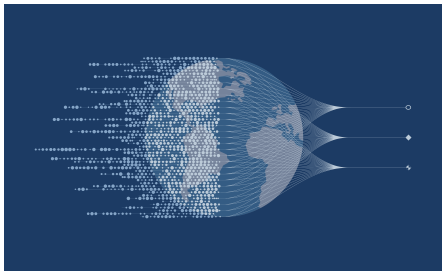

ID: **P1.2-870** Type: **E-poster**

Motion and Aftershock Seismicity Characteristics following the Mw 6.5 Earthquake in Paphos, Cyprus on 11 January 11 2022

On 11 January 11 2022, a powerful 6.5 magnitude earthquake struck Paphos, Cyprus, affecting the broader eastern Mediterranean area. Recorded seismic activity at the AKMS station revealed a PGA of 296.496 cm/s² and a PGV of 5.573 cm/s, indicating intense shaking and rapid motion. Ground motion parameters, including intensity, perceived shaking, potential damage, PGA, PGV, and instrumental intensity were used to evaluate the earthquake's impact. Over nearly two years following the event, data collection recorded 693 seismic events with an estimated completeness magnitude (Mc) of 1.4. Analysis using the maximum likelihood method demonstrated a b-value of 0.65 ± 0.09, suggesting the mainshock occurred in a zone of elevated tectonic stress. The aftershock decay rate, with a p-value of 0.73, indicates a quick reduction in stress levels post-mainshock, accompanied by a high frequency of initial aftershocks as shown by a c-value of 5.0. The fractal dimension (Dc) of 1.75 ± 0.01, indicating aftershock clustering along a particular fault line. The analysis exhibited a slip ratio of 0.58, indicating significant slip during the mainshock, with potential implications for future stress distribution. Integrating these findings with geological studies provides deeper insights into fault dynamics, stress distribution, and future seismic activity forecasting.

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Session Classification: P1.2 The Solid Earth and its Structure

Track Classification: Theme 1. The Earth as a Complex System: T1.2 The Solid Earth and its Structure