

ORIGIN OF SALT-WATER WEDGE UNDER THE COASTAL PLAIN IN SOUTHWESTERN TAIWAN

1.LIU, T. K., 1.The Department of Geology, National Taiwan University, Taipei, Taiwan, ROC.

The coastal area of the Pintung plain has been suffered from the over-withdrawal of groundwater and the resulting land subsidence. A salt-water wedge exists within the confined aquifer underlying this area. There are two opinions concerning the origin of this wedge: 1) modern (40 y old) sea water or, 2) residual formation water. In order to solve this problem, two 200-300m long sediment cores were taken and water wells constructed. The study of depositional environments, pore-water and well water quality, and carbon-14 ages and tritium concentration of well water have been carried out. The strata deposited in marine environments occur at two depth intervals: 56.5-80.5 m and 96.5-130.5 m below sea level. These two horizons and intervening terrestrial beds act as the regional aquitard which contains freshwater. On the contrary, the concentration of Na⁺, K⁺, Ca⁺⁺, Cl⁻ and SO₄⁻ of water in the gravelly aquifer overlying the aquitard are lightly higher than common freshwater. Moreover, Cl⁻ concentration of water in the lower (160 m depth) gravelly aquifer ranges from 20 to 100 % of that of open sea water. The carbon-14 ages and tritium concentrations of the upper unconfined freshwater aquifer is 490 ± 40 yBP and 2.77 ± 0.14 TU, respectively. On the contrary, the carbon-14 ages of the salt-water in the deeper aquifer are approximate to their respective depositional ages of sediments (12000-20400 yBP) and no bomb-tritium signal was found in this aquifer. Thus it is apparent that the salt-water are ancient, instead of modern, sea water in origin. The model which invokes the Holocene sea-level rise as the cause of the salt-water wedge is proposed.