

# YASUDA LAB.

## Measuring and Understanding River Physics During Floods for Safer River Design



Department of Human and Social Systems

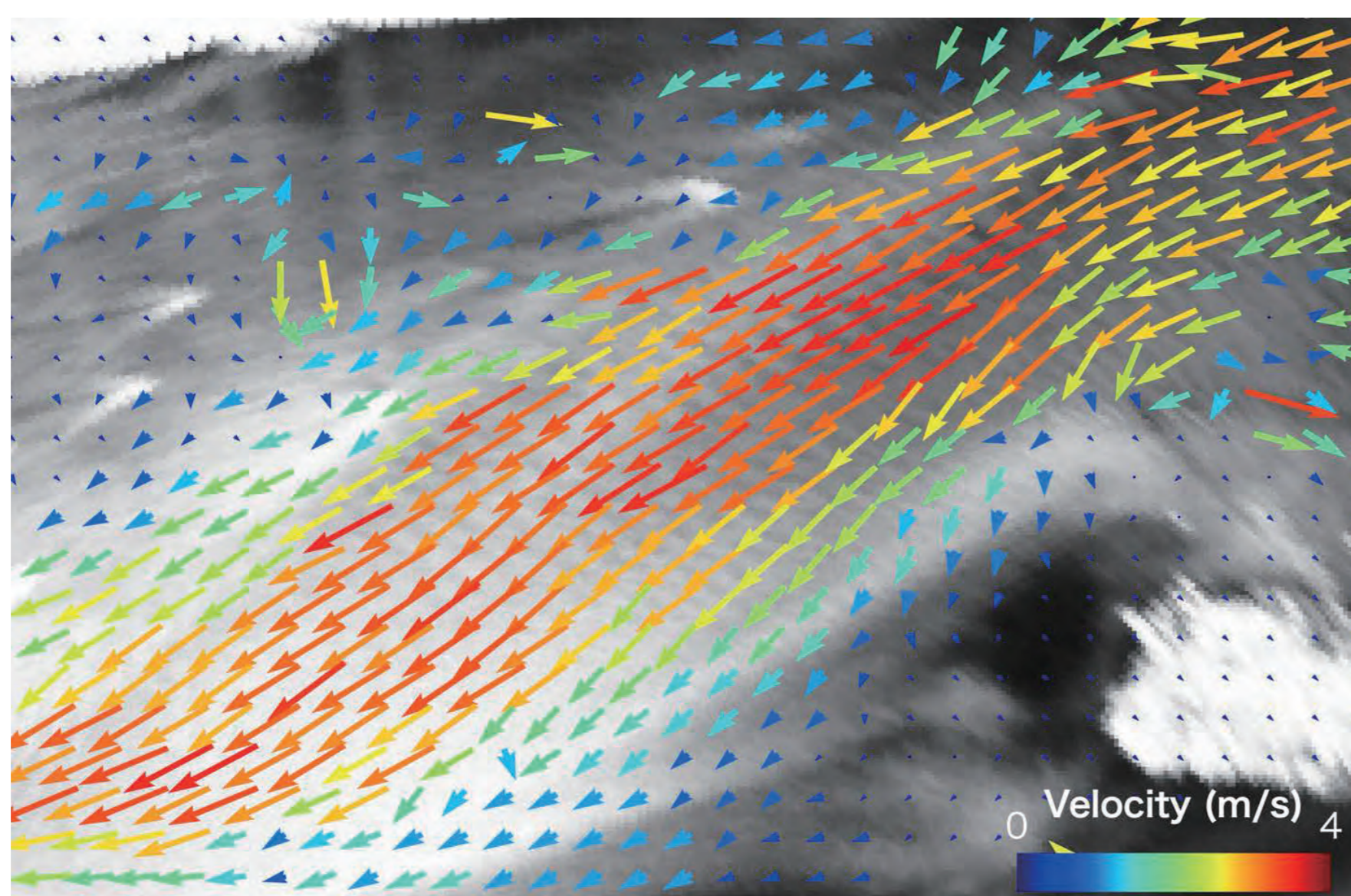
River Physics

<https://rpl.iis.u-tokyo.ac.jp/>

### Understanding Why Rivers Meander and Creating Resilient Rivers

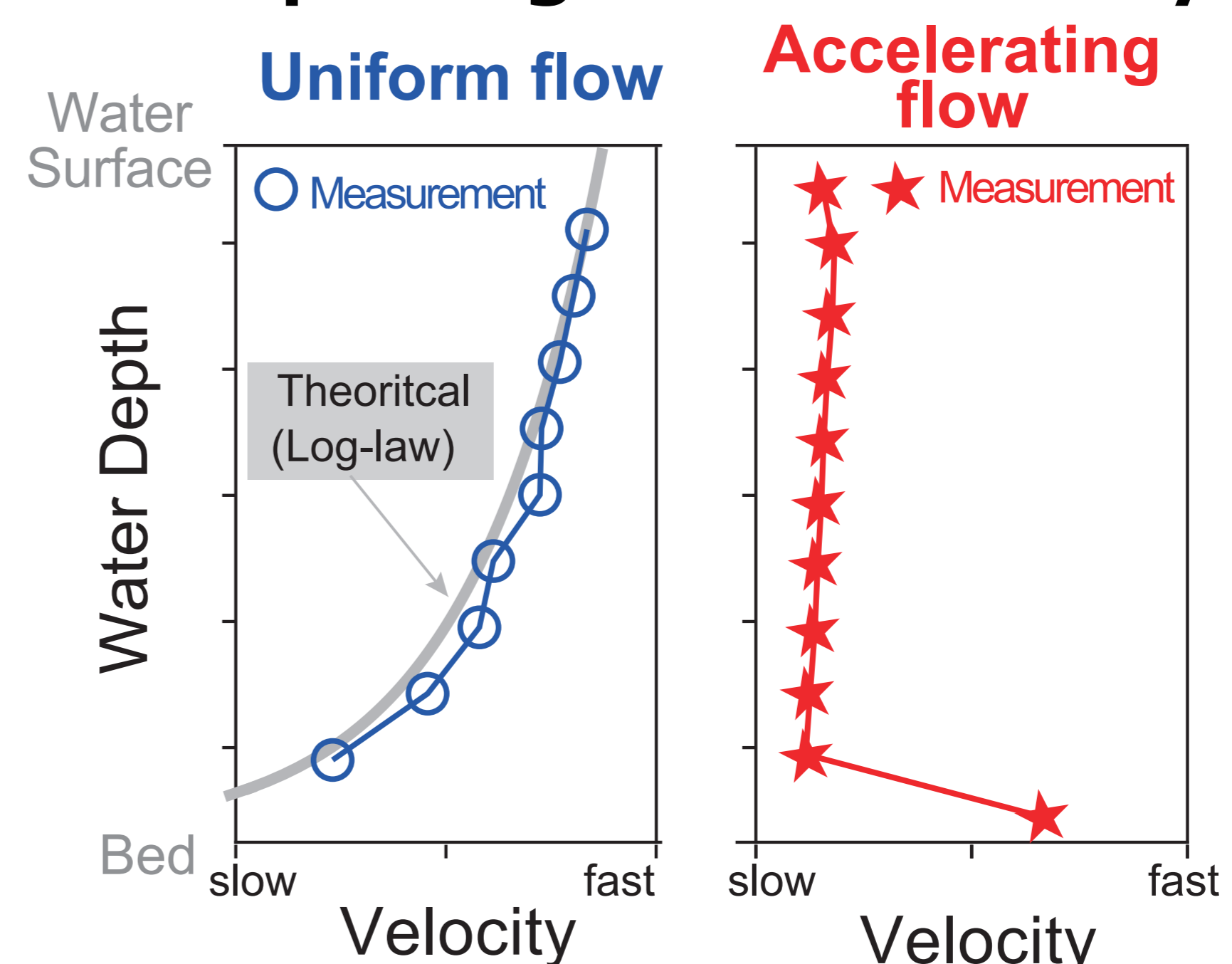
Understanding flood-time river flows and translating that knowledge into safe, environmentally conscious river design remains challenging. In our laboratory, we develop ① technologies for autonomous, detailed flow measurements over wide areas, ② methods to identify conditions that reduce flow resistance, and ③ deep-learning methods to estimate unseen riverbed topography. By integrating these approaches, we capture previously hard-to-observe flood-time phenomena, clarify their mechanisms through theory and data, and develop ④ river-channel design methods tailored to individual rivers.

#### ① Measuring River Flows During Floods



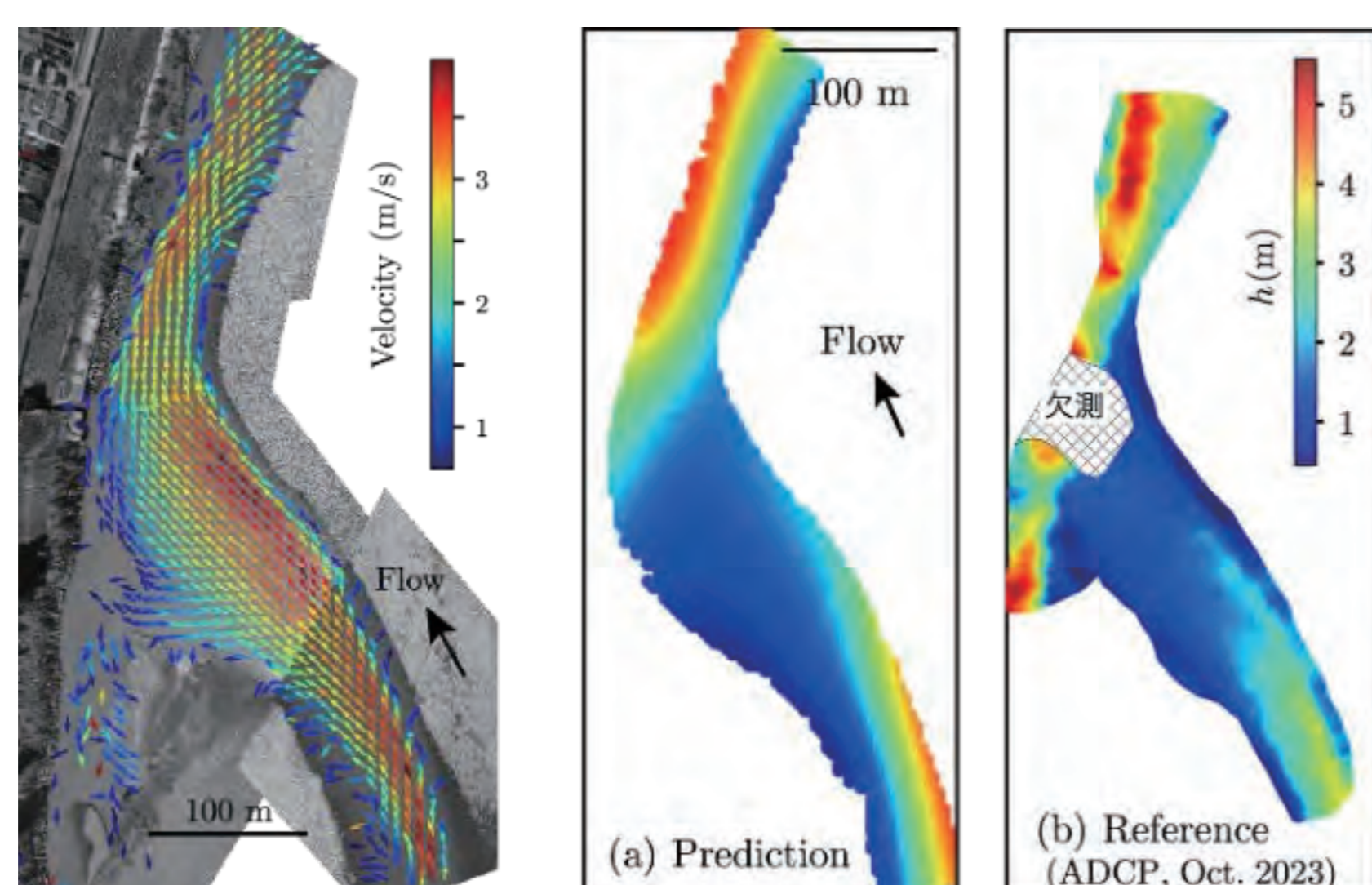
Developing wide-area, autonomous measurement methods using microwaves

#### ② Exploring New River Physics



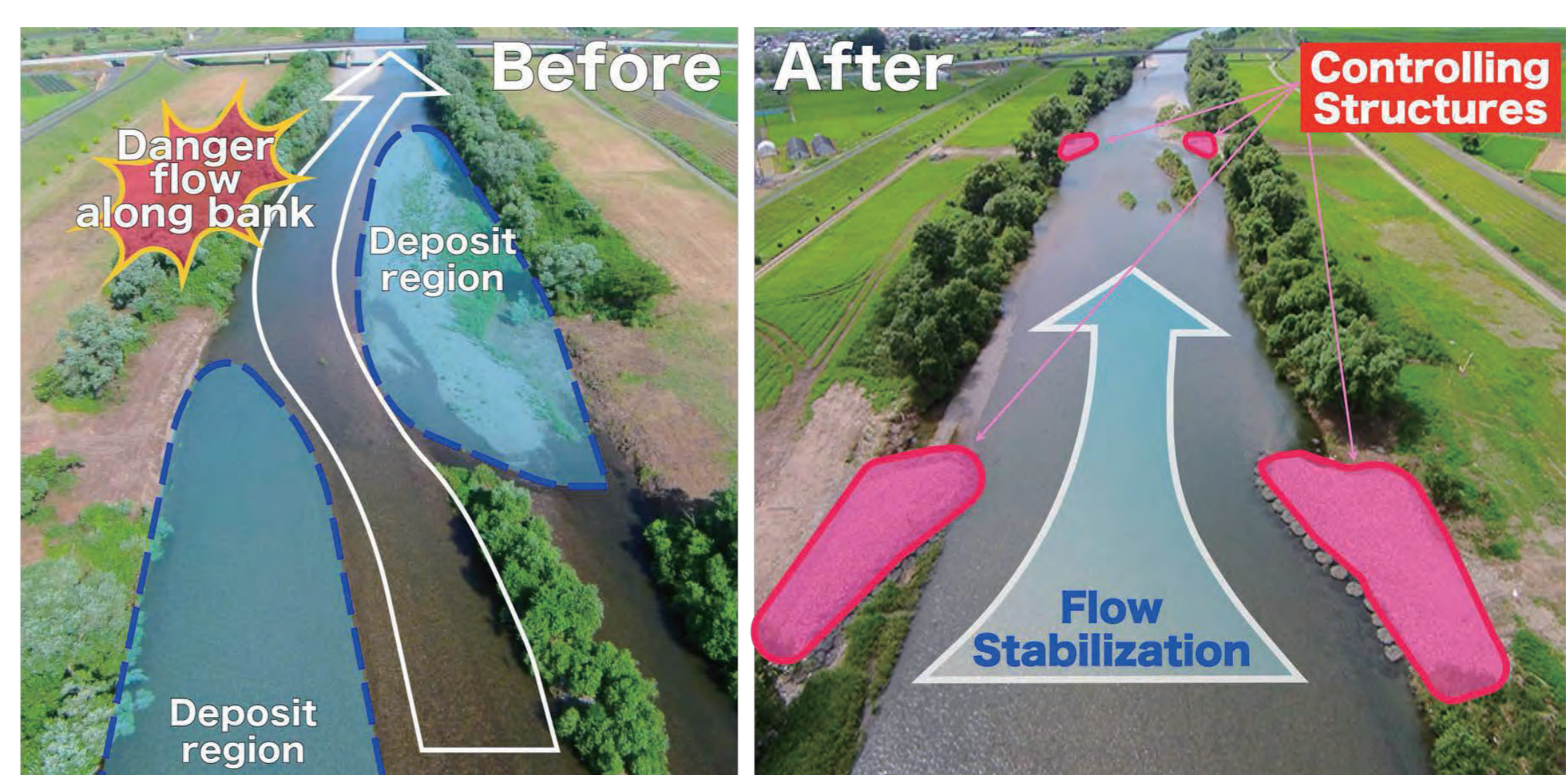
Exploring flow conditions and channel geometries that minimize friction loss

#### ③ Estimating Unseen Riverbed



Developing deep-learning methods for estimating unseen riverbed topography

#### ④ Designing River for Flood Safety and Environmental Conservation



Developing river-specific channel-design methods