Driving mechanisms of Land Subsidence of Beijing plain, China

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The Beijing area is one of the typical regions in China which suffers from severe land subsidence. The maximum subsidence rate could reach up to 14cm/yr in recent years. An integrated subsidence-monitoring program was conducted, including levelling survey, borehole extensometers, multilayer monitoring of groundwater level and Synthetic Aperture Radar Interferometry(InSAR), with the aim to monitor the main hydrogeophysical processes which cause the land subsidence. This paper aims to describe the different driving mechanisms that drive the pattern of the ground displacement. Deep causes are recognizable in the fault movement which range from 0.35mm/yr to 1.5mm/yr and rebound of basement. Medium causes are related to anthropogenic groundwater withdrawal and geochemical compaction caused by high salt concentration in the lacustrine sediments, mainly in the Mid-Pliocene strata of Shunyi depression. Shallow causes include the Holocene sediment compaction and the oxidation of the organic soils. The shallow compaction primarily occur in the southern and southeastern area of Beijing plain. The building loads may cause local compaction of shallow deposits. From monitoring and analysis, the different areas show the variable driving mechanisms. The major factor that contribute to the present land subsidence of Beiing plain is groundwater overexploit. And the deformation contribution of Holocene deposits should be considered for the manmade structures.