

INFRASOUND TECHNOLOGY WORKSHOP 2024 - VIENNA AUSTRIA 4th to 8th NOVEMBER 2024.

IMS INFRASOUND STATION 132KE, MONITORING PERFORMANCE AND DETECTION IMPROVEMENT.

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IMS UNIT – DEPARTMENT OF EARTH AND CLIMATE SCIENCES, UNIVERSITY OF NAIROBI-KENYA.

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INTRODUCTION

- Infrasound station I32KE is a seven element array station with apertures of between 600m and 2.5 Km, equipped with 18 meter wind noise reducing system(WNRS). Prior to 2019 each WNRS was supported by four rosettes of twenty four inlet pots combined with galvanized steel pipes, summing manifolds and resonance suppressors.
- Despite high data availability, this system experienced data quality problems affecting its monitoring capabilities. The challenges included blocked inlet pots, leaking junctions, faulty micro barometer nozzle connection, and pipe array deterioration due to old age. This problem was detected and timely intervention undertaken in 2019, the effect of which was improvement in detection capability and data quality.

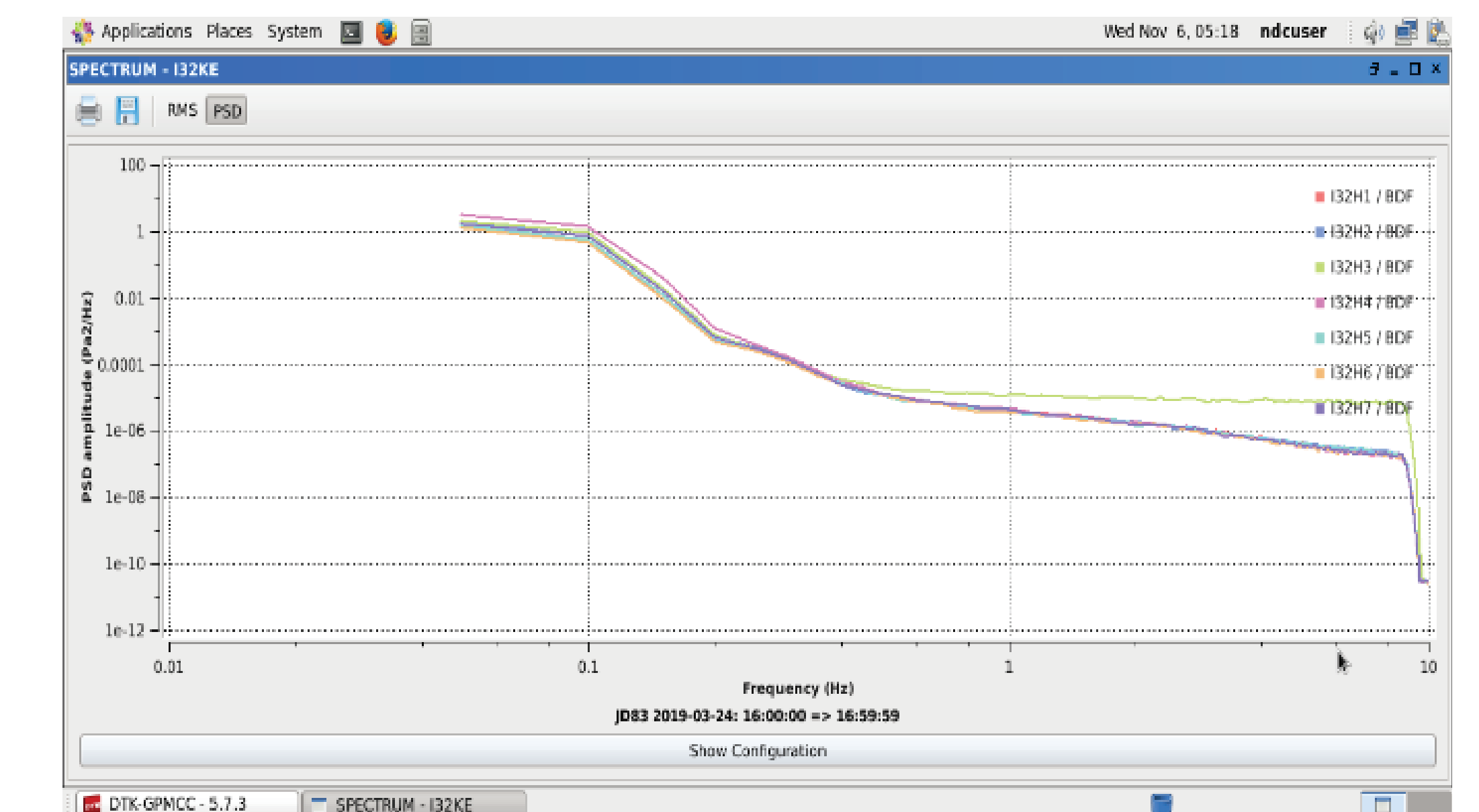
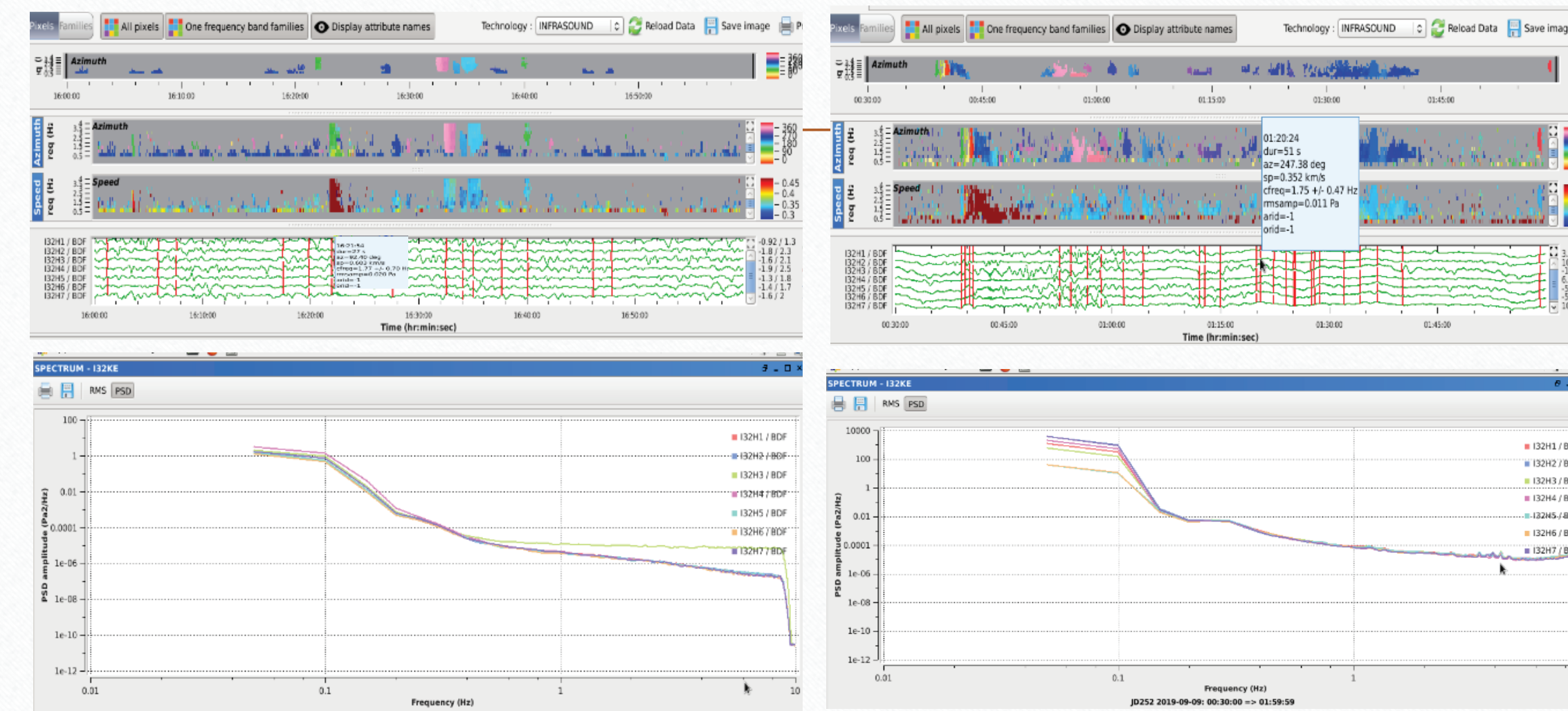
STATION LAYOUT (OLD AND NEW EQUIPMENT)



EQUIPMENT PERFORMANCE AND CHALLENGES

- The MB3a which is now the main acquisition micro-barometer(sensor) continue to perform very well. The MB200 is now used as reference and also for calibration of the infrasound station..
- The new Centaur digitizer which replaced the Europa-T, also continue to perform very well with a capacity to buffer seven days of data.
- The old WNRS faced various challenges which included;
 - Blocked inlet ports.
 - Leaking junctions.
 - Faulty connections to the micro barometer nozzles.

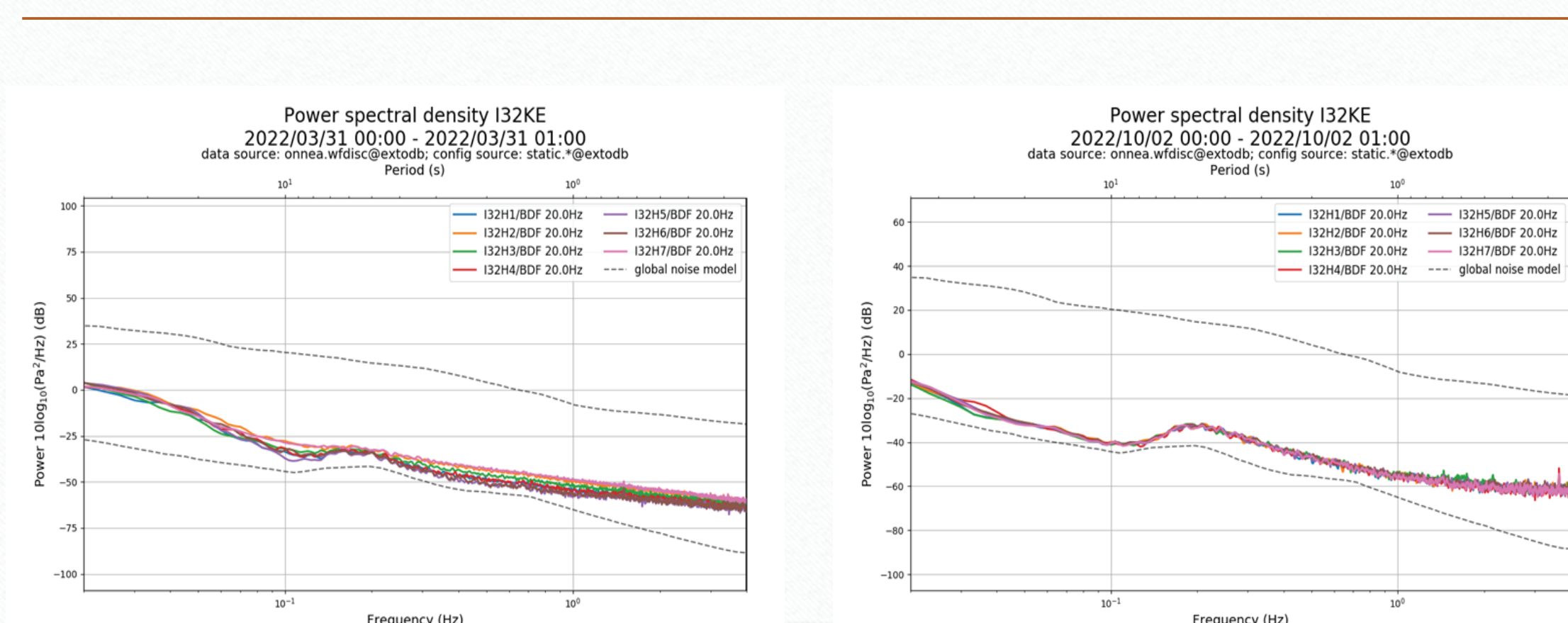
THE PERFORMANCE AND DATA QUALITY IMPROVEMENT OF INFRASOUND STATION I32KE POST MAJOR UPGRADE BASED ON COMPARISON OF EVENTS FROM THE EAST AFRICAN REGION



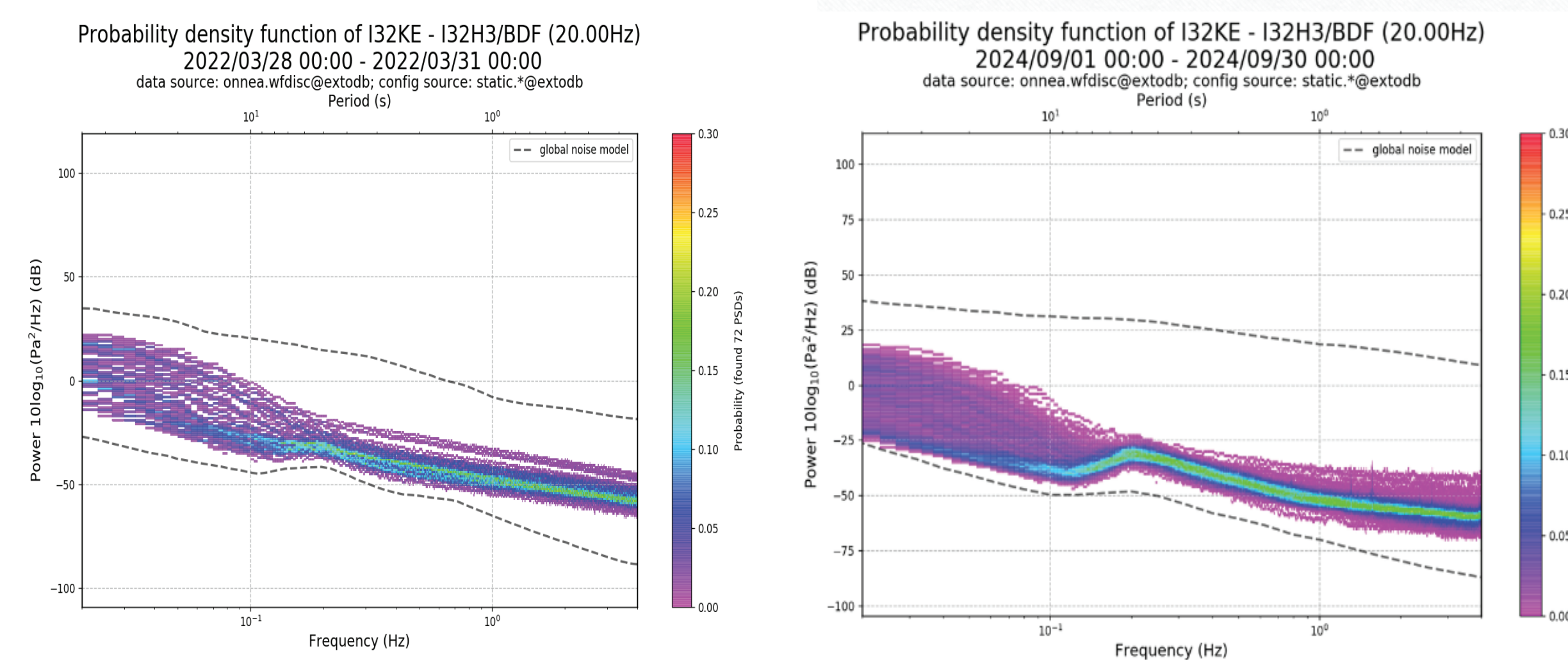
COMPARISON OF THE NOISE LEVELS

Noise levels with the Eurpa-T and Galvanized steel WNRS

Noise levels with the new Centaur digitizer and Stainless steel WNRS



PROBABILITY DENSITY FUNCTION(PSD)



CONCLUSION

- Improved GPS timing after the installation of the new tallyman's GNSS GPS antennas. But we continue to observe minor GPS loss at array station H7. Delay in MET GPS timing previously observed was resolved.
- Improved equipment performance and high levels of data availability and quality.
- Based on our local observation and data from the IDC, CTBTO, we can comfortably conclude that the station's detection capability has tremendously improved since 2019. We have compared detection and power spectral density (PSD) for the waveforms recorded at the station based on two events which occurred in the East African region. The station I32KE demonstrates excellent detections and improved PSD at low frequency.
- Array site H3 is close to a water fall was relatively noisy but the noise levels have since reduced. However, spurious noise levels at frequencies of 4Hz recorded in all sites is still under investigation.