MAPPING METASOMATISED MANTLE BY INTEGRATING MAGNETOTELLURIC, PASSIVE SEISMIC AND GEOCHEMICAL DATASETS – SE AUSTRALIA

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There is growing evidence that the distribution of giant magmatic and hydrothermal ore deposits are linked to the presence or absence of metasomatised lithospheric mantle. It follows that mapping the distribution of this mantle should be an important component of exploration programs for world class deposits, yet to date there has not been a robust means of spatially constraining the distribution of metasomatised mantle. Classically, metasomatism has been identified through petrological and geochemical analysis of mantle xenoliths and mantle derived melts which provide information on the vertical distribution of metasomatism beneath magmatic centres. Here, we show this classical information integrated with constraints on lithospheric thickness and conductivity, derived from passive seismic and magentotelluric imaging of the lithosphere provide an effective means of mapping both the lateral and vertical distribution of mantle metasomatism. As a case study we show the integration of the aforementioned datasets over south-eastern Australia where the Australian Lithospheric Architecture Magnetotelluric Project (AusLAMP) was started.