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### **Semiquantitative estimation of carbonates in Holocene siliciclastic sequences of the Mississippi Delta**

Study of diagenesis in Holocene siliciclastics of the Mississippi Delta required semiquantitative estimation of carbonates in these matrices. Siderite is the dominant carbonate, but accessory dolomite and calcite also are ubiquitous. Siderite occurs in tabular zones and nodular masses, while dolomite occurs primarily as an accessory mineral in nodules. Dolomite and calcite also occur as minor constituents in the clay matrix. Methods utilized include: chemical extractions, use of high-resolution X-ray radiographs, and X-ray diffraction. Chemical extractions involve a sequential extraction process in which Fe from siderite is used as a measure of the siderite. Nonsideritic Fe is first removed by pretreatment. Sideritic Fe is then released by extraction with heated 0.1 N HCl. A correction is made for contributions from the clay matrix. Semiquantitative concentrations of nodular siderite can also be obtained by examination of radiographs. Estimates of relative siderite concentrations are obtained by placing a transparent grid over the radiograph. Areas corresponding to nodules versus total areas then approximate siderite concentrations. Initial examination of the nodules is required to verify that siderite is the dominant carbonate in the nodules. Results of X-ray diffraction may, in some cases, also provide estimates of relative carbonate concentrations. As a beginning step, samples are milled in a McCrone micronizer mill to grain sizes of less than a few microns. Following this procedure, subsamples of the material are examined by X-ray diffractometry and relative peak intensities used to estimate concentrations. Results from the different methods suggest that, for homogenized bulk samples containing nodular carbonates in higher concentrations, chemical extractions provide semiquantitative results. Continuous radiographic data tend to support these results. Results from X-ray diffraction studies, when applied to 60 ml samples collected at one meter intervals do not support results from the other methods in that siderite only appeared in three of the samples. However, homogeneously distributed dolomite and calcite could be seen in most of the matrix samples from these borings, despite the lower concentrations and fine grain sizes that inhibited determination by chemical extraction or direct observation by radiography.