# GEOCHEMICAL EFFECTS OF ORGANIC-RICH SWAMP EFFLUENTS FROM THE OKEFENOKEE SWAMP-MARSH COMPLEX OF SOUTHERN GEORGIA

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ABSTRACT

The Okefenokee swamp-marsh complex of southern Georgia is losing upward of $10^{11}$ g per year of humic matter as a result of surface drainage. The loss of these highly stable polymers amounts to ∿50 g per $m^2$ per year. Because net accumulation of peat is <100 g per $m^2$ per year, this loss could have a significant effect on the eventual petrography of the coal which could result from Okefenokee peats.

The waters leaving the swamp, notably those of the Suwannee River, carry a load of 70-100 mg/l dissolved humic substances. These are characterized by high total acidity (>10 meq/g) and a high carboxyl content (>6 meq/g). Number average molecular weights range from ∿500 to ∿3000. Elemental composition and spectral properties resemble those of soil humic substances. The organic matter contributes more than 0.4 meq/l of acidic functional groups to the low ionic strength swamp effluents, thus controlling pH and providing anions for electrical charge balance. The presence of salicylic acid sites in the humic polymers allows the formation of strong metal chelates, in addition to other complexing reactions, which explains the linear correlation between organic carbon and iron.

During periods of high discharge from the headwaters of the Suwannee, the effect of the dissolved humic matter extends to the mouth of the river, as evidenced by concentrations of 40 mg/l organic carbon and a slow gradual increase of pH downstream to ∿6.7. During periods of low discharge the karst waters from the downstream limestone terrains dominate. The organic carbon concentrations are as low as 10 mg/l, and pH values increase sharply from 4.2 to 7.2 immediately after entering the karst region.