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The sustainability of fresh groundwater resources in major deltas around the world

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Increasing population, growth of cities and intensifying irrigated agriculture in the world's deltas promote the demand for fresh water resources, accelerating groundwater extraction. This, in turn, leads to sea water intrusion and salt water upconing, which threaten near-future water and food security. Proper water management in deltas requires precise knowledge about the current status of the deltas' fresh groundwater resources, in the form of a groundwater salinity distribution. However, this knowledge is scarcely present, especially at larger depths. In this research, we applied three-dimensional variable-density groundwater model simulations over the last 125 ka to estimate present-day fresh groundwater volumes for several major deltas around the world. We also compared these to current extraction rates and estimated the time until in-situ fresh groundwater resources are completely exhausted (ignoring local-scale problems), partly leading to groundwater level decline and mostly replacement with river water or saline groundwater. In this presentation we will share our findings, for example which deltas' groundwater reserves presumably are under stress.