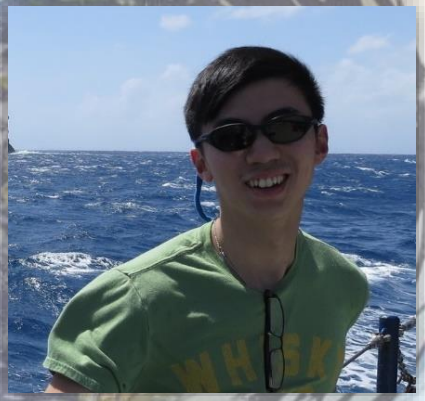
Seismic Imaging of Partial Melting in the Tonga Mantle Wedge



Professor Songqiao WEI
（魏松嶠教授）

Michigan State University, U.S.A

The Tonga subduction zone and the adjacent Lau back-arc basin are one of the most geologically active regions in the world. In order to investigate the distribution of partial melt beneath the Tonga arc and Lau back-arc basin, we conduct tomographic studies of surface wave velocity and body wave attenuation using seismic data from a local OBS array and island-based stations. The shear wave velocity structure is jointly inverted from the phase velocities of teleseismic and ambient-noise Rayleigh waves. Additionally, we determine the 3D attenuation structure from t^* measurements of *P* and *S* waves from local earthquakes. Tomographic results show strong signals of low velocity and high attenuation within the upper 100-km of the mantle beneath the back-arc basin, suggesting perhaps the lowest shear velocity and highest seismic attenuation known in the upper mantle. These anomalies require not only the abnormally high temperature but also the existence of partial melt. The inferred partial melt aligns with the spreading centers at shallow depths, but shift westwards away from the slab, implying a passive decompression melting process governed by the mantle wedge flow pattern.

25 February 2022

11:30 a.m.

Zoom Link: Here
Meeting ID: 992 4969 9833
Passcode: 983837

EARTH SYSTEM SCIENCE PROGRAMME

Enquires: 3943 9624 essc@cuhk.edu.hk