

## **Zircon as a tool to determine the position of tectonic suture: a case study from the Jiaodong Peninsula, eastern China**

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To determine the position of tectonic suture between two collided continents is a hard task, particularly in the case when the involved continents experienced complicated tectonothermal histories before and after they collide together. In this case, it is essential to comprehensively understand the history of crustal growth and reworking in each continent. Zircon, as a crustal archive, can provide valuable information about this and stands up as a potential tool to fulfill this task.

Zircon Lu-Hf isotopes, U-Pb ages, trace elements and O isotopes were analyzed for various types of metamorphic rocks from the Jiaodong and Jiaobei terranes in the Jiaodong Peninsula, eastern China. The results show contrasts in the crustal nature between the two terranes and thus provide constraints on the tectonic suture between the North China Craton and the South China Block in this region. Zircon U-Pb dating for the Jiaodong terrane indicates protolith emplacement mainly in the middle Neoproterozoic and subordinately in the middle Paleoproterozoic. The zircons of Neoproterozoic U-Pb ages exhibit a wide range of  $\epsilon_{\text{Hf}}(t)$  values from  $-16.8 \pm 1.0$  to  $5.9 \pm 1.0$ , indicating reworking of both ancient and juvenile crustal rocks during the Neoproterozoic magmatism. Low zircon  $\delta^{18}\text{O}$  values ( $<5\%$ ) are a diagnostic feature of the Neoproterozoic protolith in the Jiaodong terrane. Growth of the juvenile crust in the middle Paleoproterozoic is also recorded by a few samples. In contrast, zircon U-Pb dating for the Jiaobei terrane yields three episodes of magmatism at  $\sim 2.9$ ,  $\sim 2.7$  and  $\sim 2.5$  Ga, respectively. Zircon Hf isotope results suggest growth of juvenile crust at the two earlier episodes but reworking at the later episode. The crustal reworking is intensive in the Paleoproterozoic, resulting in granulite-facies metamorphism and S-type granitic magmatism at 1.90-1.85 Ga, and migmatization at 1.75 Ga. The zircons of Paleoproterozoic U-Pb ages usually exhibit high  $\delta^{18}\text{O}$  values (7-10%). Taken together, the crustal nature of the Jiaodong and Jiaobei terranes are generally similar to that of the South China Block and the North China Craton, respectively. Therefore, the suture between the two collided continents is located along the Wulian-Yantai fault marking the boundary between the Jiaodong and Jiaobei terranes.