EGU25-1571, updated on 08 Jan 2026
https://doi.org/10.5194/egusphere-egu25-1571
EGU General Assembly 2025

Global distribution of small reservoirs and their role in surface water storage

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Small on-farm reservoirs play a vital role in sustaining irrigation and livestock water demands, particularly in regions facing acute water scarcity (Aminzadeh et al., 2024). However, comprehensive understanding of their global distribution and contribution to local water budgeting and management remains limited. This research leverages high-resolution satellite data from Sentinel 1 and Sentinel 2 to develop a global database of small agricultural reservoirs (<0.1 km^2) across geographic and climatic zones. Machine learning algorithms are employed to improve the accuracy of reservoir detection from satellite imagery. In addition to mapping the spatial and temporal distribution of these reservoirs, we estimate their storage capacity by correlating surface area and depth metrics. The study enables monitoring of surface water storages across scales thus offering critical insights into the role of small reservoirs in water budgeting and accounting, particularly in water-stressed regions of the world.

Reference

Aminzadeh, M., Friedrich, N., Narayanaswamy, S.G., Madani, K., Shokri, N. (2024). Evaporation loss from small agricultural reservoirs: An overlooked component of water accounting, Earth's Future, 12, e2023EF004050, https://doi.org/10.1029/2023EF004050.