iASPEI!AGA
JOINT SCIENTIFIC MEETING LISBON 2025

IAGA / IASPEI Joint Scientific Meeting

31 August - 5 September 2025
Lisbon, Portugal

BOOK OF ABSTRACTS

IUGG IAGA International Association of Geomagnetism and Aeronomy

IUGG IASPEI International Association of Seismology and Physics of the Earth's Interior

iaga-iaspei-2025.org

Title: IAGA / IASPEI Joint Scientific Meeting 2025, 31 August – 5 September 2025,
Lisbon, Portugal: Book of Abstracts
Publisher: CZECH-IN s. r. o., 5. května 65, 140 00 Prague 4, Czech Republic
Issued: August 2025
1st edition

ISBN number: 978-80-909294-2-5

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THU 4 Sept	08:30-10:00		J04	S10	J07/S06	S08	A03	A22	A31	A32	A13	S13	A20	
	11:00-12:30	S02	J04	S10	J07/S06	S08	A07	A22	A31	A32	A14	S13	A20	
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THU 4 Sept	08:30-10:00	S02	J03		J01	S07	A08	A25	A29	A28	A14	S11	A21	A09
	11:00-12:30	S02	J03		J01	S07	A08	A25	A29	A28	A14	S11	A21	A09
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	16:30-18:30													

Please note the symposia schedule is subject to change.

AS25-0380

Crustal structure of Mutnovsky volcano (Kamchatka) and its surroundings from ambient noise tomography

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Mutnovsky volcano, located in Kamchatka, Russia, is a highly active volcano characterized by frequent ash and gas explosions. Its explosive eruptions, the most recent of which occurred in 2013, pose a threat to the nearby city of Petropavlovsk-Kamchatsky (70 km away) and the Mutnovsky Geothermal Plant (MGP), located near the volcano within a fumarole field. While the mantle wedge structure beneath Mutnovsky has been studied, the upper crust structure remains poorly understood.

The research utilized continuous seismic data collected from a temporary seismic network surrounding Mutnovsky during 2023–2024 consisting of 65 temporary stations and 4 permanent stations of the Kamchatka Branch of the Geophysical Survey RAS. Vertical components of the records were processed to construct cross-correlation functions, from which Rayleigh surface wave group velocity dispersion curves were extracted. To enhance the signal-to-noise ratio, the SVD-based Wiener filter was applied, and the covariance matrix spectral width was analyzed. The resulting dispersion curves were then used in a seismic tomography algorithm to compute a three-dimensional shear-wave velocity model. Several "Checkerboard" tests were performed to evaluate the model's robustness.

The model reveals a low-velocity anomaly at a depth of 2–5 km below sea level beneath Mutnovsky, likely corresponding to the magma chamber. Another low-velocity anomaly is observed beneath the MGP at a depth of 2–5 km below the surface, linked to the surface by a narrow vertical anomaly. It may represent an intrusion acting as a geothermal energy source. The study provides new insights into the Mutnovsky hydrothermal-magmatic system.