

Breaking Through the Basalt Barrier: Unveiling the Mt Read Volcanics with Ambient Noise Tomography

Tjaart De Wit¹, George Taylor¹, Ashley Morris¹

¹Ambient Resources, Hobart, Australia

Ambient noise tomography (ANT) was employed across Special Exploration Licence 11/2021 near Guildford, western Tasmania, to generate a S-wave velocity model of the upper 2 km of the crust. This study, conducted in 2023, aimed to delineate the thickness of post-Paleozoic basalt cover and map the sub-basalt geology relevant to exploring the prospective Mount Read Volcanics (MRV) beneath. Our S-wave velocity model reveals significant basalt thicknesses (potentially >500 m) northeast of Mount Pearce and southeast of Waratah, posing a considerable challenge to conventional exploration techniques targeting MRV-hosted mineralisation. Furthermore, the ANT data effectively maps the contact between Proterozoic basement in the west and the Paleozoic MRV to the east, providing crucial structural context. Complementary analysis using Rayleigh wave ellipticity and horizontal-to-vertical spectral ratio (HVSr) methods supports the spatial trends in basalt thickness identified by ANT, although HVSr generally suggests a thinner cover (<380 m). The insights gained from this passive seismic survey provide critical information for designing future exploration programmes within the tenement. The enhanced understanding of cover thickness and sub-basalt architecture will guide targeted exploration strategies to effectively evaluate the potential of the MRV beneath this challenging cover sequence.