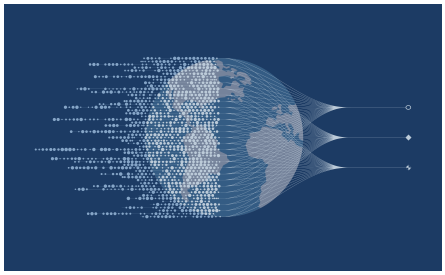

ID: **P3.5-472** Type: **E-poster**

Detection Capabilities and Picking Precision of Deep Learning Methods for Local Seismic Network Processing: The Case of Terceira Rift, Azores, Portugal

Thursday 11 September 2025 11:00 (1 hour)

The production of high-quality event bulletins relies on high-accuracy and high-precision hypocentral locations and low completeness magnitude. The Terceira Rift provides an ideal setting to study rifting processes due to its seismicity and volcanism, driven by slow transtensional deformation between the Nubian and Eurasian plates. This study leverages data from the UPFLOW project, including 49 Ocean Bottom Seismometers and land stations, to improve seismic detection in the region. Traditional land-based seismic networks struggle with detecting smaller events and precise locations using classical methods. By integrating dense networks and employing Machine Learning techniques, such as the EQTransformer, the study aims to enhance event detection and phase picking accuracy. A ten-day dataset from the IPMA network (October 2021) was analyzed using EQTransformer, where waveform pre-processing included removal of instrument response, detrending, maximum taper of 1%, high-pass filter at 2 Hz, and threshold of 0.10 for both P and S. Results show a median pick-probability of ~90% and ~70% for P and S respectively, and picking precision within ±0.5 seconds for P and ±1 second for S phases. Deep learning methods outperformed manual analysis in detecting events in this test, indicating its potential for improving seismic monitoring in regions like the Terceira Rift.

E-mail

pfeitio@hotmail.com

In-person or online preference

Primary author: FEITIO, Paulino Cristovao (University of Lisbon)

Co-authors: Ms CUSTODIO, Susana; Ms FERREIRA, Ana (University College London); Mr HICKS, Stephen (University College London); Mr JAMAL, Daud (Universidade Eduardo Mondlane, Mozambique)

Presenter: FEITIO, Paulino Cristovao (University of Lisbon)

Session Classification: P3.5 Analysis of Seismic, Hydroacoustic and Infrasound Monitoring Data

Track Classification: Theme 3. Monitoring and On-Site Inspection Technologies and Techniques: T3.5 Analysis of Seismic, Hydroacoustic and Infrasound Monitoring Data