martedì 28 marzo 2023

EnvNoise LogBook - Heater and Compressor noise, Lorenzo Mobilia and the EnvNoise team.

Analysis of the noise reduction in the Heater and the Noise presence in the Compressor. NEB, acoustic Noise due to INF\_NEB\_COMP1\_PRES.

The analysis started due the presence of noise in the seismographs associate to the Heater cycle (INF\_ NEB\_HEATER\_TE). In particular in the seismic channel ENV\_NEB\_SEIS\_N



We see [left picture] that in January 27th 2023 from 18.00 to 19.00 you can measure a noise in the range 20-40 Hz due to the cycles of the Heater. [right picture] moving from 27th January to 5th February at the same time the noise disappears. Also the cycle of the heater is doubled.



During this analysis the noise was also present in the velocimeters array (NN\_NEB\_ACC\_07,08,09) in the NEB [~35Hz]. At the beginning we thought it was due to the new heater, but it was not (see the periodic on the glitches).



Also this noise source seems to be persistent in time and present in upper bands (~145 Hz).



Finally, the noise source for the ~145Hz band has been identified as the Compressor (NEB\_COMP1\_PRES).



This noise is also visible in other channels (ENV\_NEB\_MAG\_V, ENV\_NEB\_IPS\_CURR\_R, ENV\_NEB\_IPS\_CURR\_T). In particular the magnetometer shows a huge glitch at the beginning of the compressing cycle.



Continuing the study of the noise in the accelerometers, we found an acoustic noise also in the INF and in the SAS mic (ENV\_NEB\_SAS\_MIC, NN\_NEB\_INF\_Z\_06,07).





Finally we found out that this noise is due to the AIR Press channel (INF\_NEB\_AIR\_PRES which now is called INF\_NEB\_AIR\_COMP\_LINE\_PRES). This channel follows the compressors 1 and 2 (COMP1 and COMP2) which converge to a unique line. This line has a pressure regulator and a cumulating tank, also due to the inertia this line is also a stabilizer. Usually AIR\_COMP reach a minimum at the minimum of COMP1\_PRES (the turning on of the compressor), while the max of AIR\_COMP corresponds to the application of the directional valve (so it precedes the max of COMP1\_PRES). The following min of AIR\_COMP is then due to the unidirectional valve and not to the turning on of the COMP1, that's why the frequency of the AIR\_COMP is doubled. The COMP2 is active only when COMP1 does not start, so it is usually inactive.

