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2 Fig. S1. Dynamic subduction process of the Pacific slab beneath the CVP since 35 Ma predicted  
 3 by the best-fit geodynamic model presented by Zhu (2024). The areas enclosed by purple dash  
 4 lines stand for the delaminated continental lithosphere.

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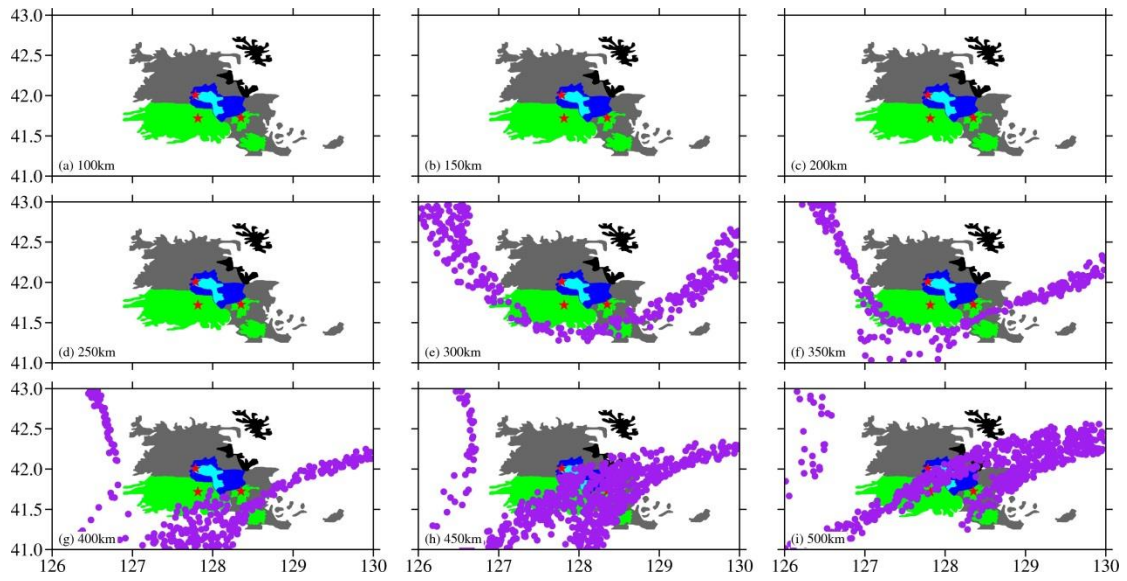
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Fig. S2. Distribution of oceanic asthenosphere material (purple) with depth at 20 Ma

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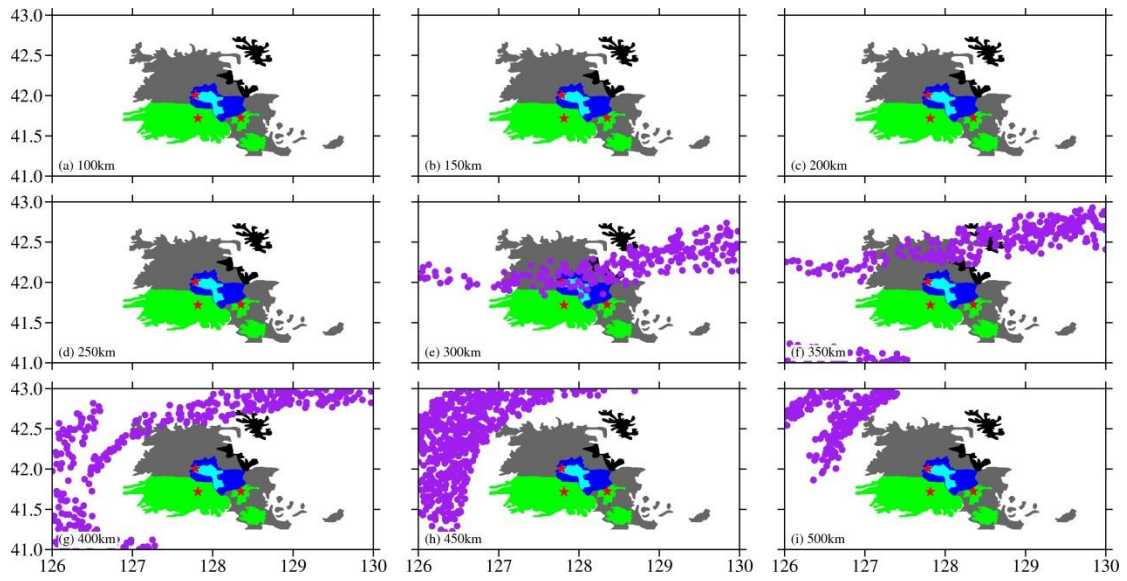
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Fig. S3. Distribution of oceanic asthenosphere material (purple) with depth at 15 Ma

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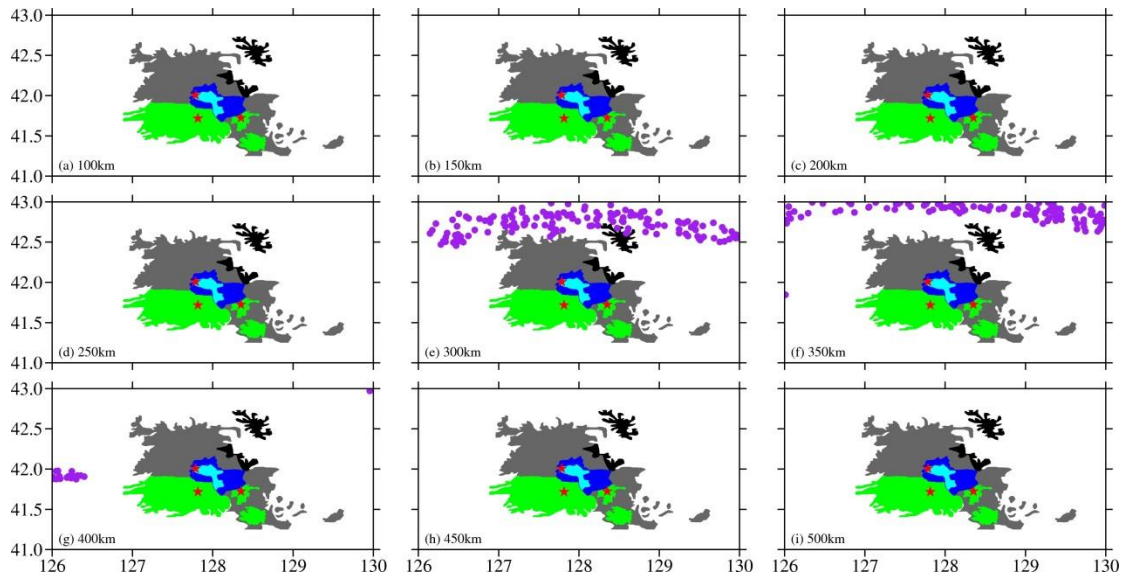
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Fig. S4. Distribution of oceanic asthenosphere material (purple) with depth at 10 Ma

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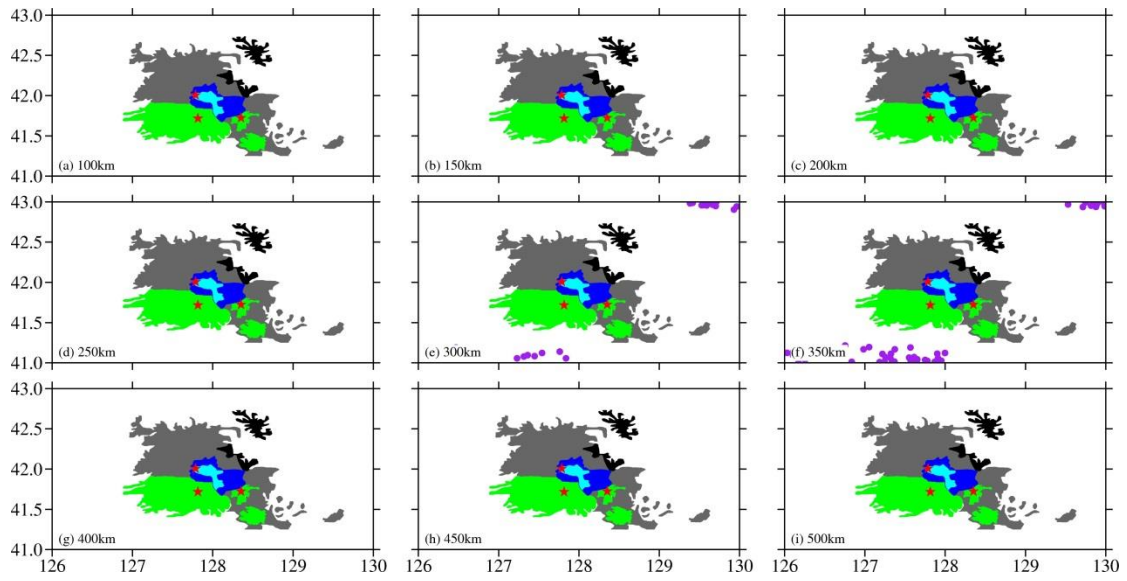
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Fig. S5. Distribution of oceanic asthenosphere material (purple) with depth at 5 Ma

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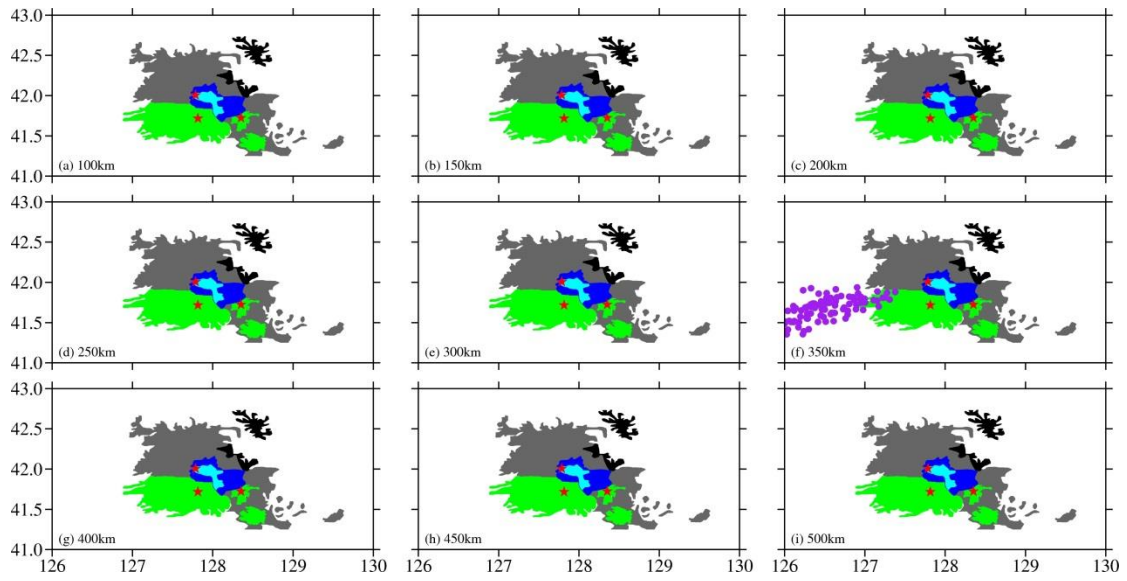
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101 Fig. S6. Distribution of oceanic asthenosphere material (purple) with depth at the present (0 Ma)

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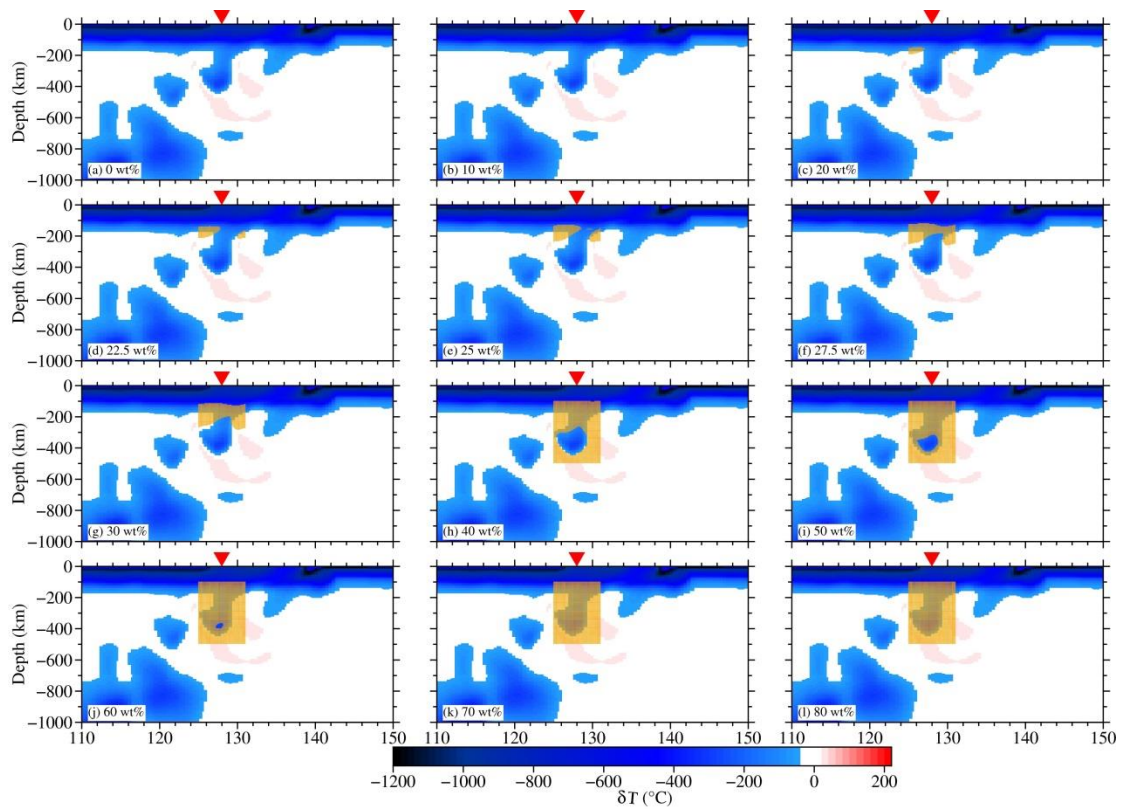
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122 Fig. S7. Melts (orange) in the mantle beneath the CVP along latitude 41.67°N at 25 Ma varying

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with  $W_{H_2O}$ 

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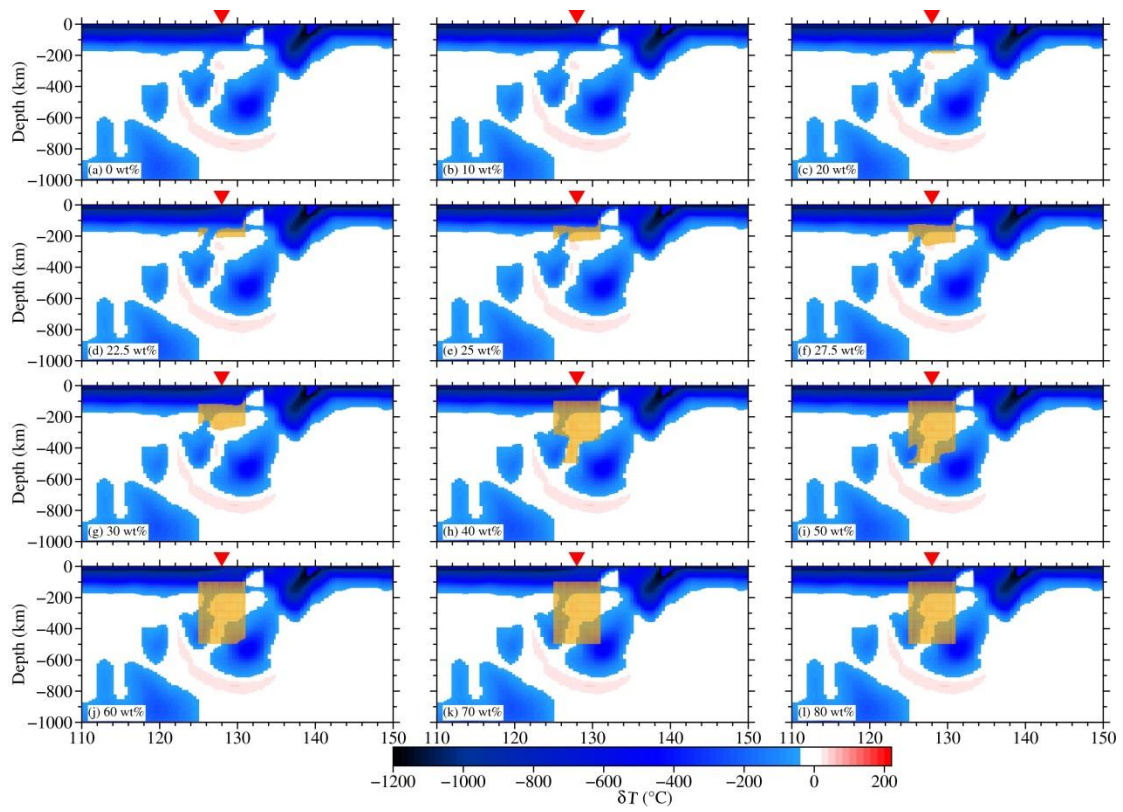
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139 Fig. S8. Melts in the mantle beneath the CVP along latitude  $41.67^\circ\text{N}$  at 20 Ma varying with

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$$W_{\text{H}_2\text{O}}$$

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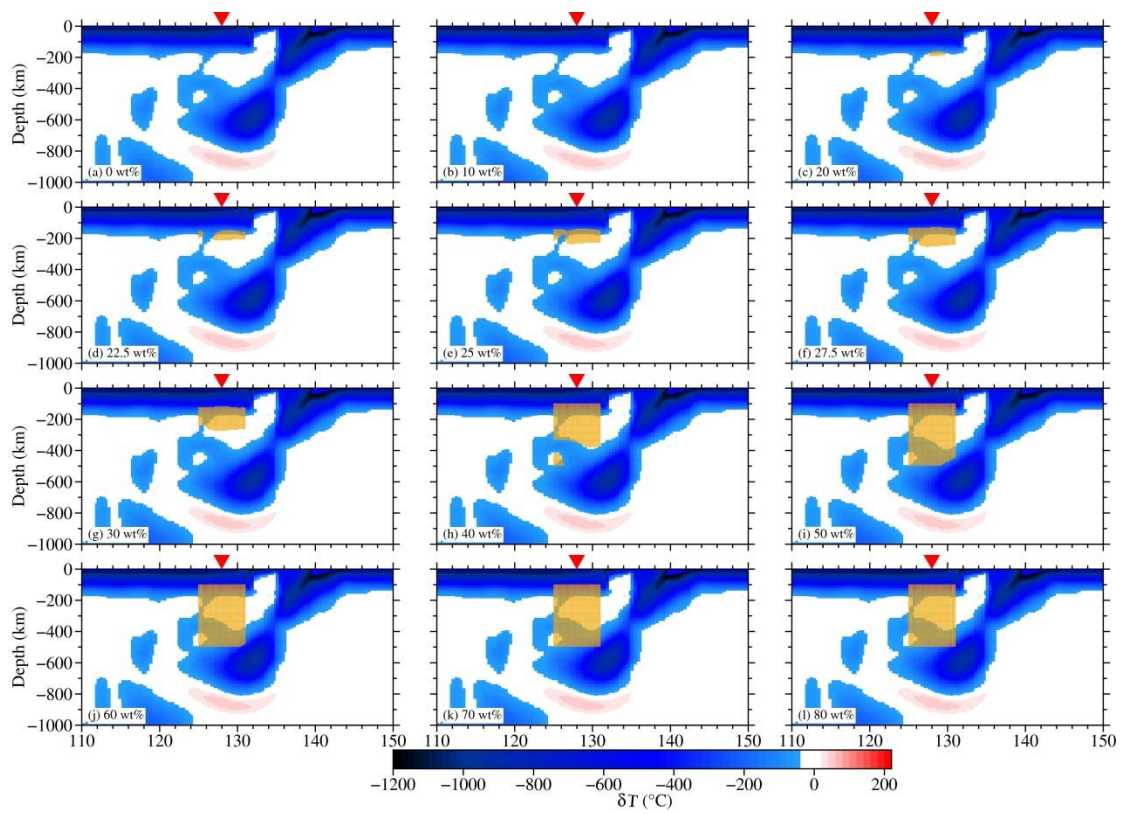
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154 Fig. S9. Melts in the mantle beneath the CVP along latitude  $41.67^\circ\text{N}$  at 15 Ma varying with

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$$W_{\text{H}_2\text{O}}$$

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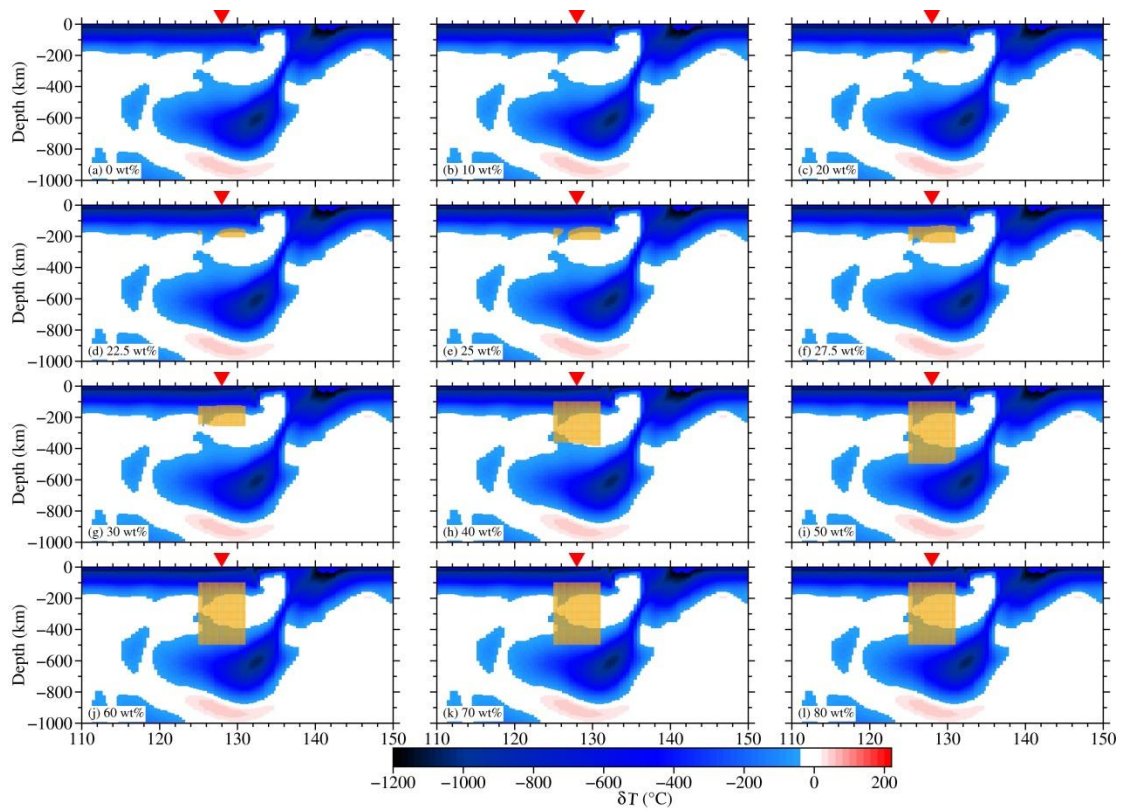
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169 Fig. S10. Melts in the mantle beneath the CVP along latitude 41.67°N at 10 Ma varying with

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$$W_{\text{H}_2\text{O}}$$

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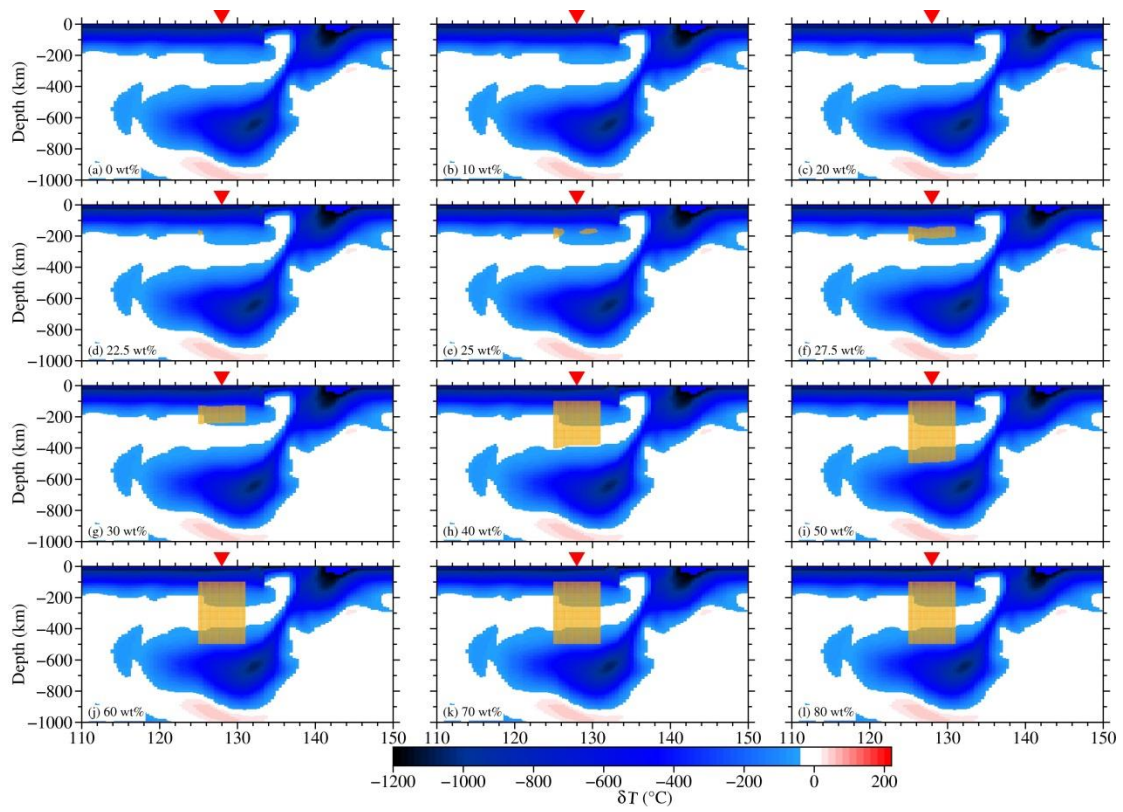
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185 Fig. S11. Melts in the mantle beneath the CVP along latitude 41.67°N at 5 Ma varying with

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$$W_{\text{H}_2\text{O}}$$

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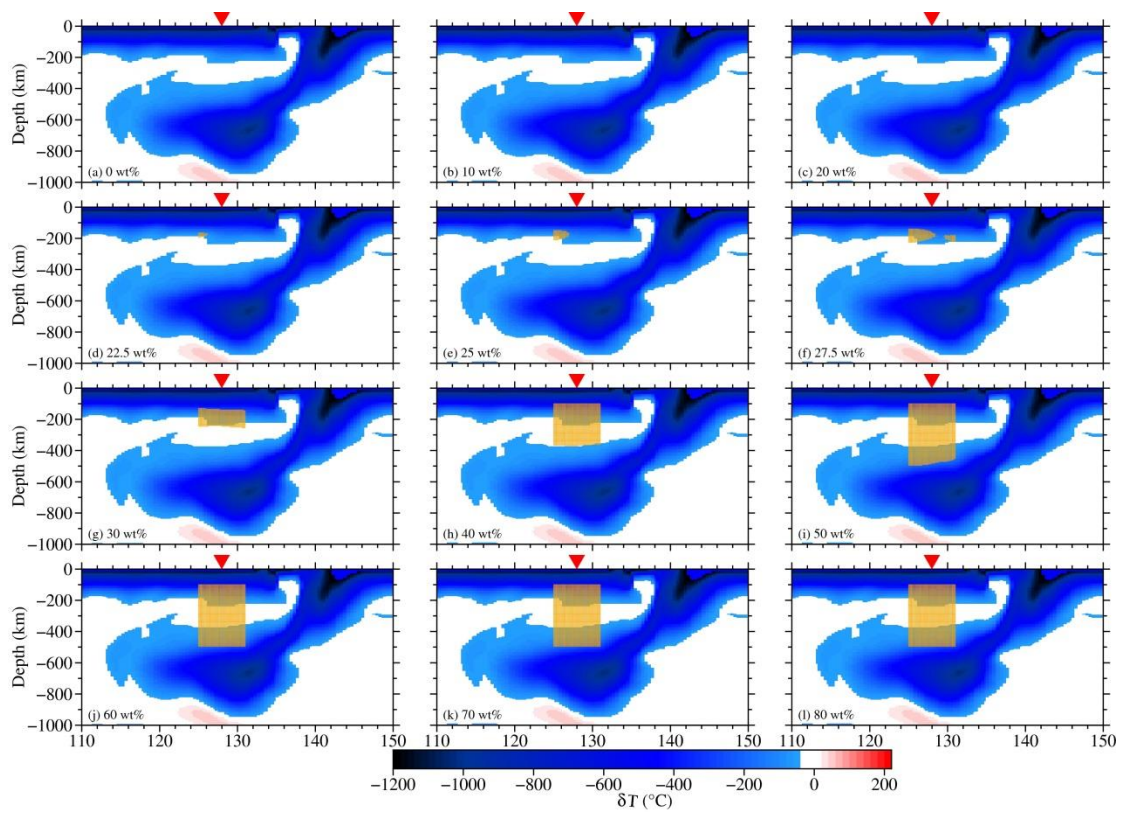
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200 Fig. S12. Melts in the mantle beneath the CVP along latitude  $41.67^\circ\text{N}$  at 0 Ma (present-day)

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varying with  $W_{H_2O}$ 

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