

Mechanism of cataclasite occurring in Hiraodai Karst region

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Geofluids are considered to have important effect on earthquake generation and volcanic activities related to the subducting slab. Different aspects of geofluids have become the highlights of recent research. In the present study, we focus on the exposed cataclastic layer and have tried to unravel the mechanism of the formation of such disintegration of rocks due to fluid activity. The studied cataclastic layer occurs in Hiraodai karst region, where limestones were thermally altered to marble by contact metamorphism of the adjacent granodiorite pluton. In the vicinity of the cataclasite layer, calcite crystals have selectively high amount of fluid inclusions. Moreover, many of the disintegrated gravels inside the cataclasite layer are rounded. All these facts are strongly pointing towards participation of fluids during the formation of the studied cataclasite layer. Here, we present the observations of deformation microstructure of calcite and geochemical characterization of fluid inclusions in it, which lead to the understanding of origin of fluid producing the cataclasite layer as well as the process of disintegration of the studied marble. The data reveals that (1) fluid-induced differential stress produces cataclasite layer in the marble body, (2) the fine-grained matrix of the cataclasite layer is formed by calcite which were crystallized in the presence of fluid, and (3) this cataclasite-producing fluid is possibly cogenetic to the magma of adjacent the granodiorite.

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