
Kübler Illite " Crystallinity" Index of the Cretaceous Gyeongsang Basin, Korea: Implications for Basin Evolution

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Abstract: Thermal maturity of the Lower Cretaceous Sindong and Hayang groups in the Gyeongsang Basin, Korea, was investigated using the Kübler illite " crystallinity" index (KI) which is based on the numerical expression of the 10- Å peak width after calibration to the Crystallinity Index Standard scale. The metamorphic grade of the Sindong and Hayang groups ranges from late diagenetic zone to high anchizone. Depth of burial was not a major factor controlling KI variation in the basin because Hayang mudrocks have higher thermal maturity than the underlying Sindong mudrocks. Short-lived heating by the emplacement of the Upper Cretaceous plutonic rocks is responsible for the higher thermal maturity in the Hayang mudrocks. A linear NNE-SSW trending belt is drawn by connecting the lowest KI values, and it seems to reflect a hidden fault trace beneath the Hayang Group. Emplacement of Upper Cretaceous plutonic rocks and introduction of hydrothermal fluids along the inferred fault may have been the main cause of the lowering of KI values along this belt. This inferred fault is interpreted to represent the buried eastern boundary of the Nagdong Trough, which was the main depositional site for the Sindong Group in the western part of the Gyeongsang Basin. Deposition of the Hayang Group occurred in the enlarged basin when the basin extended eastward. This study provides an example that KI values can be used in the reconstruction of an early history of basin evolution.

Key Words: Gyeongsang Basin • Illite Crystallinity (Kübler Index) • Korea • Low-Grade Metamorphism

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