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# Directional Variation of Elastic Wave Velocities in Oriented Clay

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**Abstract:** Sonic anisotropy of clay resulting from particle orientation was studied by means of velocity measurements on anisotropically consolidated kaolinite. Samples were prepared from a kaolin-water slurry under consolidation pressures ranging from 80 to 400 psi, with two distinct stress histories. Directional velocity measurements were made over a wide range of water contents as saturated samples were allowed to dry by evaporation to water contents below the shrinkage limit. Directional variation was most pronounced with partial saturation, when directional velocities differed by as much as a factor of two. The degree of sonic anisotropy is seen to correlate with variation in the shrinkage limit, showing a systematic dependence on particle orientation, but no unique relation to consolidation stress exist because of the overriding influence of stress history.

*Clays and Clay Minerals*; October 1972 v. 20; no. 5; p. 285-293; DOI: [10.1346/CCMN.1972.0200505](https://doi.org/10.1346/CCMN.1972.0200505)

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