
Clay Mineral Studies of the Lower Permian Havensville Shale in Kansas and Oklahoma

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Abstract: Analyses of samples of the Havensville Shale, collected from six localities in Kansas and northern Oklahoma, showed that the distribution of clay minerals and chemical variations in the clay minerals were related to changes in the sedimentary facies. The major clay mineral assemblages were: (1) illite, mixed-layer illite—montmorillonite, and regularly interstratified chlorite-vermiculite in the shaly facies of northern and central Kansas, (2) montmorillonite, illite and mixed-layer illite-montmorillonite in the calcareous shale and algal limestone facies of southern Kansas, and (3) kaolinite, illite and mixed-layer illite—montmorillonite in the sandy facies of northern Oklahoma. Differential settling and transportation of clay detritus were the major factors in the pattern of distribution of the clay minerals. Regional differences were noted in the abundance of 2M illite polymorphs, the K/Rb ratio and the illite 001/002 intensity ratio. Some structural variations and chemical differences among the clay minerals were consequences of modifications during deposition in different environments and diagenesis.

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