Global to coastal multiscale modeling in the Energy Exascale Earth System Model

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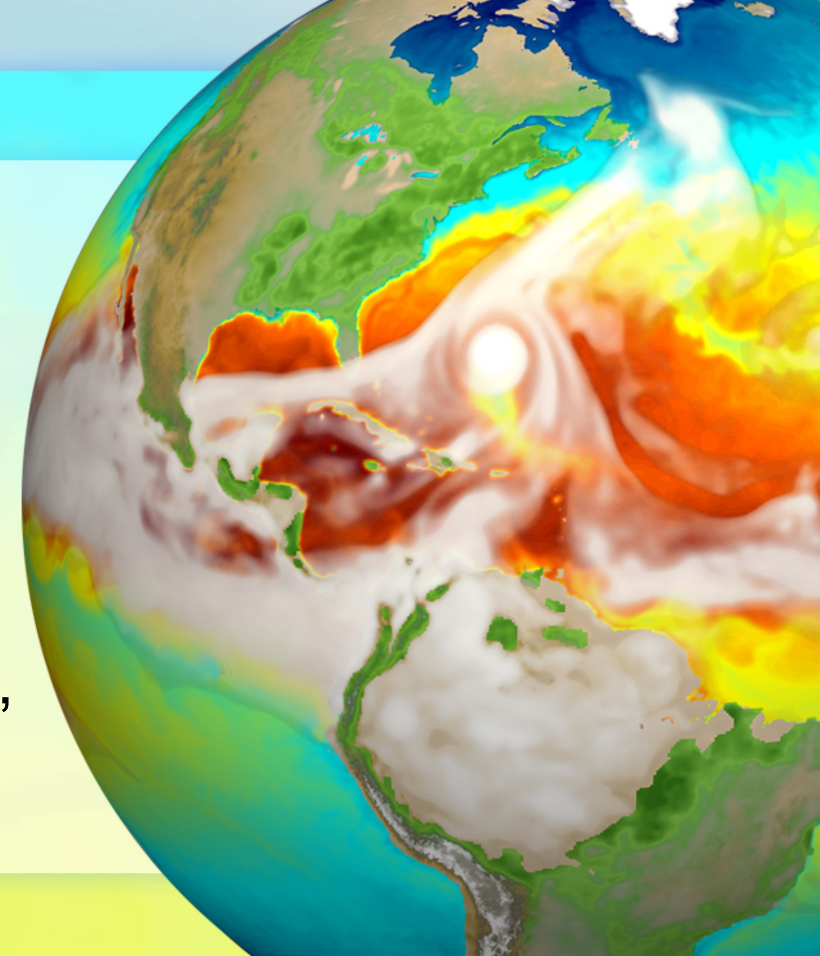
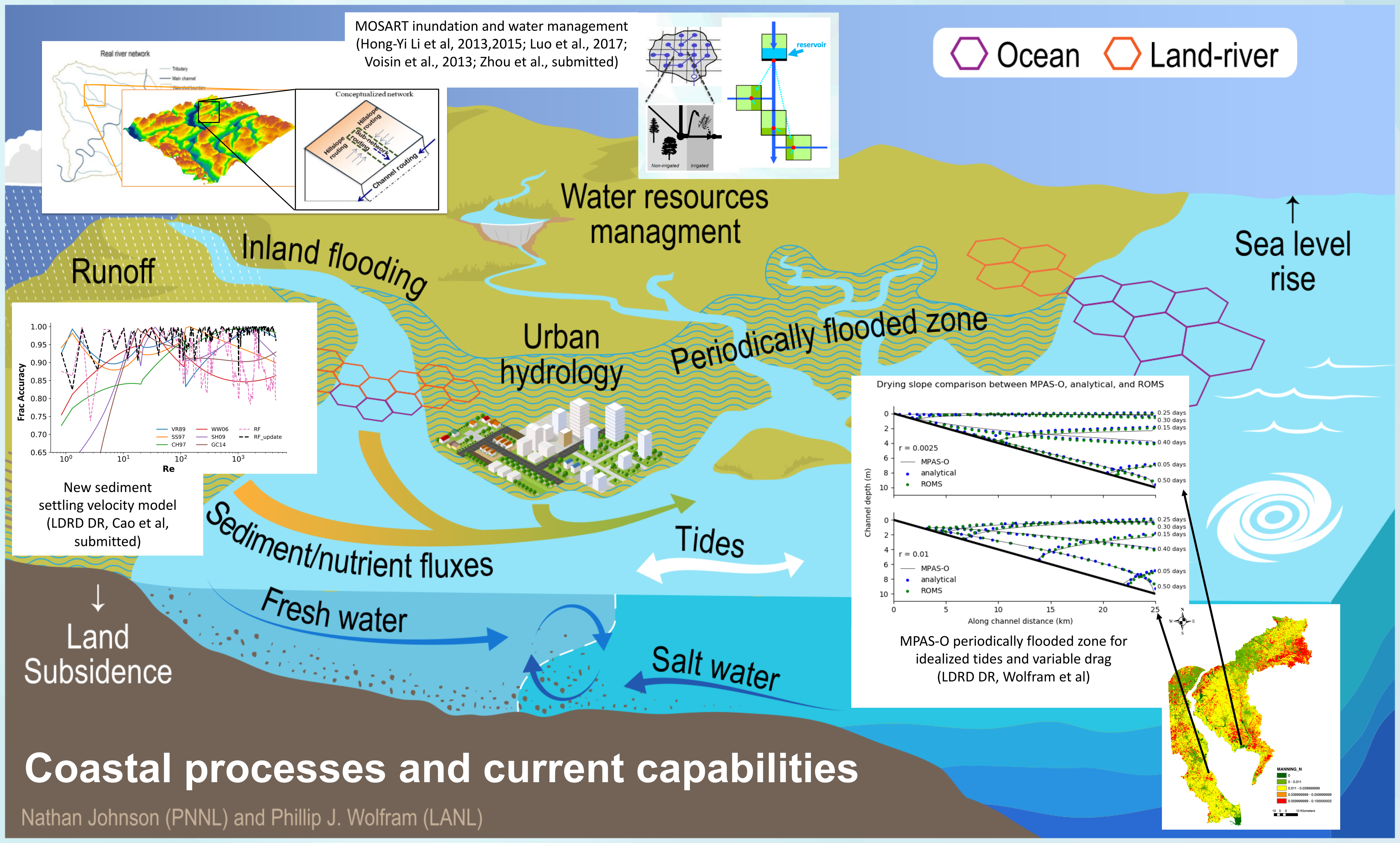
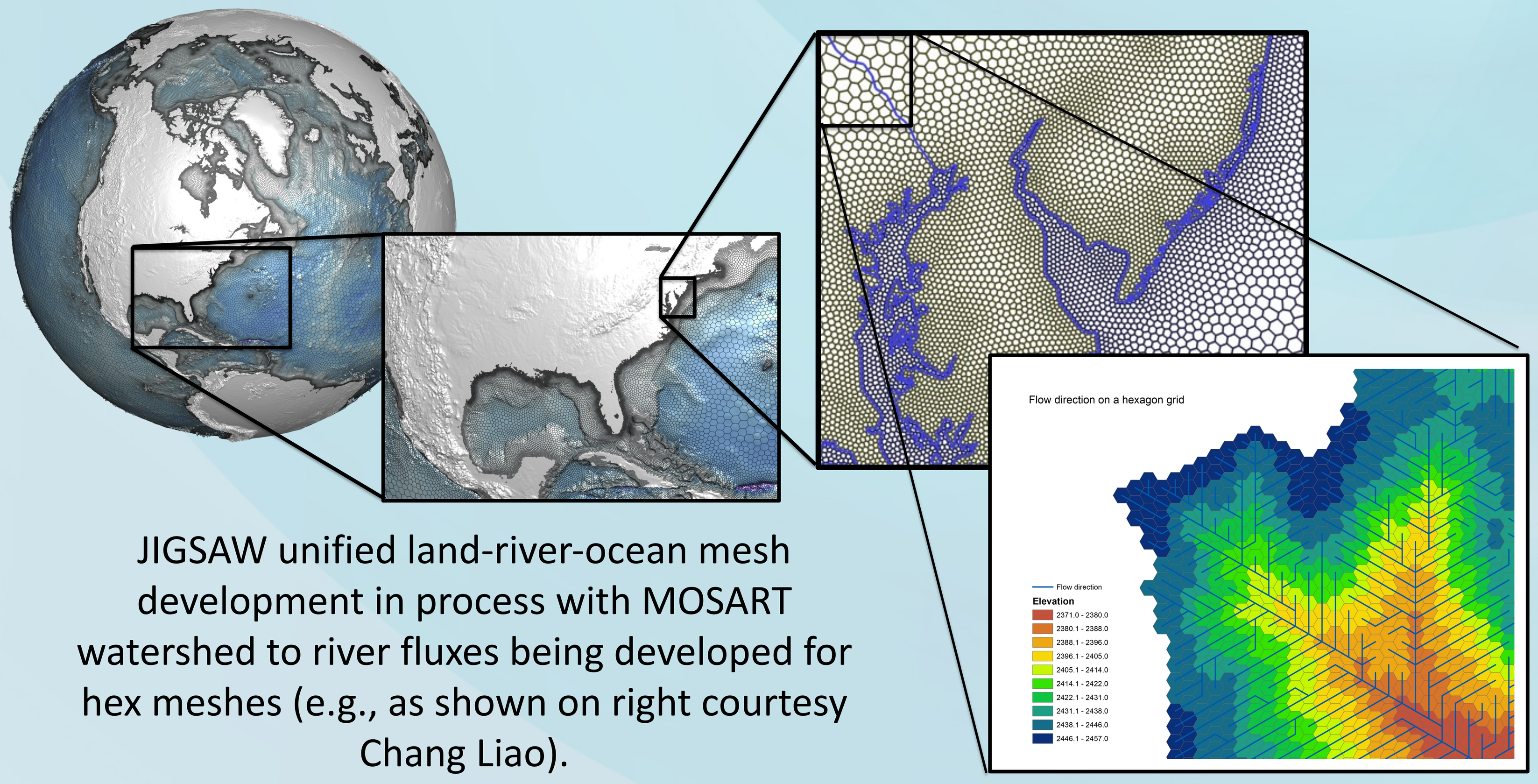
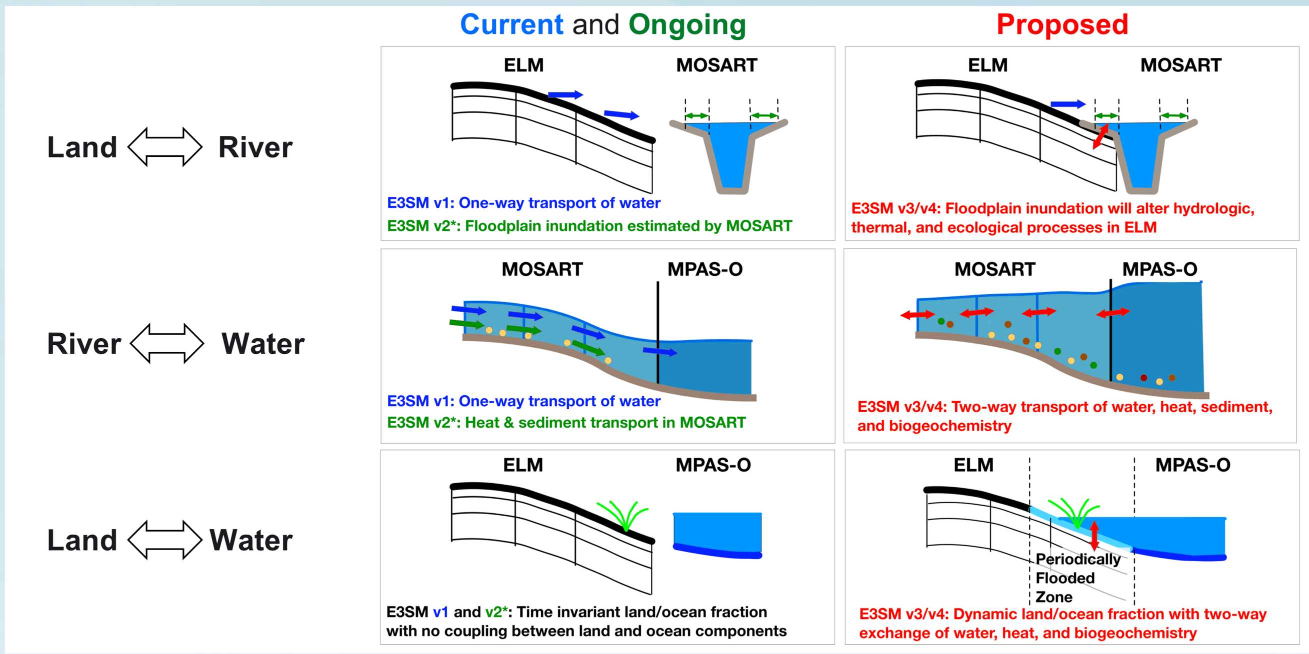




Toward a unified land-river-ocean



JIGSAW unified land-river-ocean mesh development in process with MOSART watershed to river fluxes being developed for hex meshes (e.g., as shown on right courtesy Chang Liao).



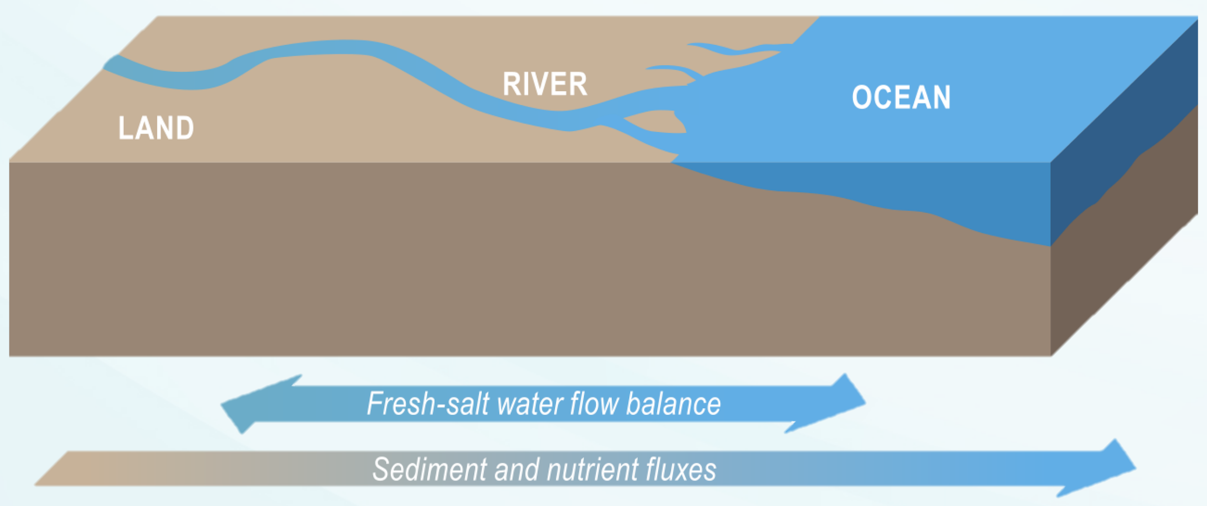
Two-way land-river-ocean coupling needed to represent flooding, land-derived fluxes to ocean, and periodically flooded zone.

Key science questions

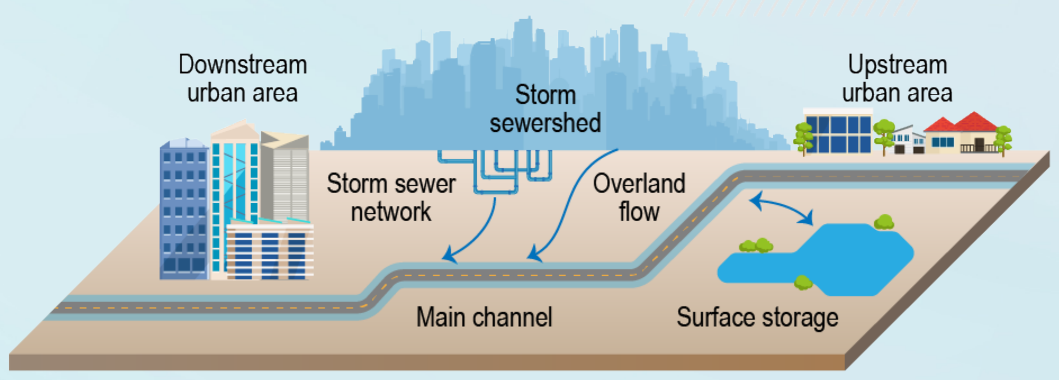
Inundation:
What is the sensitivity of coastal flooding to human and natural changes?

Coastal salinity:
What are the interactions between processes and controls of coastal salinity, a key driver of coastal biogeochemistry?

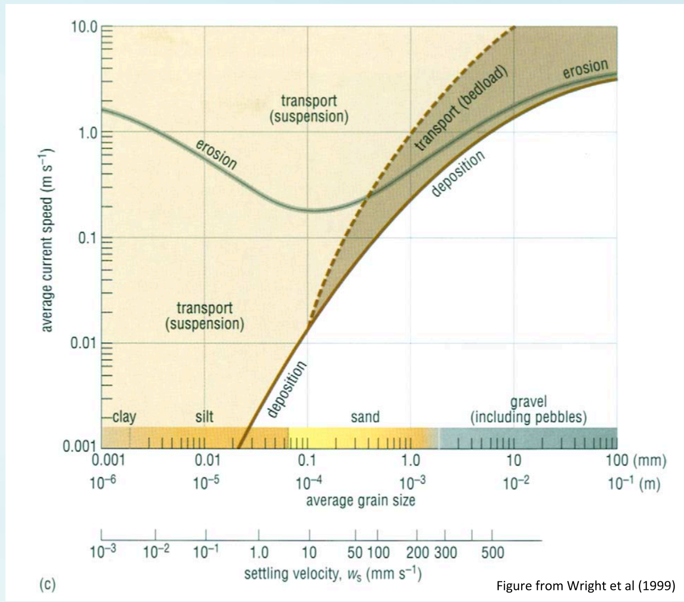
Nutrient and sediment coastal fluxes:
What controls the coastal fate and transport of nutrients and sediment in terms of timing and spatial distribution?



New process development

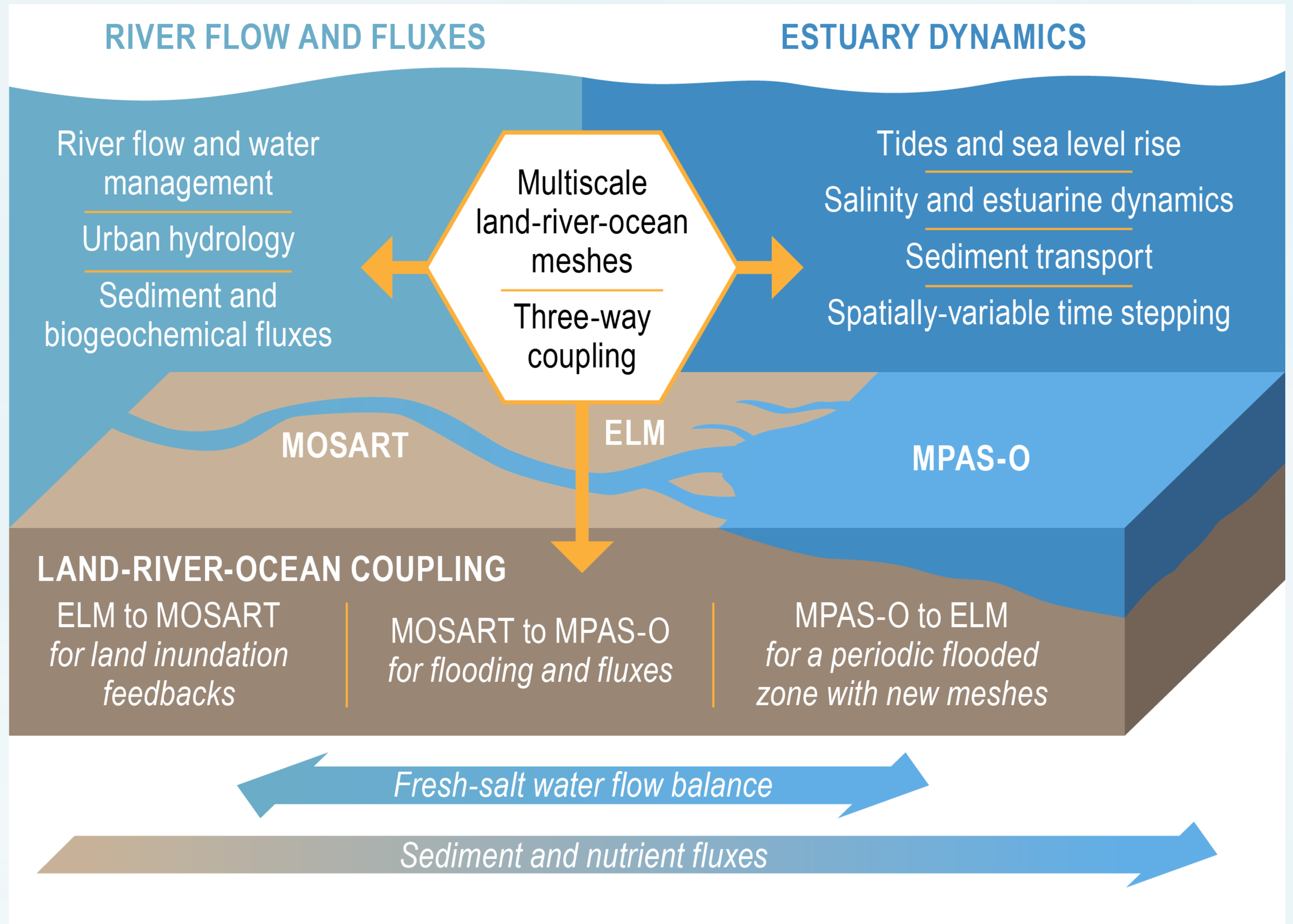


Development of new MOSART-Urban component to represent urban watersheds and flooding.



Development of sediment transport in MPAS-O modifies water turbidity depending on estuary flows and sediment characteristics.

Project research thrusts



E3SM Energy Exascale Earth System Model

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