

Land Subsidence and Groundwater Basin Monitoring System in Chiba Prefecture, Japan

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The Kanto Plain is called the Kanto Groundwater Basin. The maximum depth of the basin is over 3000m - 2500m below surface and the lower part contains brine groundwater including natural gas and iodine. The most of the aquifer layers contain fresh groundwater is composed of the upper part of the basin, middle - late Pleistocene sediments. Chiba Prefecture is located in south-east part of the Kanto groundwater basin, and monitoring the land subsidence by 159 observation wells and 1408 benchmarks in total as of 1998. The following 4 types land subsidence mechanism are make clear by continuous monitoring.

1. Natural land subsidence : A characteristic compaction of the Alluvial deposits has been recognized in deltaic low land area.
2. Natural Gas Production : Maximum subsidence of 247mm/year occurred on natural gas field. Chiba prefecture regulated the production. Such the resulted in progressive increase rising groundwater level and the surface has been slightly uplifted.
3. Groundwater Pumpage : The upper aquifer has the largest pumping up volume of groundwater for drinking, agricultural, industrial and building use. The groundwater level has been stabilized from the standpoint of the long time scale.
4. Liquefaction : Liquefaction subsidence is exceptional event, however it is a big problem for low lying and reclaimed land areas because of the immediate heavy damages caused.

We could almost succeed the pumping up of groundwater without land subsidence. Furthermore, we have to monitor and protect groundwater quality from Geo-pollution, that is sedimentary strata (soil),

groundwater and ground air contamination.