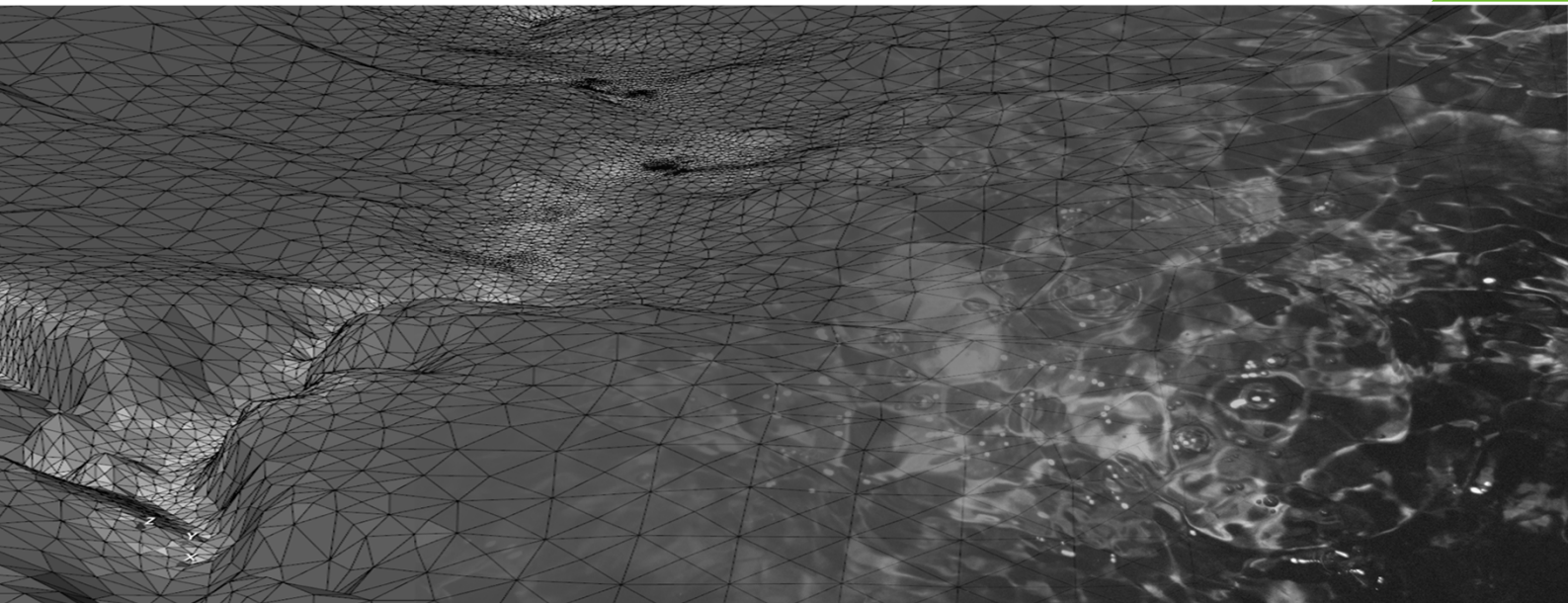


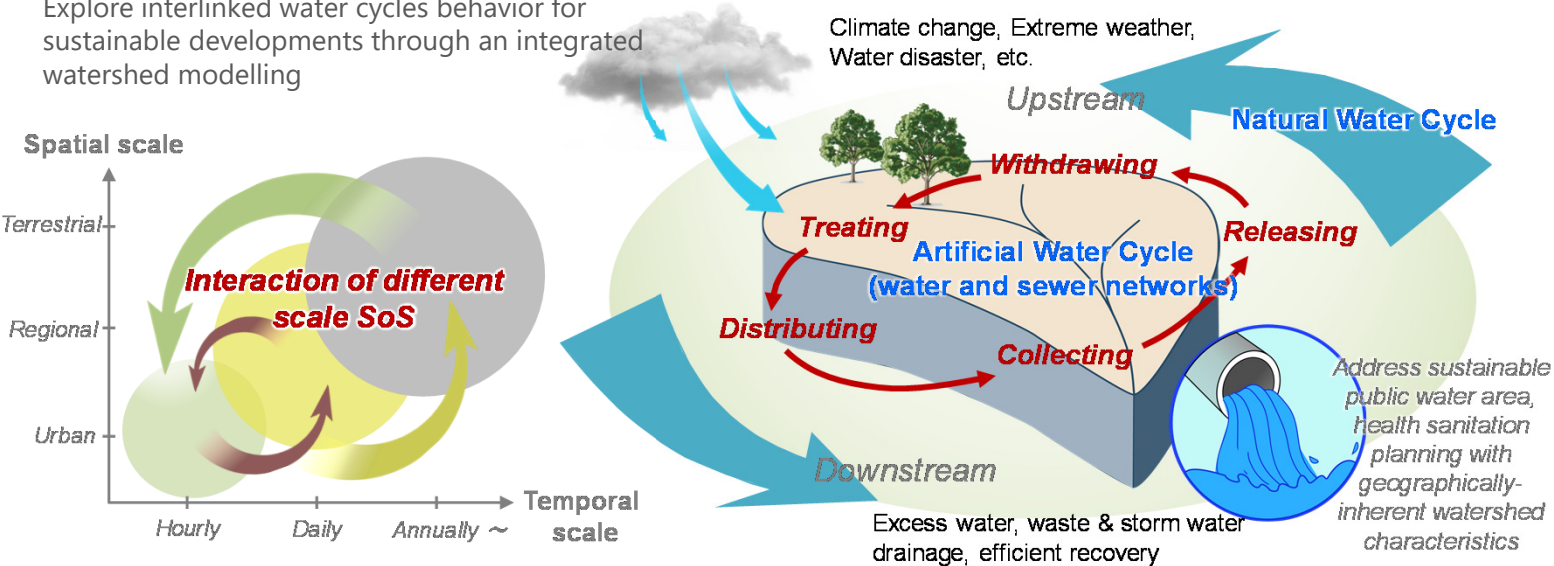
Integrated Watershed Modelling Technologies to strengthen water security



Our modern computing & modelling technologies makes you a trusted administrator for sustainable management of natural and artificial water cycles as SoS (System of Systems)

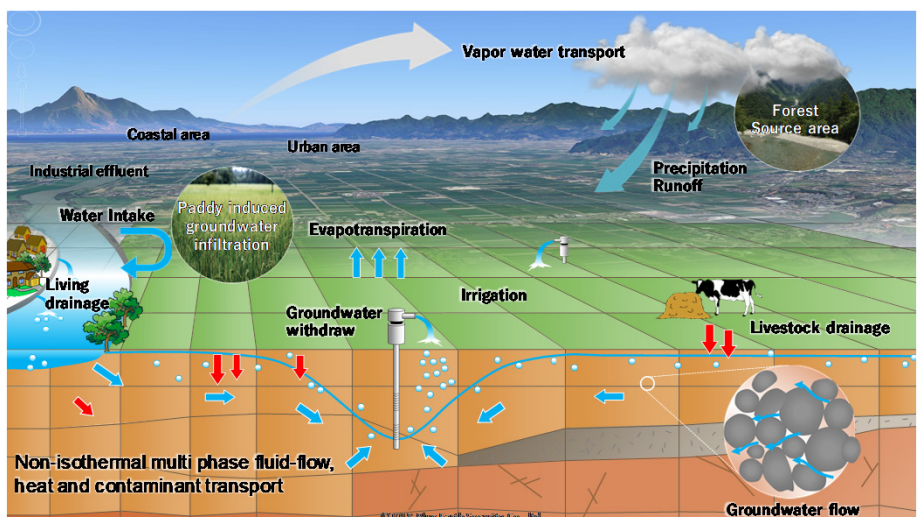
TOWARD SUSTAINABLE WATER SECURE WORLD

Explore interlinked water cycles behavior for sustainable developments through an integrated watershed modelling



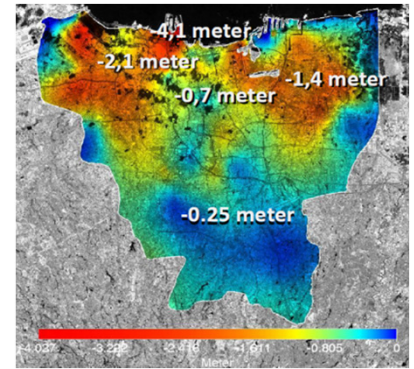
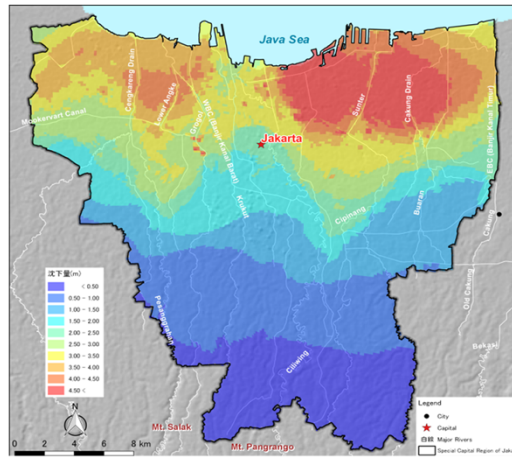
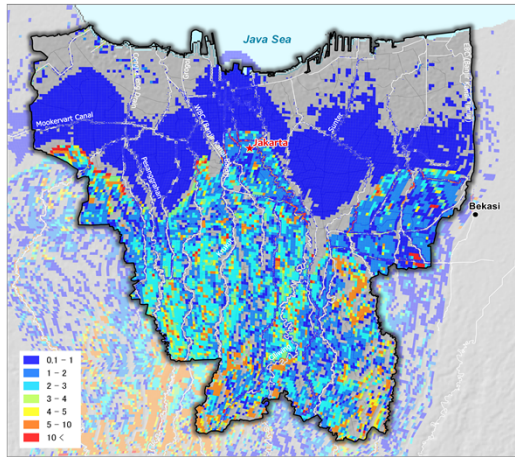
OUR EXPERIENCED SOFTWARES

- MODFLOW-2005/NWT*1 - 3D groundwater and surface waterflow coupled flow
- MODFLOW-USG*1 – unstructured 3D model
- MODFLOW6*1 – the latest version of MODFLOW core
- MT3D-USGS*1 – reactive solute transport
- GETFLOWS*2 – multi-phase fluid flow
- TOUGH2*3 – multi-phase fluid flow
- FEMWATER*4 – 3D groundwater flow
- HYDRUS*5 – groundwater flow



CASE 1: Ciliwung River Basin Model (Jakarta, Indonesia)

Land subsidence induced by over-pumping of groundwater resources was reproduced using the GETFLOWS simulator, enabling to compute fully-coupled behaviour between surface water and subsurface water. The estimated water budget indicated that the lack of water amount is approximately 40,000K m³/y and 53,000K m³/y in 2020 and 2050, respectively.

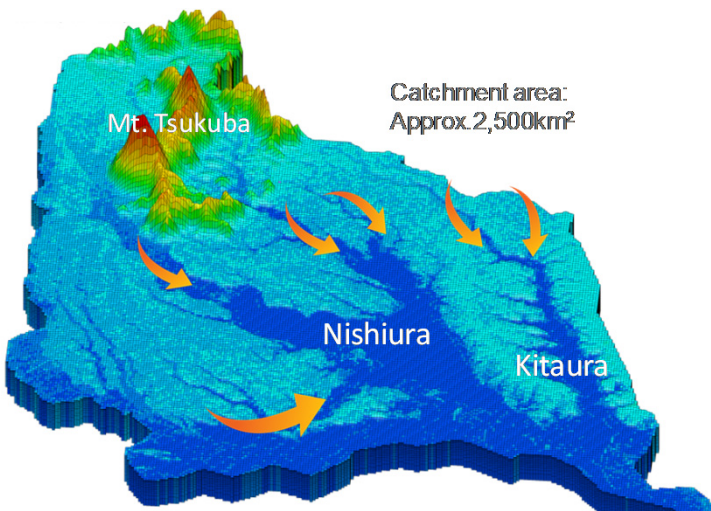


Background of GW flow estimated by the locally-refined model in DKI Jakarta (Left: Recharge rate in millimetre per day, Right: land subsidence in meter)

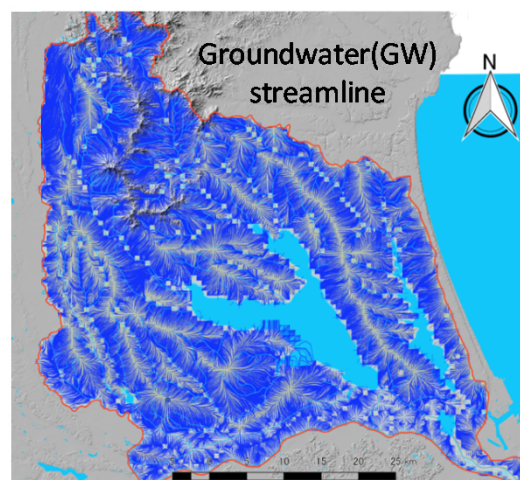
Jakarta Coastal Defense Strategy (JCDS) Study, World Delta Summit Jakarta, Nov. 22, 2011

CASE 2: Lake Kasumigaura Basin Model (Japan)

To understand the dominant pathways of the Total Nitrogen(TN) load to the lake water quality, the MT3D-USGS simulator with MODFLOW-NWT(SFR, LAK and UZF packages) were applied to the whole basin scale. The simulated results with Global Sensitivity Analysis (GSA) indicated that TN-contaminated groundwater discharge to rivers, which are inflowing to the lake, is one of the primary pathways of long-term contamination in the enclosed lake aquatic environment.

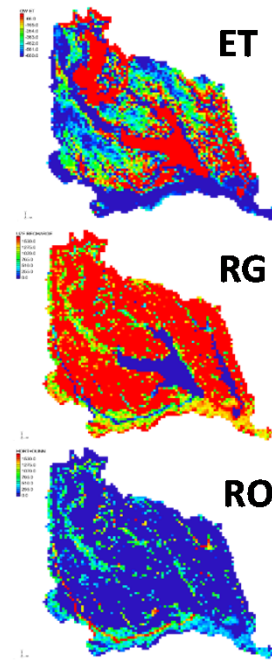


Lake Kasumigaura Basin Model



Estimated background field of GW flow

(ET : EvapoTranspiration, RG : groundwater RecharGe, RO : RunnOff)



*1©United States Geological Survey(USGS), *2©Geosphere Environmental Technology, Corp., *3©U.S. Lawrence Berkeley National Laboratory, *4©U.S. Army Corp of Engineers, *5©U.S. Salinity Laboratory in cooperation with the International Groundwater Modeling Center (IGWMC), the University of California Riverside, and PC-Progress, Inc.

