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Università degli Studi di Napoli "Parthenope"

Via Amm. F. Acton, 38 - 80133 Napoli, ITALY

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Topic: Marine geology and geophysics.

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ABSTRACT Subject :

Relationship among rifting, magmatism and mantle melting of the West Antarctic Rift System

Abstract 31/01/2023 18:21:32

The West Antarctic Rift System (WARS) had undergone a transition from the Cretaceous diffuse rifting to the Cenozoic focused rifting, but its drive and transition mechanism are still obscure or controversial. Obviously, a geodynamic mechanism is necessary to address the relationship among rifting of the WARS magmatism, along the Terror Rift and melting of the mantle low-velocity zone (MLVZ). According to the global plate model, combined with the rotation parameters of 9 key time nodes and tectonic outlines of the Antarctic plate, we refined the relative movements between the East and West Antarctica since 100 Ma on the GPlates. We integrate structures of the Ross Sea basins indicated by geophysical data into the newly constructed plate kinematic model. The results show that the WARS rifting could be interpreted by the plate kinematic model, whose change of velocities corresponded to an event of episodic extensions in the Ross Sea basins. By establishing the relationship between the extensional deformation of the Ross Sea basins in different phases and the MLVZ now beneath the western Ross Sea, it is inferred that there could occur a coupling between the MLVZ development and its overlying basin rifting. This coupling possibly determines the transition of the WARS rifting modes and the magmatism along the Terror Rift. The transtension from the strike-slip faulting may import more water into upper mantle than the orthogonal extension with detaching faults, and promoted mantle melting and magmatism, especially at the two ends of the Terror Rift. It was just after the TR and the northeastern VL coast appeared above the LVZ, there have occurred magma intrusion and volcanic eruption during 8-5 Ma, especially at Ross Island and Mount Melbourne.

