

SIT042-04

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マンツルの断熱温度プロファイル

The adiabatic temperature profile in the mantle

桂 智男^{2*}, 米田 明¹, 山崎 大輔¹, 芳野 極¹, 伊藤 英司¹

Tomoo Katsura^{2*}, Akira Yoneda¹, Daisuke Yamazaki¹, Takashi Yoshino¹, Eiji Ito¹

¹岡山大学地球研, ²バイロイト大学

¹Inst. Study Earth Int., Okayama Univ., ²Bayerisches Geoinstitut, Uni Bayreuth

The temperature at the 410-km discontinuity is reinvestigated using the in situ X-ray diffraction experiment by Katsura et al. [2004] and equation of state of MgO by Tange et al. [2009] (Tange scale). The newly estimated temperature is 1850±20 K, which is 90 K higher than that by our previous study. The equations of state of the major mantle minerals (olivine, wadsleyite, ringwoodite and perovskite) are recalculated using Tange scale. The adiabatic temperature gradient is calculated using thermal expansion coefficient obtained from these equations of state. The adiabatic temperature gradient decreases with depth in the region without a phase transition, and abruptly increases in association of the phase transitions. The adiabatic temperature gradients are found to be 0.4~0.5 and 0.3 K/km in the upper and lower parts of the mantle. The temperatures at the depth of 200 km, the bottom of the mantle transition zone, top of the lower mantle and depth of 2700 km are found to be 1720±20, 2010±20, 1980±20, and 2730±30. The mantle potential temperature is found to be 1610±15 K.

キーワード:断熱温度分布,マンツル,熱膨張率, 410km不連続,オリビンワズレアイト転移,
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