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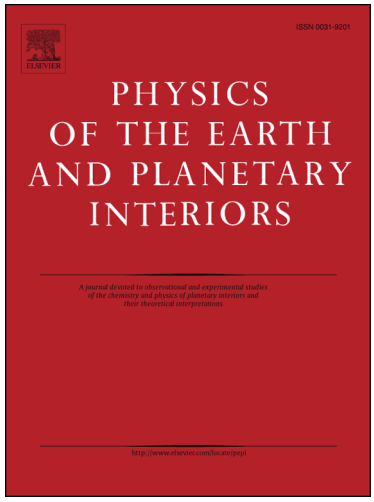

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Inversion of magnetotelluric data using integral equation approach with variable sensitivity domain: application to EarthScope MT data

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Abstract

We have developed a multi-level parallel magnetotelluric (MT) integral equation based inversion program which uses variable sensitivity domain. The limited sensitivity of the data, which decreases with increasing frequency, is exploited by a receiver sensitivity domain, which also varies with frequency. We assess the effect of inverting principal impedances, full impedance tensor, and full tensor jointly with magnetovariational data (tipper). We first apply this method to several models and then invert the EarthScope MT data. We recover well the prominent features in the area including resistive structure associated with the Juan de Fuca slab subducting beneath the northwestern United States, the conductive zone of partially melted material above the subducting slab at the Cascade volcanic arc, conductive features in the Great Basin and in the area of Yellowstone associated with the hot spot, and resistive areas to the east corresponding to the older and more stable cratons.

Keywords: magnetotellurics inversion integral equation EarthScope

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