Integrated Eco-Hydrological Observation, Data, and Modeling for the Endorheic River Basin in the Pan Third Pole Region

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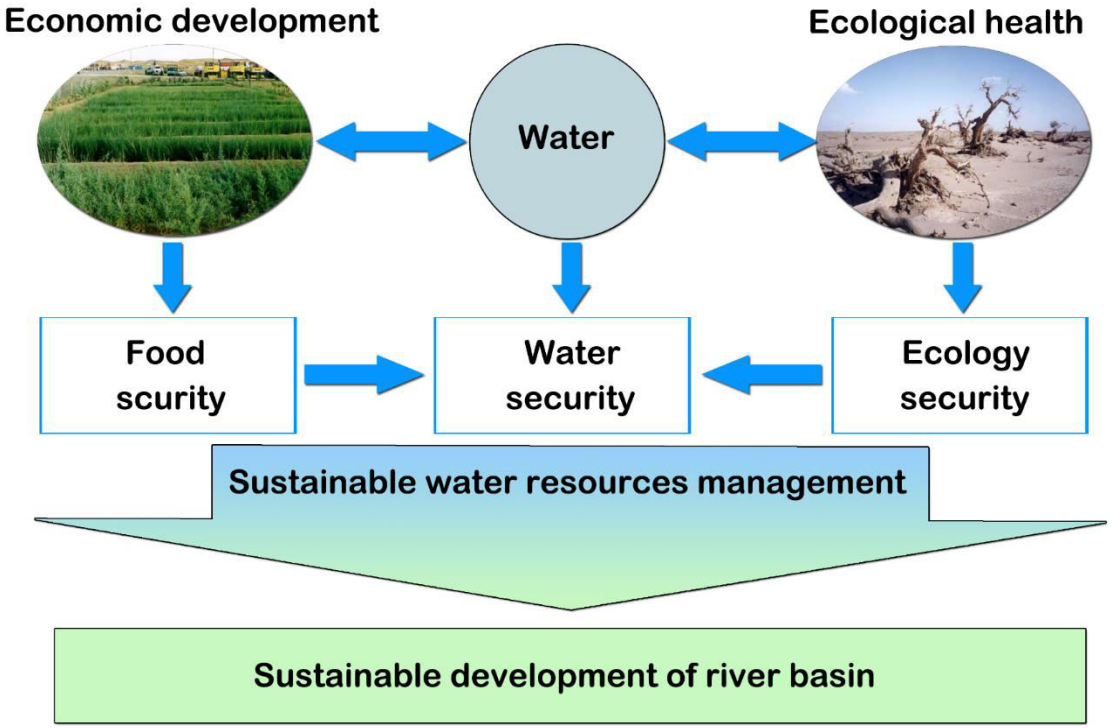
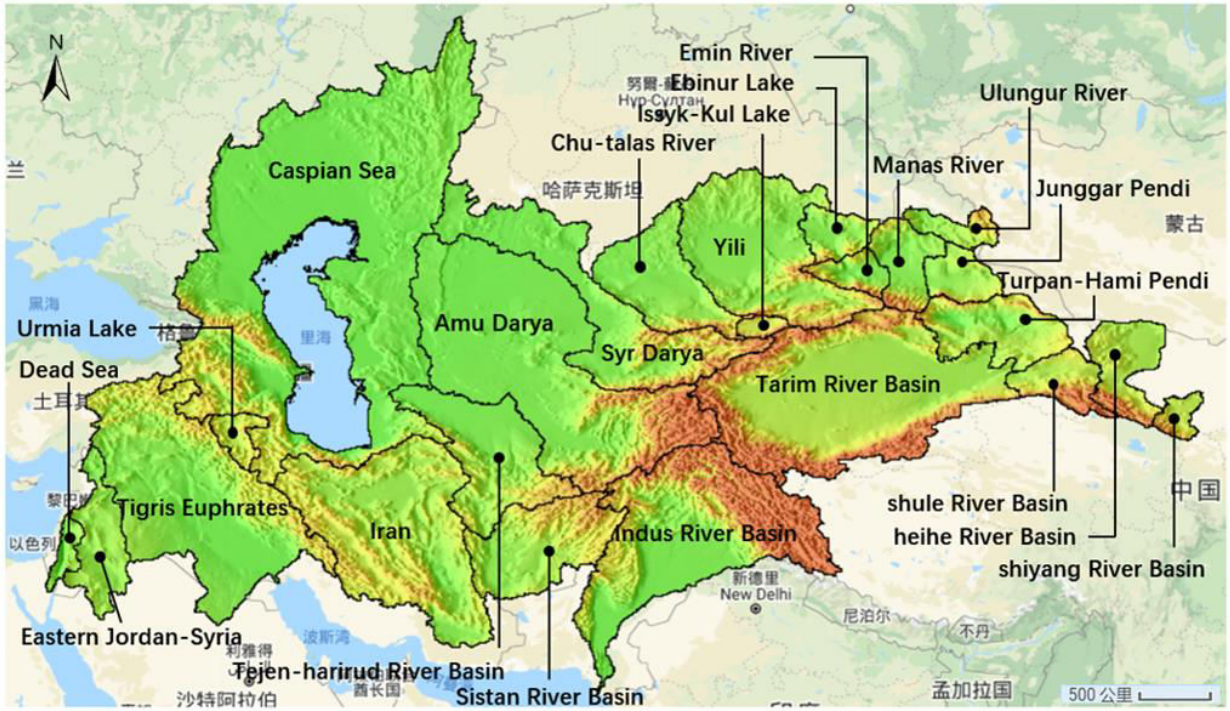
How to achieve “Our Common Future” and avoid the “Tragedy of the Commons” in the endorheic river basins of the Pan Third Pole region

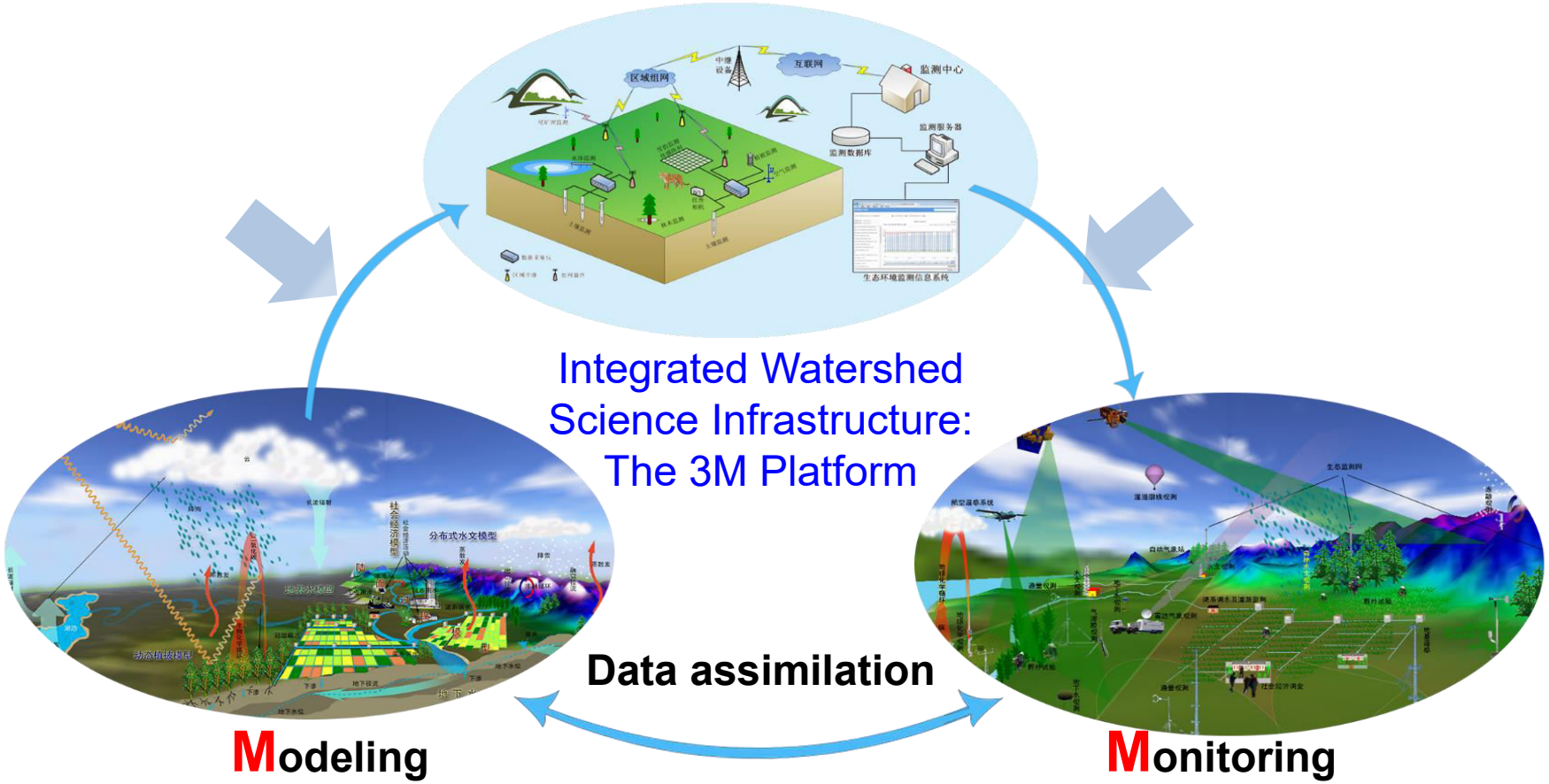




Integrated Platform for Watershed Science Research: Observations-Data-Models

Manipulating

(Data integration, data analysis, and data assimilation)



Integrated Watershed Science Infrastructure: The 3M Platform

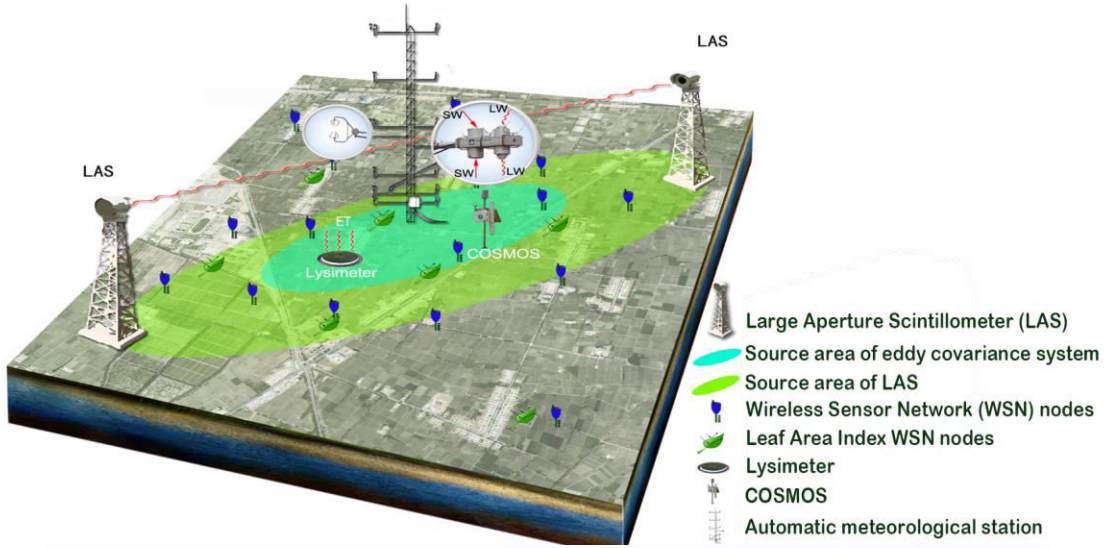
Data assimilation

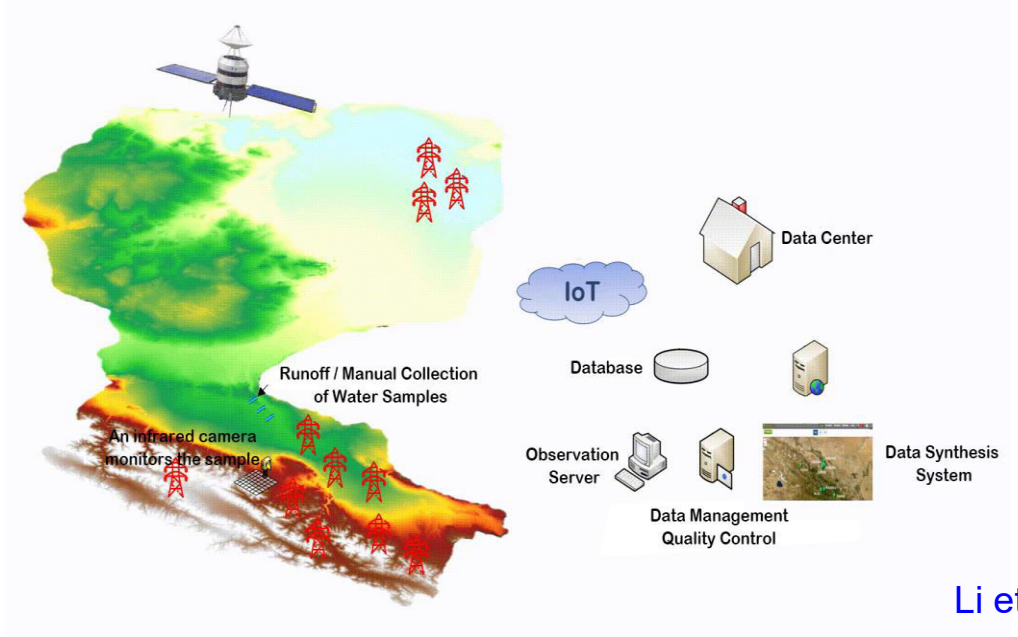
Modeling

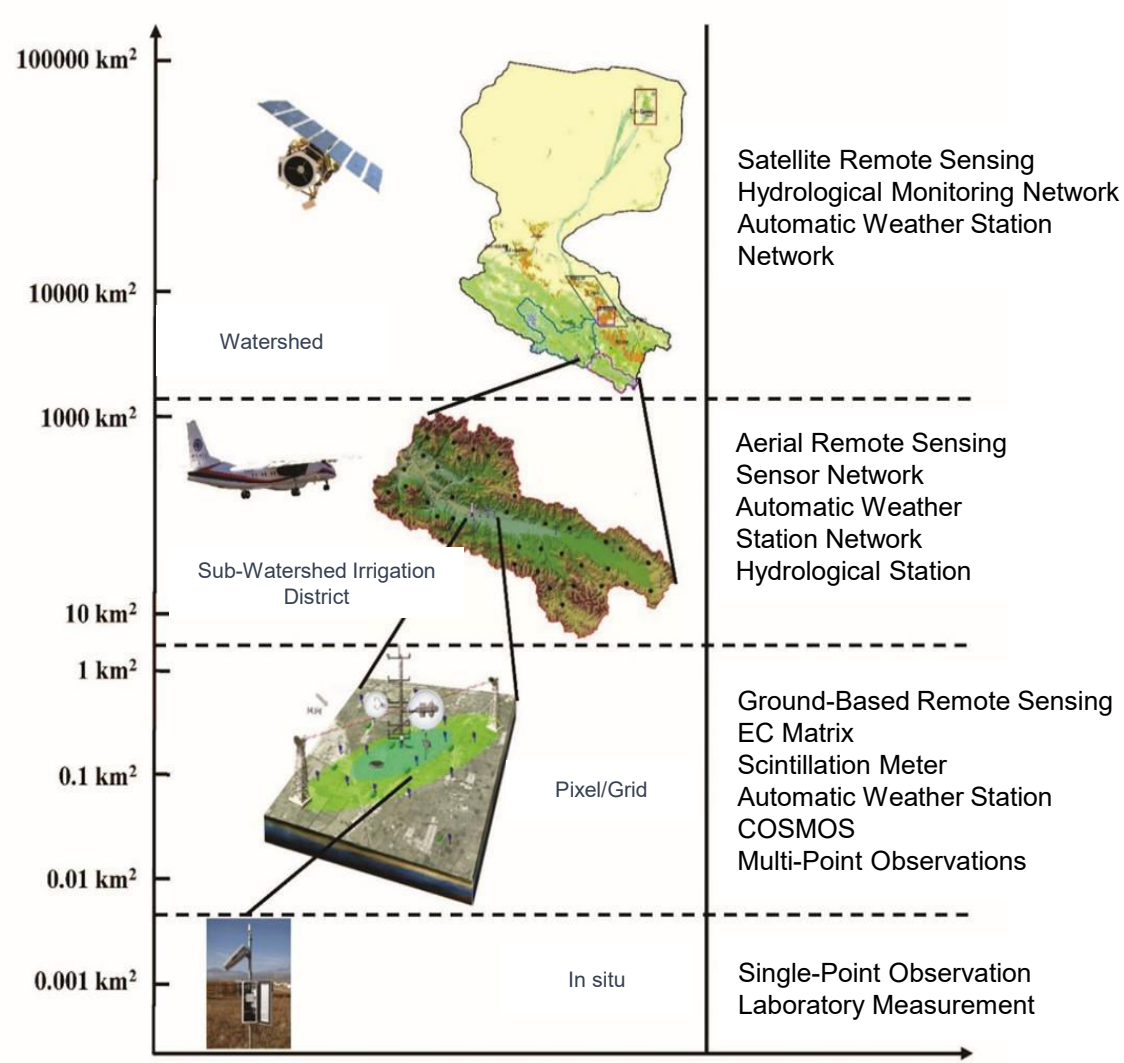
Monitoring

Cheng et al., 2014, NSR; Cheng and Li, 2015, SCES; Li et al., 2018, JGR

Innovative Multiscale Observations



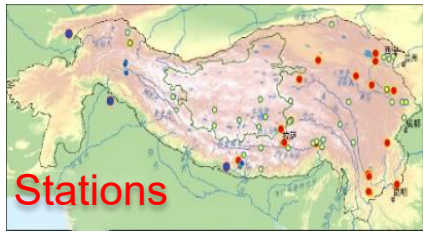


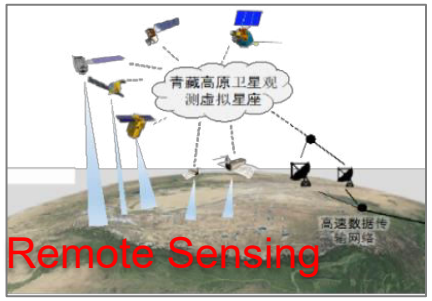


Li et al., 2013, BAMS; Zhang and Li, 2020, 2022, IEEE Internet of Things Journal

Observation and Modeling Information Hub

National Tibetan Plateau Data Center (https://data.tpdc.ac.cn)



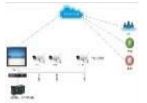


Observation


Data transmission

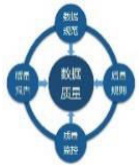

Data storage


Data assimilation


Remote monitoring

TPDC 国家青藏高原科学数据中心 National Tibetan Plateau Data Center


Machine learning

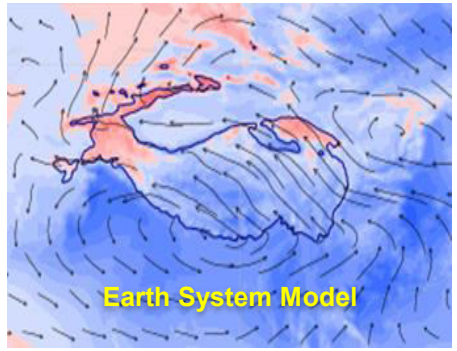


Quality control


Visualization

Artificial Intelligence

Big Data Platform

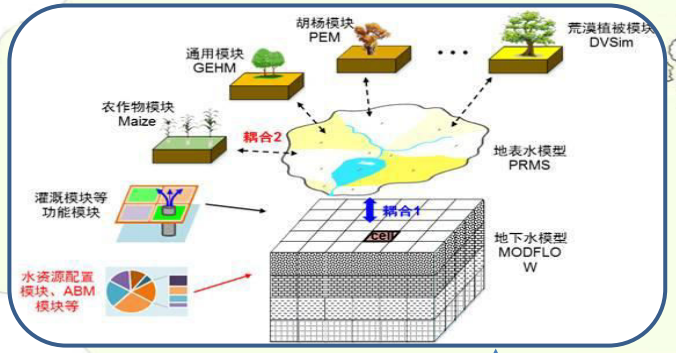


Social Services and Earth System Science

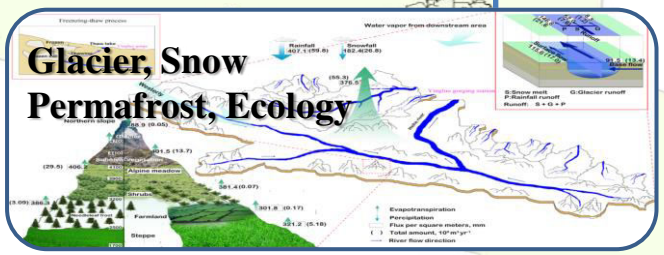
- Using the National Tibetan Plateau Data Center as the hub of the observation alliance, achieve real-time data aggregation, real-time integration, as well as a comprehensive integration with models and decision support.

An integrated water-ecosystem-economy model at river basin scale

HEIFLOW 2.0: Hydrological-Ecological integrated watershed flow model in mid- and downstream



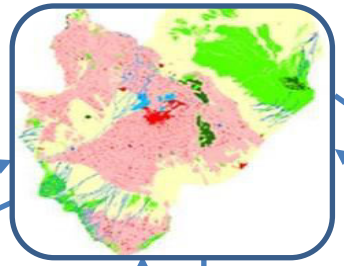
Surface flow and groundwater flow from each sub Basin.

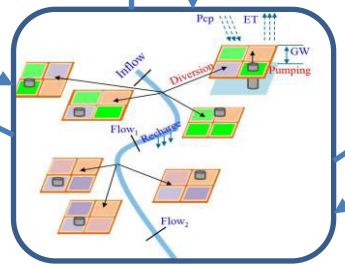


Geomorphology-based eco-hydrological model (GBEHM) in upstream

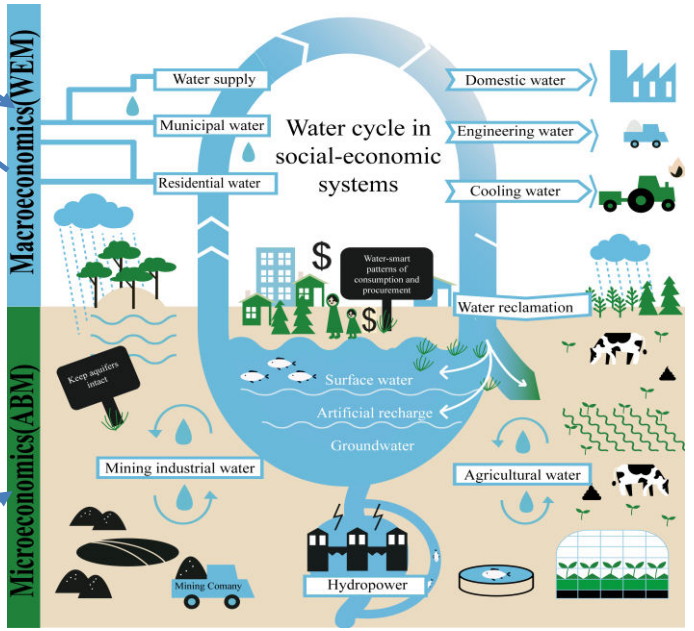
Eco-hydrological model

Land use model





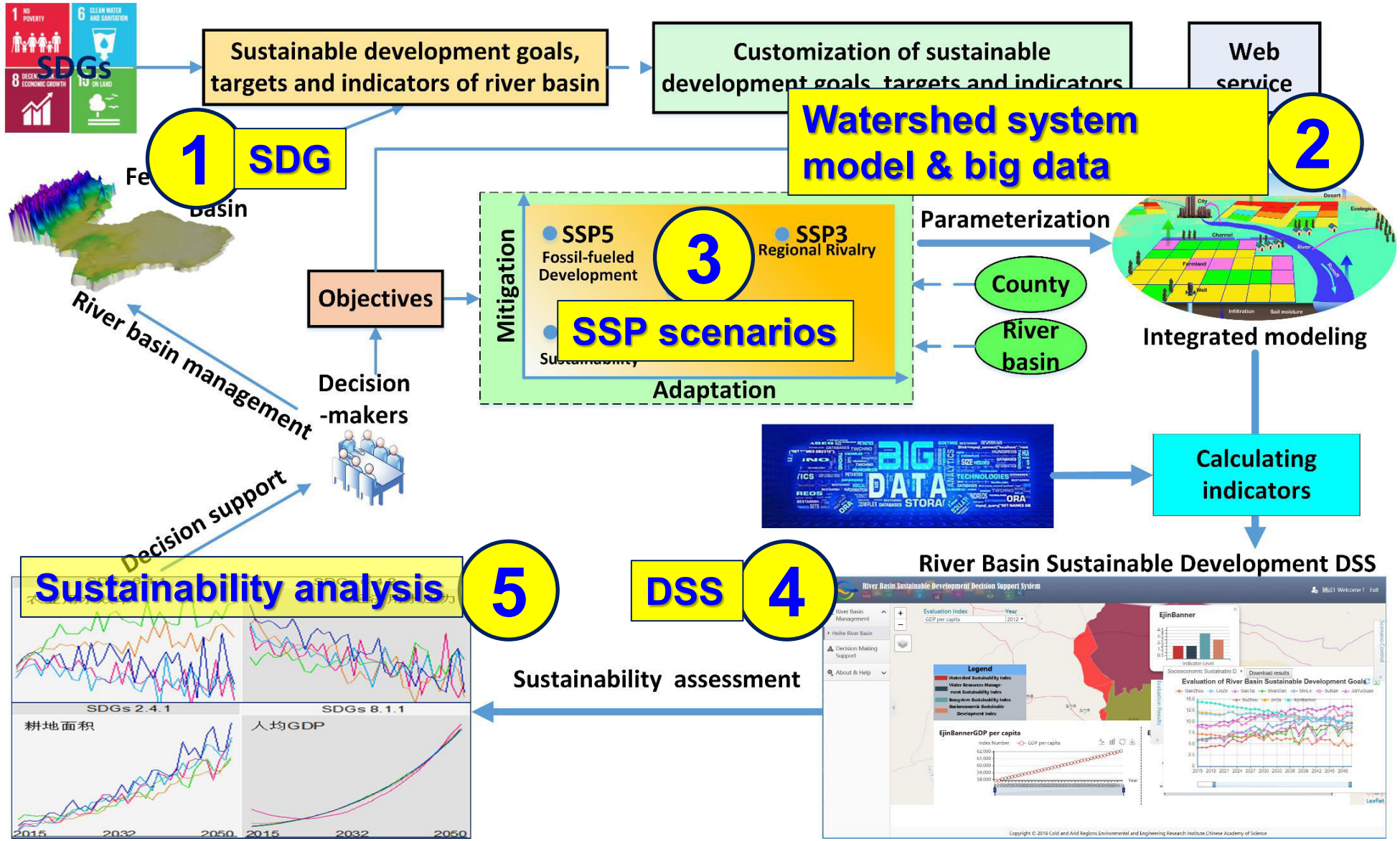
Water resources model



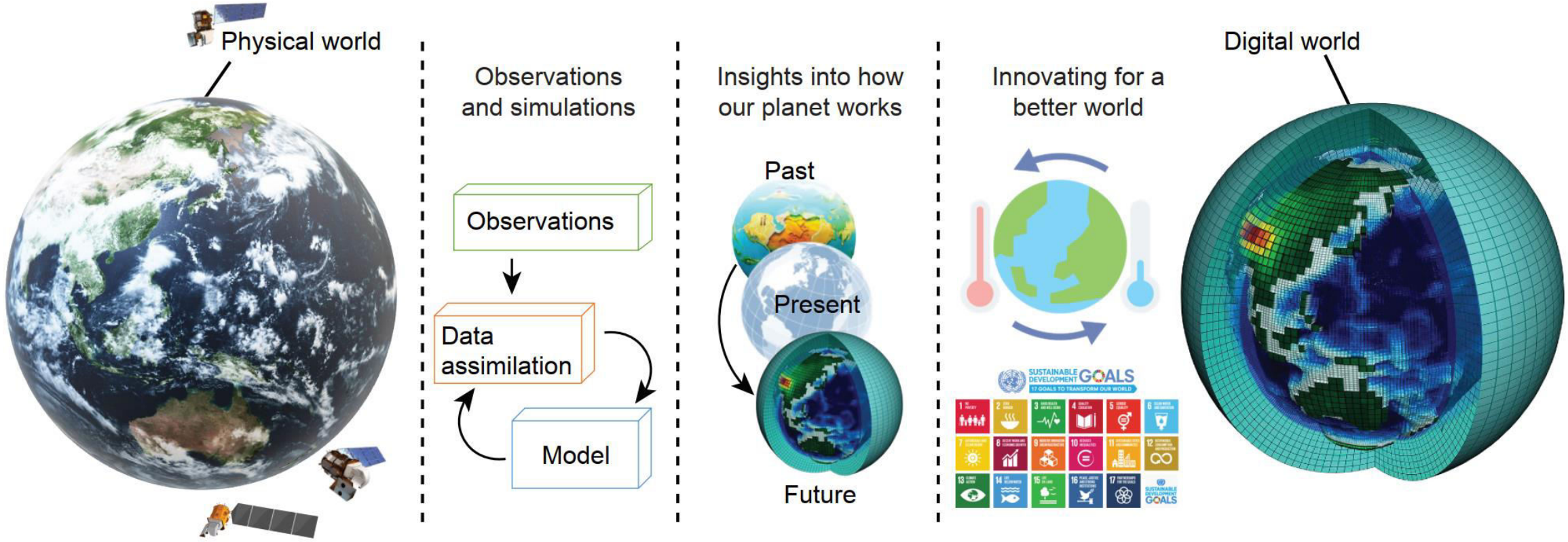
Scocioeconomic model

Li et al., 2018, JGR, Li et al., 2021, EMS; Li et al., 2022, Earth's Future

Developing a river basin sustainability decision support system by adopting UN SDG indicator system



Big data assimilation: drive the digital twin Earth



Big data assimilation can act as a **data driver** of the digital twin of Earth by fusing crossing all categories of big Earth data, including social sensing and other nonmainstream observations, into ultrahigh-resolution Earth system models.

Li X et al., 2023, *Nature Reviews Earth & Environment*