationships (Valley et al., 2011)