
Tectonic Implications of Illite/Smectite Diagenesis, Barbados Accretionary Prism

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Abstract: The depth distribution of illite/smectite (I/S) compositions was investigated for a well drilled to a depth of 3462 m on Barbados Island, the only subaerial exposure of the Barbados accretionary complex. The classical pattern of increasing percentage of illite interlayers in the mixed-layer clay with increasing burial depth was not observed. Rather, the data describe an irregular, zig-zag trend with depth. This trend is probably the result of reverse faulting in the section. I/S data were also used to infer several kilometers of uplift and subsequent erosion of the section. This study shows that irregular patterns of clay diagenesis with depth can be anticipated for sequences that have undergone complicated tectonism and deformation. Combined with other geologic information, these patterns can help to determine the tectonic history of the sedimentary sequence.

Key Words: Barbados • Diagenesis • Faulting • Illite/smectite • Tectonics

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