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Editorial: Hydrological processes in agricultural lands

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Editorial on the Research Topic
Hydrological processes in agricultural lands

Agriculture plays a vital role in the socioeconomic development of the world. Alongside an increase in human population, agricultural land increased by 1.9 million km^2 between 1960 and 2019 (Winkler et al., 2021), and it is estimated to occupy 36% of the terrestrial surface (FAO 2022). With increasing pressures in food production, a thorough understanding of the hydrological processes in agricultural lands is essential to manage and protect natural resources while optimizing agricultural productivity.

This Research Topic is intended to help researchers and other relevant stakeholders working in agricultural lands by compiling recent advancements in the field, including the development and application of models to quantify different aspects of the hydrological cycle, predict salinization and solute transport in irrigated areas, and provide tools to manage resilience to climate change.

After a thorough review, the accepted papers in our topical Research Topic are novel, comprehensive, and informative. In total, seven papers have been published, representing authors and study regions from across China.

Shi et al. highlight the effects of agricultural evapotranspiration from the angle of re-precipitation due to irrigation. They quantify moisture recycling using a two-layer water accounting model and assess the possible re-precipitation from agricultural lands in the Tarim basin, the largest endorheic basin in China. This work provides insights to improve irrigation arrangements by taking into account land-atmosphere interactions. Li et al. investigate phosphorus *p*) and iron (Fe) mobilization during the different hydrological phases of rice growth in paddy fields. Paddy fields for rice growth are one of the most common land uses among irrigated farmland in China. The alternation of flooding with dry periods, necessary for rice growth, drives *p* transformation and transport. The authors use a combination of microsensors and pore-water samplers to obtain highly resolutive *in-situ* measurements of *p*, Fe, and oxygen concentrations during the different stages of rice growth. Their results provide useful information on how to manage water during rice production to prevent soil *p* loss and environmental pollution.

Dong et al. provide estimations of actual evapotranspiration for different terrestrial vegetation types in China. The authors have created a database of vertical root distributions for China's terrestrial vegetation types, they develop root distribution functions and apply them

to improve the root water absorption modulus of the soil-plant-atmosphere continuum (SPAC) model. Deng et al. present a model to evaluate root water uptake for the alpine meadows in the Qinghai-Tibet Plateau (QTP). Using a combination of data Research Topic and modeling, the authors quantify root water uptake in alpine meadows and characterize its variability across phenological stages to inform vegetation's water use and response to climate change in the region. Yan et al. investigate the belowground mechanisms of maize adaptation to drought using "Denghai 618" summer maize as the experimental material. The authors explore root morphology adjustments and physiological and biochemical changes that improve water absorption and thus allow the adaptation to drought stress.

In addition, Lian et al. use long-time observations of soil salt content, groundwater mineralization, groundwater depth, and irrigation metrics in a closed hydrogeological unit in the Jingtaichuan Electric-Lifting Irrigation Area in Gansu Province of China to study the drivers of soil salination. Finally, Qin et al. focus on how to optimize the allocation of ecological restoration on slopes to mitigate the impacts of climate change on hydrological processes and improve ecological functions. The authors provide technical guidance and demonstrate their applicability in the Huangshui River Basin, in Qinghai Province, China.

With these published articles, we observe a variety of research ideas. This Research Topic provides a dedicated platform for papers in the field of hydrological processes in agricultural lands. We look forward to more research results in this field in the future.

Meanwhile, we would like to thank all our readers, authors, peer reviewers, editors, and technical team for their support.

Author contributions

Conceptualization, JN; investigation, JN, SS, BS, AA; writing—original draft preparation, JN; writing—review and editing, AA and SS. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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