

## Role of mineralogy in areas affected by natural acid saline seeps, southwestern Australia

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(Received: 12/9/2004, received in revised form: 20/5/2005)

**Abstract:** The study of morphological and mineralogical changes within a natural acid saline seep affected landscape revealed that seasonal differences in surface mineralogy, reflecting the operation of sulfidization and oxidative sulfide weathering processes. During the wet season, the surface and near surface of the waterlogged seep and marsh areas is dominated by black sulfidic materials (pyrite) and minor salt crusts, with negligible iron oxides and oxyhydroxides. The Fe and S emerging from seeps contribute to the sulfidization processes operative in reducing conditions within the waterlogged zones. During the dry season, the surface mineralogy of the natural seepage zone is dominated by salts (halite), sulfates (gypsum and barite) and importantly, iron oxyhydroxides gel precipitates and crusts (ferrihydrite, goethite, schwertmannite). The gradual drying of previously waterlogged zones during summer facilitates oxidative weathering of the sulfides, which together with rapid oxidation of  $\text{Fe}^{2+}$  emerging from the still persisting minor seeps, results in the formation of iron oxyhydroxides and acid generation. The visible near infrared (VNIR) reflectance spectra of the surface minerals from unaffected, salt crusted and acid seep areas, showed spectral differences expressed in the VNIR region due to absorption bands of iron oxides and hydroxides. The spectral difference can be utilized for regional scale mapping of acid seeps and acid sulfate soils of affected areas via hyperspectral and multispectral remote sensing.