[EE] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-HW Hydrology & Water Environment

[A-HW22]Hydrological Cycle and Water Environment

convener:Seiya Nagao(Institute of Nature and Environmental Technology, Kanazawa University), Isao Machida(Geological Survey of Japan), Shin'ichi Iida(国立研究開発法人森林研究・整備機構森林総合研究所森林研究部門森林防災研究領域水保全研究室, 共同), Takeshi Hayashi(Faculty of Education and Human Studies, Akita University)

Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

We focus on various issues of water cycle and environment and aim to answer questions of hydrological and earth system sciences including 1) surface, subsurface and evapotranspiration processes of water cycle; 2) natural and anthropogenic hydrothermal systems, 3) environments issues and studies on a watershed or global scale, 4) water-related issues with ecological, environmental, and geochemical aspects, and 5) other issues in hydrological sciences. This session welcomes presentations regarding various kinds of approaches and techniques such as field survey, remote sensing, isotope tracers, numerical simulation, and theoretical analysis.

[AHW22-P13]Long-term groundwater storage changes and land subsidence development in the North China Plain (1971-2015)

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Keywords:Over-abstraction, Subsidence, Drought, GRACE, InSAR

The North China Plain (NCP) has been suffering from groundwater storage (GWS) depletion and land subsidence for a long period. This paper collects data of GWS changes and land subsidence from in situ groundwater-level measurements, literature, and satellite observations to provide an overview of the evolution of the aquifer system during 1971-2015 with a focus on the sub-regional variations. It is found that the GWS shows a prolonged declining rate of -17.8±0.1 mm/yr during 1971-2015, with a negative (positive) correlation to groundwater abstraction before (after) 2000s. Statistical correlations between subsidence rate and GWS anomaly (GWSA), groundwater abstraction, and annual precipitation show that the land subsidence in three sub-regions (Beijing, Tianjin, and Hebei) represents different temporal variations due to varying driven factors. Continuous drought caused intensive GWS depletion (-76.1±6.5 mm/yr) and land subsidence in Beijing during 1999-2012. Negative correlations between total groundwater abstraction and land subsidence exhibited after 1980s indicating that it may be questionable to infer subsidence from regional abstraction data. Instead, the GWSA generally provides a reliable correlation with subsidence. This study highlights the spatio-temporal variabilities of GWS depletion and land subsidence in the NCP under natural and anthropogenic impacts.