R003-P03
ポスター 2 ：9/25　AM1/AM2 （9:00-12:30）

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Constrained inversion of MT data with seismic velocity model in the southern part of NE Japan

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The integration of one or more independently derived physical Earth models in the magnetotelluric (MT) inversion can result in a narrower solution space of resistivity models, leading to higher confidence for geological interpretations (e.g., Kalscheuer et al., 2015; Franz et al., 2021). It is called constrained or cooperative MT inversion. The resulting resistivity structure is required to explain the observation and satisfy a certain relationship to the constraining model. In this study, we apply the idea of constrained inversion to study the subsurface structure beneath the southern part of NE Japan, especially to reveal the deep fluid distribution associated with active volcanoes and seismic activities. Previously, a resistivity structure was obtained from an MT-only inversion (Diba et al., 2023). Here, we use the same MT datasets, but the inversion is constrained using a pre-existing seismic velocity structure by Matsubara et al. (2022). To couple the inversion and the fixed velocity model, we used a structural cross-gradient coupling, which enforces a structural similarity between the resistivity and velocity model (e.g., Gallardo and Meju, 2003). Cross-gradient is a widely accepted coupling strategy, especially suitable when defining a direct relationship between resistivity and velocity is difficult. The objective function of the FEMTIC inversion code (Usui, 2015) was modified to include the cross-gradient coupling term in addition to the data misfit and regularization terms. The resulting models and evolution of objective function terms will be discussed in the presentation, as well as our approach for obtaining the optimum weights in the objective function.