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Factors Controlling Brittle Deformation in Active Accretionary Prisms: Insights from the Nankai Accretionary Prism

Accretionary prisms exemplify the initial stage of mountain building at convergent margins. The most apparent representations of deformation in accretionary prisms, the décollement and thrust faults, are distinctly brittle features. A good general understanding of the mechanisms behind brittle deformation in earth materials is known, but each setting is unique and has distinctive material properties. The factors that determine specifically where brittle structures form within accretionary prism sediments are not well constrained. New sediment samples from the toe of the Nankai accretionary prism allowed for the collection of structural observations and physically properties data, and provide me with the opportunity to determine controlling factors behind the development of brittle structures within the prism. My research will involve four main components: (A) mapping the spatial distribution and geometries of brittle structures found in drill cores from the toe of the Nankai accretionary prism, (B) compiling and characterizing correlations among sediment physical properties data sets, such as porosity, density, and acoustic velocity, from these drill sites, (C) using electron microscopic methods (e.g., SEM) to determine grain fabrics and structures within the sediments, and to recognize presence or absence of intergranular cementation, and (D) integrating observations and measurements to defining correlations among and spatial distributions of sediment physical properties, microfabrics and microstructures, distribution of brittle deformation features, and determining the initial causes and consequences of brittle deformation within accretionary prism sediments.